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AND OTHER

FUNCTIONAL DISORDERS OF DAILY LIFE

BY

ROBSON ROOSE, M.D.

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NERVE PROSTRATION

AND OTHER FUNCTIONAL DISORDERS OF DAILY LIFE.

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AND OTHER FUNCTIONAL DISORDERS OF DAILY LIFE.

BY

ROBSON ROOSE, M.D., F.C.S.

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ETC., ETC.



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PREFACE.

In placing this work before the profession, I venture to make a few remarks by way of explanation. While fully recognizing the important services rendered to medical science by recent pathological discoveries, I feel convinced that the distinction between functional and structural disorders is one which is not yet obliterated. Some sanguine observers think that the term "functional" will soon be expunged from medical nomenclature, on the ground that every disturbance of function must be due to change of structure. Even admitting the validity, though by no means capable of demonstration, of this latter statement, it does not follow that the change should always be of such a character as to be discoverable by the aid of any instrument whatever.

I regard the condition termed "neurasthenia," or "nerve-prostration," as a typical example of functional disorders; and in addition to those complaints which fairly belong to the same category, I have included a few others in which slight and temporary changes are seen to occur in the tissues, because under suitable treatment they rapidly pass away, leaving no trace of their previous existence, beyond a certain weakness which shows itself in liability to recurrences of the same morbid state.

Functional disorders constitute a large proportion of the ailments which come before the physician in daily practice, and I hope that a clear and comprehensive account of them may prove acceptable to the profession. While not neglecting to make myself acquainted with the views of others, throughout the work my aim has been to utilize the experience acquired in the course of a somewhat extensive practice.

45, Hill Street,
Berkeley Square, W.
June, 1888.

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NERVE PROSTRATION

AND OTHER FUNCTIONAL DISORDERS OF DAILY LIFE.

INTRODUCTION.

FUNCTIONAL DISORDERS IN GENERAL.

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IN the various attempts to classify diseases, the terms "structural" or "organic" on the one hand, and "functional" on the other, have always found a place. Their general meaning is obvious; the former term being applied to diseases in which the affected part is the seat of alterations more or less easily demonstrable,

while a "functional" disease or disorder is one which depends on an unnatural or irregular action of a part, unconnected with any apparent injury to its structure. The conditions embraced by these descriptions are therefore contrasted, and the belief was once prevalent that a distinct line of demarcation existed between the two classes. No separation of this kind can, however, be made. The progress of discovery has indeed effected a great change in the relative numbers of the diseases thus classified, and many disorders formerly *believed* to be functional are now *known* to be organic. In no department of pathology has this change been more marked than in disorders of the nervous system. During the last quarter of a century many of these affections have been transferred from the "functional" to the "organic" class, and the progress thus made justifies the hope that the former class will become less and less numerous as time goes on. It is sufficient to cite a recent and striking example. Not many years ago the disorder known as infantile paralysis was described as "essential," *i.e.*, "functional." It has, however, been shown by microscopical examination that in this disease the spinal cord and its nerves are the seat of a variety of lesions, such as atrophy of the anterior

cornua and of the anterior columns, and granular disintegration and atrophy of the anterior nerve-roots.

Other instances might be adduced to show that in all probability disorders still regarded as functional are really dependent upon structural changes which our present means of observation are insufficient to enable us to detect. It may, however, be doubted whether we shall ever be able to discover the actual anatomical conditions of those innumerable forms of perverted function which in themselves constitute so many of the disorders of every-day life. When describing the condition of any organ, and still more, when attempting to define its range and modes of action, we must often be puzzled to determine the point at which health ends and disease begins. In the state of every part, and in the performance of every function, there are considerable differences within the limits of health, and changes which, if permanent, would constitute disease, may be so transient as not to merit such a designation. In the case of slight and temporary nervous disorders, it may well be imagined that there is a dynamic derangement of the nerve-centres, or some change in their intimate being or mode of action, without any recognized alteration of the nervous tissue. It may easily be supposed that, under

such circumstances, a piece of nervous mechanism should act in an abnormal manner, and that the perverted action should be accompanied by other signs of disorder. Excitability is the common property of all living parts, and is an essential condition of life. It is obviously susceptible of considerable variation in degree or extent, without going beyond or falling short of the limits of health. The other vital endowments of the tissues, *e.g.*, the assimilatory property and sensibility, are also capable of similar variations.

Under the influence of various causes, the excitability or any other property may be so increased or diminished as to cause uneasiness to the individual and to modify the performance of the functions of the part especially affected. Such a condition, if of brief duration, does not necessarily constitute disease, even if the alteration in the function appear to be considerable. This statement may be illustrated by a consideration of the effects produced by heat and cold. These agents often cause either increase or diminution of function as well as painful impressions; but if these disappear on removal of the cause, and no permanent alteration results, the condition which was temporarily set up can hardly be regarded as one of disease.

That considerable alteration in the action of a part may occur in the absence of structural change is abundantly evidenced in the case of the heart; and in certain conditions of this organ we have the most striking examples of another fact, viz., that functional disorder long-continued may end in structural lesion. While it is true that cardiac hypertrophy most often proceeds from increase of resistance to the onward flow of the blood, cases are sometimes seen in which the enlargement is a result of increased cardiac action without any augmentation of resistance. The action of the heart is accelerated by excitement of all kinds, and the resultant phenomena are due to the abnormal activity of a normal function. As Niemeyer states, "in many persons suffering from cardiac hypertrophy we are forced to assume the existence of an exalted irritability, an erythism of the nervous system, particularly of the nerves of the heart, so that trifling causes serve to excite and strengthen its action." In cases such as these the increased cardiac action, at first purely functional, sets up after long continuance a decided structural change.

It is, however, in connection with the nervous system that the large majority of functional disorders are found to exist, and to this class of affections the term

"neurosis" has been applied. It is quite true that in many fatal cases of these disorders structúral changes of various kinds have been discovered, but the relations which such changes bear to the symptoms are matters of the greatest uncertainty. The great variety in the alterations as regards their seat, character, and intensity often renders it impossible to connect them with the symptoms in any definite manner. Two well-known nervous disorders, epilepsy and chorea, furnish abundant evidence in proof of this statement. With regard to epilepsy, Dr. Brown-Séquard states that "nothing has resulted from the efforts that have been made to establish the theory that epilepsy depends on disease in any part having a special name in the nervous centres. The so-called *seat of epilepsy* has been successively placed in the cerebellum, the cornu Ammonis, the pons Varolii, the convolutions of the brain, etc. There is just as much reason to place that seat in those parts as there would be to place it in the mucous membrane of the bowels or the sole of the foot, or in any peripheric part of the nervous system where an irritation is found causing epilepsy. In cases such as these last, as well as in the preceding, an irritation starts from the place where we find an organic lesion and proceeds to nerve-cells in

the base of the brain, and in the upper part of the cord, or in one of these parts alone. Through this irritation those nerve-cells have their nutrition altered, and after a time they acquire that morbid excitability which is the essence of epilepsy. We do not think it will ever be possible to recognize what cells are altered, as it is quite likely that the change in them is more dynamical than physical, and that no more microscopic differences could be detected between two of them, one normal and the other possessing great morbid reflex power, than there are visible differences between two pieces of magnet—one poor, the other rich in magnetic power." It is of course admitted that in cases of epilepsy lesions are often found within the cranium which have set up the irritation in the nervous centres, while other changes are the consequences of the oft-repeated paroxysms. The important fact remains that no special lesion is constantly present.

The pathogeny of chorea is, if possible, still more obscure than that of epilepsy. To give a detailed account of the various theories that have been advanced, and of the morbid conditions that have been found in connection with chorea, would be beyond the scope of this chapter, and for information on these topics the

reader is referred to subsequent pages. It is here only necessary to mention some of the morbid appearances that have been described in order to show the difficulties of reconciling any of them with the clinical manifestations of the disorder. The embolic theory of chorea, first advanced in 1852 by Dr. Kirkes, has gained much acceptance of late years. Before that date, and from the early part of this century, the disorder was supposed to be closely connected with rheumatism, a view which was further supported by the frequent existence of a cardiac murmur. The presence of warty vegetations on the valves of the heart, so commonly found in fatal cases of chorea, suggested the embolic theory. Dr. Hughlings Jackson thinks that "the direct pathological state leading to instability of grey matter, producing choreal movements, is increased quantity of blood in the periphery of the capillary district embolized." The main seat of such lesions is fixed in the corpus striatum. Another authority on chorea, Dr. Dickinson, in his examination of seven fatal cases of the disorder was unable to detect any signs of embolism. On the other hand, he found that both the brain and spinal cord were affected, and that the changes were all connected with vascular disturbance. The parts of the brain most

decidedly implicated were those lying "between the base and the floor of the lateral ventricles in the track of the middle cerebral arteries;" in the cord no region was exempt. In all parts the first visible change appeared to be "injection or distension of the arteries succeeded by extrusion of their contents, to the irritation and injury of the surrounding tissue."

It is unnecessary to refer to accounts of other morbid appearances discovered in fatal cases of chorea, for with reference to all of them it may be stated that they cannot be presumed to underlie even severe choreic manifestations which come on suddenly, and quickly disappear under suitable treatment. With regard to embolism, it has been clearly pointed out by Dr. Sturges, in his excellent work on chorea, that this process, so far as our knowledge of it extends, does not produce symptoms similar to those of the disorder under consideration. The symptoms of cerebral embolism are vertigo, pain in the head, faintness or sickness, more or less complete hemiplegia, and impairment of sensation; the course of the disease is usually from bad to worse, recovery is never complete, and the symptoms characteristic of the first attack are apt to recur. When minute arteries are affected, Dr. Sturges points out that in addition "there

is often active delirium, high temperature, and a train of symptoms, rapidly fatal, which resemble most specific fever." It is almost needless to say that symptoms such as these offer the strongest possible contrast to those of chorea. Additional evidence against the embolic theory is supplied by the fact that microscopic emboli have been very rarely found in fatal cases of the disease.

The anatomical theories of chorea being thus insufficient to account for the symptoms, we may ask, with Dr. Sturges, whether the affection may not "be looked upon as a functional disorder, which is as much beyond the reach of anatomical demonstration as are the various passions and emotions which, like it, distort and coerce the body in a great variety of ways?" There is much to be said in favour of this view, and the following are the principal arguments adduced by the author referred to. The limbs are affected in chorea in the order of their use as intelligent instruments, and not as they would upon any assumption of injury or irritation of a motor centre. The untaught muscles and those that have never been employed as agents of intelligence never suffer from chorea, while the more complex the muscular employment, the greater the liability to suffer.

There is therefore in chorea the withdrawal or impairment of controlling power over certain parts of the frame; the education of the muscles concerned is arrested "by some nervous shock which renders them useless and unruly, while the operation of the will, no longer sufficing to regulate the limbs, tends rather to disfigure the movements it seeks to arrest." Chorea consists of an exaggeration of those muscular movements which are constantly taking place, and especially in children who have not as yet acquired the power of governing the actions of their muscles. The irregular movements are most marked in the face, arms, and hands, for the muscles of those parts are mainly employed as agents of intelligence, and when the controlling power of the brain or higher centres is lessened or removed, as a result of shock or otherwise, fuller play is given to the power of the lower centres. The mismovements are but an exaggeration of those which are natural to the age of the child; a mere restlessness devoid of character or rhythm. "But when chorea comes to the adult, his fixed habits of moving will impart to the disorder a distinct method; the affected limbs, that is to say, are jerked about in a manner that may be described." As additional evidence in support

of the functional hypothesis of chorea, Dr. Sturges refers to the frequent recurrence of the symptoms until adult life is reached; the starting-place of the movements, this often being situated in those muscles most directly beset or embarrassed, and to the most common immediate causes of the disorder. To these arguments may be added the fact that the movements are sometimes originated as a result of imitation, and may thus spread through a school.

Having thus endeavoured to show that functional disorder may exist in the absence of discoverable change of structure, it remains to consider the causes and general characters of functional affections, especially of those of the nervous system. The discovery of the cause in a case of this nature is a matter of the highest importance, for the obvious reason that it constitutes the only safe guide to a rational and successful treatment. When structural changes have taken place, the discovery of the cause, though always desirable, is less likely to be followed by satisfactory results.

Hereditary predisposition plays a very considerable part in the causation of functional nervous disorders, and aids greatly in perpetuating attacks which have been excited by influences of the most diverse kinds. Thus,

to take chorea again as an example, in many cases its symptoms are obviously caused by fright or mental excitement which they immediately follow. Their continuance long after the exciting cause has disappeared must be due to some peculiarity in the nervous organization, and in children thus affected with chorea hereditary predisposition to nervous disorder will generally be traceable. Sometimes the same disease is handed down ; in other instances another form of disorder appears in the descendants. Epilepsy is thus often transmitted from father to son, and this feature of the disorder is very clearly exhibited by Dr. Brown-Séquard's experiments, in which the progeny of guinea-pigs artificially rendered epileptic suffered in the same manner. In the second class we meet with examples such as this : an epileptic father begets a son who suffers from chorea, and one or more children of the latter display symptoms of idiocy. The phenomena of atavism are often witnessed in connection with nervous disorders.

Families in whom histories of this character are discoverable are said to possess a neuropathic predisposition, that is to say, their members come into the world possessing a greater or less tendency towards affections

of the nervous system. Wherein such a tendency consists is a question that cannot be answered in precise terms. We may assume an abnormal increase of irritability, a diminished power of resisting external influences, or lastly excessive elasticity of the vascular walls and a consequent tendency to hyperæmia.

In dealing with cases of nervous disorder, and especially in forming a prognosis, it is a matter of great importance to determine whether a neuropathic predisposition is present or not. To establish its presence, it is not indeed necessary to discover a history of such typical nervous disorders as are described in text-books; evidence of marked peculiarities of psychical character may be all that is forthcoming and may yet be sufficient. Another factor of considerable importance is the intensification which almost any kind of tendency to nervous disorder derives from being common to both parents, as measured by the results too often witnessed from the marriage of persons nearly related to each other and subject to the same taint. The influence of alcoholic excesses on the part of one or both parents is daily becoming more and more recognized in connection with nervous disorders in the offspring. It is also highly probable that drunkenness at the time of impregnation

is not without influence on the nervous system of the fœtus.

The hereditary constitution is, however, liable to considerable modification from external influences, both such as directly affect the physical conditions and such as act through the consciousness. In the latter category the most potent factors are those which are connected with education. The influence of the early training upon the causation of nervous disorder on the one hand, and upon its prevention on the other, can scarcely be over-estimated. One point deserves special attention. The first thing that a child ought to learn is to obey; for if this lesson be neglected the power of self-government is likely never to be acquired, and the passions will remain unchecked. The vaso-motor system of nerves is highly excitable in childhood, and the indulgence of every unchecked passion causes hyperæmia of the brain and distension of the cerebral vessels. Frequent repetition leads to paresis of the muscular coat of the vessels and more or less permanent dilatation. Results of this character are often due to continuous mental strain and to sexual excesses. In the course of time another factor comes into play. The inhibitory centres in the brain, from want of exercise, lose their

functional capacity, so that a very slight cause suffices to induce cerebral hyperæmia, which at last becomes habitual.

With reference to physical and mental causes of nervous disorders, I venture to quote what I have elsewhere written on this subject. "Every age is characterized by the presence or prevalence of special disorders of health, which have a more or less obvious causation. At the present day 'want of tone' is the characteristic feature of disorders in general, and in none is it more obvious than in those which peculiarly affect official and professional men working at high pressure. As might be expected, the signs of this want of tone, or weakness of the nervous system, vary in different persons," but the condition itself is mainly due to excessive wear and tear of body and mind. At the present day almost everything has to be done at high pressure; we strive to emulate the rapidity of the telegraph and the steam engine. "Incessant struggles to get on, trampling, crushing, elbowing, and treading on each other's heels, are manifest symptoms of the present phase of industrial progress. Even in our recreations there are evidences of a similar spirit." Thus it happens that many of our contemporaries fall out of the race with only

shattered nerves and weakened bodies as results of their ill-regulated efforts. Over-strain of the heart is another modern disorder traceable to the same causes, and this is due to mental as well as to bodily over-exertion. The influence of sexual excesses in producing and perpetuating nervous disorders, and in lowering the tone of the system, can scarcely be over-estimated.

The immoderate use of stimulants is another fertile cause of nervous disorders, and it greatly aids the operation of other factors. Alcohol, tobacco, coffee, and tea are often taken in excess in order to enable a man to continue the struggle. These agents stimulate the nervous system and enable it to get through an abnormal amount of work, but as excitement is necessarily followed by debility the total result of the repeated stimulations is simply a lessening of power. With regard to other agents, such as morphine and chloroform, which are used to deaden sensibility and to drown care, there is, unfortunately, too much reason to believe that their employment is becoming more and more common.

We are often inclined to attribute nervous disorders to the operation of cold, and sometimes for the reason that no other cause is sufficiently obvious. As a matter of fact, there is a close connection between exposure to

cold and certain nervous affections, but the statements of patients on this point should always be carefully sifted. There is no doubt that neuralgia is often provoked by exposure to draughts of air, and that the most common form of facial paralysis owns a similar causation.

In our endeavours to discover the cause of functional nervous disorder we must not forget the influence of irritation conducted from distant parts, and of pathological changes in other organs. It is only in comparatively recent times that we have learnt to recognize the fact that injuries of peripheral nerves may set up changes, probably of an inflammatory character, which extend to the central organs and cause serious lesions. In persons with a neuropathic predisposition, *e.g.*, to epilepsy, very slight injuries may suffice to produce paroxysms. In a similar manner pathological irritation of peripheral portions of the nervous system, and particularly such irritation as is liable to occur in the digestive and sexual organs, not unfrequently gives rise to, and invariably exaggerates, many nervous affections; for example, hysteria and hypochondriasis. Not only changes in distant organs, but changes in the blood itself may be the cause of nervous affections; it is only

necessary to mention the common effects of anæmia and of various exhausting diseases as examples of this kind. Neuralgic affections are often the results of exposure to malarious influences, and according to the statements of some writers are closely associated with that condition of system which predisposes to pulmonary consumption.

Among blood-poisons affecting the nervous-system, syphilis occupies a very prominent place. Its morbid products are liable to be deposited in the brain, spinal cord, and peripheral nerves; such deposit may give rise to symptoms of the most severe type, and these may not show themselves until many years have elapsed since infection. The possibility of syphilis being at the root of a given nervous disorder should always be borne in mind. Many cases with a syphilitic history are more amenable to treatment, and admit of a more favourable prognosis than others in which no such taint can be traced. The gouty diathesis is another, and a potent cause of nervous disorders; in fact, the term "nervous gout" has been applied to the entire class of irregular gouty manifestations. "Nervous affections of this character occur especially in women, and in individuals generally of a nervous temperament and

descended from gouty ancestors. In some families the male members are the victims of acute gout, while the females suffer from neuralgia in various forms, headache," &c. Facial neuralgia, hemicrania, and sciatica sometimes alternate with attacks of articular gout, and such grave nervous disorders as epilepsy and insanity are, in not a few cases, of gouty origin.*

Reflex irritation has been already alluded to as a cause of nervous disorders, and Dr. Stevens, of New York, has endeavoured to show that the neuropathic predisposition may consist simply of a local irritation due to "some peculiarity of anatomical structure or of physiological adaptations, which is inconsistent with the most regular and easy performance of the function of a part or parts." As a frequent cause of physiological disturbance, Dr. Stevens refers to the difficulties often attending the functions of accommodating and of adjusting the eyes in the act of vision, or irritations arising from the nerves involved in these processes. A single condition, viz., hypermetropia, may be selected as an example. The continued and unnatural tension of

* For further details on the connection between gout and disorders of the nervous system the reader is referred to my work on "Gout and its Relations to Diseases of the Liver and Kidneys," Chapter V.

the ciliary muscle becomes at length a source of much weariness, and the hypermetropic eye is never at rest except when closed. There is also another and a greater difficulty connected with this condition of the eyes. For perfect vision "the degree of accommodation of the eyes singly and of the convergence of the optic axes must be in harmony. For if the accommodation be fixed for one point while the convergence is for a point of greater or less proximity, there must result an absence of perfect definition, or the presence of double images. A pair of normal eyes accommodated for a given distance will converge for the same distance." In the hypermetropic eye, "continual compromising adjustments must be made and great nervous perplexity and disappointed nervous action must occur, for no sooner is one part of the adjustment corrected than the other is wrong." The sensations of pain and weariness characteristic of hypermetropia are due to the nervous perplexity even more than to the actual strain of the muscles; and Dr. Stevens cites many instances to prove that this condition of things continued through many years may constitute a *permanent* source of nervous irritation. Astigmatism and myopia are other causes of nervous perplexity and irritation, and the practical value of this theory of many

forms of nervous disorder is substantiated by the good results obtained from correcting the ocular defects by means of glasses. Dr. Stevens cites cases of neuralgia, migraine, chorea, and epilepsy in which the patients exhibited ocular defects of the kinds just described. Ordinary treatment proved of little or no avail; but in many of the cases considerable relief or even a complete cure resulted from attention to the eyes and removal of ocular disturbances. Further reference to ocular defects as a cause of nervous disorders will be found in subsequent chapters.

A few general remarks on the characters of functional nervous disorders, as distinguished from those of organic origin, will conclude this part of my subject.

Functional nervous disorders occur in all conditions of the general health, though many of them are especially associated with debility; there are great variations in the intensity of the symptoms; the attacks are wont to recur at regular or irregular intervals, during which the health is often perfectly good. In organic disorders the principal symptoms remain permanent, and variations in their intensity are slowly developed. A sudden improvement, or even a rapid cure, is not unfrequent in functional disorders; such changes

are exceedingly rare in organic diseases of the nervous system. These latter are often accompanied by certain symptoms of irritation of conductors of sensitive impressions and of trophic and secretory nerve fibres, as evinced by various abnormal sensations and alterations of nutrition and secretion of the skin and mucous membranes. In functional nervous disorders, with the exception of some forms of neuralgia, these changes are of rare occurrence. Such general features as pain, spasm, and local paralyses may be very severe, but, if organic disease can be excluded, they rarely cause much anxiety as to the ultimate issue. Save in hysterical cases, the bladder and rectum are very rarely involved in functional nervous disorders, and even in hysterical paraplegia the functions of these organs may be normally discharged. The application of electricity sometimes enables us to distinguish between functional and organic disease; the use of this agent will be described in the remarks on the diagnosis of the special disorders.

SECTION I.

FUNCTIONAL DISORDERS OF THE NERVOUS SYSTEM.

CHAPTER I.

NERVE PROSTRATION—NEURASTHENIA—NERVOUS DEBILITY.

NERVE PROSTRATION—SYNONYMS AND MEANING OF TERM—NATURE AND VARIETIES—PREVALENCE OF NERVE-PROSTRATION IN ENGLAND AND IN THE UNITED STATES—CAUSES—DR. BEARD'S VIEWS—HEREDITARY PREDISPOSITION—TRAINING AND HABITS OF YOUNG SUBJECTS — INFLUENCE OF SCHOOLWORK AND COMPETITIVE EXAMINATIONS—SYMPTOMS OF NEURASTHENIA—SYMPTOMS CONNECTED WITH THE MOTOR FACULTIES—DISORDERS OF THE SENSORY FACULTIES — SPINAL PAIN — NEURALGIA — DISORDERS OF SPECIAL SENSES—VASO-MOTOR DISTURBANCES—DISORDERS OF THE CIRCULATORY, RESPIRATORY, AND DIGESTIVE ORGANS—SYMPTOMS REFERABLE TO THE KIDNEYS AND THE ORGANS OF GENERATION—SIGNS OF MENTAL DISORDER—DISORDERS OF SLEEP—DURATION OF THE SYMPTOMS OF NEURASTHENIA—PROGNOSIS AND DIAGNOSIS—TREATMENT—RELIEF OF THE SLEEPLESSNESS — FREEDOM FROM MENTAL EXERTION — AMUSEMENTS AND EXERCISE — DIET — AVOIDANCE OF TOBACCO AND EXCESS IN STIMULANTS—TONICS AND BATHING—ELECTRICITY—THE WEIR-

MITCHELL SYSTEM — REST, ISOLATION, EXCESSIVE FEEDING, MASSAGE, AND EMPLOYMENT OF ELECTRICITY—CASES IN WHICH INDICATED—DETAILS OF TREATMENT—DURATION OF TREATMENT AND RESULTS, WITH ILLUSTRATIVE CASES—CAUTIONS AS TO ADOPTION OF TREATMENT IN CASES OF ORGANIC DISEASE AND OF MENTAL DISORDER.

NEURASTHENIA or nerve-prostration is a constitutional neurosis, affecting the whole system. The term has many other synonyms, *e.g.*, nervousness, nervous debility, nervous exhaustion, spinal irritation, &c. It denotes a condition in which weakness of the nervous apparatus is associated with undue irritability; excitement and fatigue are produced by causes which in a normal state of things would not be followed by these effects. In one series of cases the manifestations of irritability and weakness appear mainly in the action of the cerebral centres, and we refer them to functional disorder of the brain. In another series the spinal cord appears to be mainly implicated; and there is yet a third class in which the symptoms indicate disorder in both these great nervous centres. Nothing is known as to the anatomical changes, if any, which underlie the symptoms. These latter are by no means of modern origination; but under the various influences of our nineteenth century civilization they have become very

common, and in not a few cases very serious. Here, in England, and especially in our large cities, instances daily come to the knowledge of the physician; but it would seem that for frequency of occurrence and severity of type the United States at present enjoy an unenviable reputation. One of their physicians, Dr. G. M. Beard, has given us an exhaustive description, drawn from his great experience, of this complaint.

With regard to the causes of neurasthenia, it may be stated that they are those of nervous depression in general. Dr. Beard asserts that the inhabitants of the United States are the most nervous people in the world. In order to exhibit in a graphic manner the causes of American nervousness, he makes use of the following algebraical formula:—Civilization in general + American civilization (a young and rapidly growing nation with religious, municipal, and social freedom) + an exhausting climate (the extremes of heat, cold, and dryness) + a nervous diathesis (the result of the above-mentioned factors) + immoderate mental and bodily exertion, or excessive proneness to be swayed by inclinations and passions = neurasthenia or nervous exhaustion. Similar causes are common enough in England, and especially in the large cities; probably

London contains as many instances of neurasthenia as any American city. The excitement connected with politics, business, Stock Exchange speculation, and various forms of gambling is nowhere more intense, and is daily becoming more and more widely spread. "Wear and tear" are in excess, while "rest and repair" are becoming more and more difficult.

We can, therefore, sum up all that can be said as to the causes of neurasthenia by stating that they are in the main as follows:—Severe and prolonged excitement and mental strain; an insufficient amount of rest and sleep, often coupled with improper and insufficient food; excesses of all kinds, and especially indulgence in alcohol and tobacco. The patients are often of a nervous temperament, and are the subjects of hereditary predisposition to nervous disorder, and this latter is one of the most powerful factors in the production of neurasthenia. In persons with a family history of diseases of the nervous system the condition most often noticed is one of undue liability to disturbance, which may show itself in several forms. If among the ancestors of a given patient there have been instances of epilepsy, hysteria, insanity, tendency to excess in alcohol, and the like, the result may be the development of any of

these maladies, and not at all necessarily a reproduction of the original disorder. In all cases of neurasthenia inquiry should be made as to the existence of any morbid tendency.

There can be no doubt as to the influence of the training and habits of young people upon the production of neurasthenia, and especially in those cases in which there is any hereditary tendency to nervous disorder. Such a tendency often shows itself in very early life, and such children are of poor muscular development, easily excited and soon fatigued, unstable in their wishes and inclinations, apt to sleep badly, not unfrequently subject to night-terrors, and peculiarly liable to convulsions and delirium upon the supervention of any febrile disorder. They are, however, generally precocious, able to outstrip their contemporaries, and learn easily; some of them, thus early in life, show signs of moral insanity in a mild form. Lying, stealing, cruelty to other children and to animals, marked insubordination and various acts of mischief appear to have special attractions for such children, and to mark them out as peculiar. These tendencies may be subdued by proper discipline and treatment; but, if neglected, they result not only in fixed habits, but in other serious perversions

of the moral faculties. I have recently had under my care a young lady, aged 17, whose father became insane from overwork. After considerable nervous prostration, lasting for some weeks, marked symptoms of hysteria and melancholia became developed. Much improvement has taken place under the influence of kindly discipline, cheerful society, good food, and tonics.

In not a few cases school-work is potent for evil in the development of neurasthenia among the young. It is only necessary to point to the struggles engendered by the competition everywhere in vogue at the present time; to the so-called "cramming" with all its unwholesome accessories, and to the anxiety, loss of sleep, and disappointment which are so often superadded to the results of extraordinary efforts. The prevalence of headache and of disorders of vision among the young of both sexes is a measure of the evil which is growing up in our midst. I have seen several cases, in both sexes, in which neurasthenia was purely the result of over-fatigue engendered by competitive examinations at school. We are also told that in America the "social engagements" of the pupils add not a little to the pressure imposed upon them by their studies.

The prominent symptoms of neurasthenia usually show themselves in early middle-age; by that time the various causes have generally been at work long enough to produce their effect. Much, of course, depends upon the constitution, habits, and surroundings of the individual. The accession of the symptoms is liable to be hastened by the outbreak of some febrile or other disorder which, even in fairly vigorous persons, is wont to leave a condition of debility in its train.

Symptoms connected with the motor faculties. These are often the first to appear, and may exist alone for some time. The most prominent symptom is muscular debility, indicative of weakness and exhaustion of the nervous system. Such patients are apt to feel tired even on rising from their beds, and a feeling of pain in the legs is often superadded to that of languor. These sensations are aggravated by exercise; a painful feeling of fatigue is easily induced. Some patients find that even the effort involved in writing a few lines causes more or less discomfort, and that this feeling becomes so marked that perseverance is all but impossible. Others find that a painful sense of fatigue comes on after a short walk, and that aching and stiffness in the limbs, lasting perhaps for several days, are the penalty

for the slightest degree of over-exertion. The weakness of the muscles is often still more clearly demonstrated by uncertainty of their action, less frequently by tremulous movements, and, in exceptional cases, by true paralyses. Convulsive twitchings of muscles and of muscular fibres are not unfrequent in the subjects of neurasthenia; and chorea-like movements are often noticed in the muscles of the face, and especially in those about the mouth. The face is seldom at rest, and a proneness to laugh is occasionally observed. Some of these patients complain of painful cramps in the legs at night. Palpitation of the heart is very common.

A case presenting several of the features just described has recently come under my notice. I was called in by a medical friend to see a gentleman aged forty-four, in whom, after a long period of anxiety, very marked and troublesome symptoms of neurasthenia had become developed. There was considerable mental depression, and muscular action was perverted and uncertain. On starting to walk, a few steps would be correctly made; then the movements would become tremulous and the muscles of the legs would twitch so violently that the patient fell unless means of support were at hand.

These attacks were wont speedily to pass off and to be followed by convulsive twitchings of the muscles of the face.

The disorder of the sensory faculties shows itself in hyperæsthesia and various other forms of disordered sensation indicative of excessive irritability of the sensory nerves and nerve-centres. Hyperæsthetic spots can often be detected on various parts of the body, and the skin is more sensitive than usual to contact with hot and cold water and solid substances in general. I have seen several cases in whom these disorders of sensation were well marked. In the case of a lady who had had several children in quick succession there was acute suffering from tender spots or points in the intercostal and lumbar regions, and the skin of the chest and back would occasionally become so tender that contact with her silk vest proved almost unbearable. Such patients often experience actual pain, especially in the head and back and along the spine. Pain in this last-mentioned situation, both spontaneous and excited by pressure, is the predominant symptom in "spinal irritation," a form of neurasthenia, which will be described in a subsequent chapter, though for the sake of completeness its prominent features will now be mentioned. The pain is most often confined to

a certain spot; but it may be diffused over the spine. It is aggravated by pressure and by pinching up the skin, and by movements of various kinds. When the cervical region is affected the seventh spinous process is generally the most sensitive. When the pain is felt in the dorsal vertebræ there are often attacks of difficulty of breathing, which are also liable to be induced when pressure is made over the painful spot. In some cases not only pain, but nausea and faintness are caused by pressure over one or more vertebræ. The pain is sometimes felt low down in the lumbar and sacral regions, and is then much increased by walking and standing. In all cases the pain is apt to change its place, and may disappear from time to time.

Various forms of neuralgia are apt to occur in neurasthenic patients, the pain being remarkably obstinate and simulating that due to serious disorder of the nervous centres. In some of these patients the pain is of a migratory character, and in the course of time affects most of the regions of the body. Other forms of disordered sensation are not uncommon, *e.g.*, chilliness, a feeling as if cold water were running down the back, numbness of the legs and arms, tingling and itching in various parts, especially about the genital organs.

Signs of disorder of the organs of special sense are

noticed in some cases. A peculiarly dull look is associated with redness of the conjunctivæ, due to sleeplessness. The pupils are dilated, but move freely; sometimes inequality is noticed. Intolerance of light, exposure to which causes headache, weakness of vision, and muscæ volitantes and flashes of light before the eyes are not uncommon. Hearing is sometimes preternaturally acute, and subjective sensations of buzzing, ringing or pulsations in the ears are frequently experienced. The rushing sound of the blood during increased cardiac action is very troublesome and alarming to some of these patients. Giddiness is a common symptom.

Symptoms indicative of vaso-motor disorder are of constant occurrence in the subjects of neurasthenia. Many of them are annoyed by the blushes which are involuntarily provoked on the slightest occasions. On the other hand, some of these patients become pale and faint when excited or alarmed; and even when the head and face are hot, the hands and feet are apt to be cold and clammy. I am now attending a gentleman full of courage and energy and yet liable to outbreaks of cold, clammy perspiration during important interviews and even on the receipt of a letter containing unexpected intelligence. Other symptoms belonging to this class

are indicative of disordered action of the heart, and these are wont to supervene very suddenly and to excite much anxiety. The slightest mental or bodily exertion causes a great increase in the frequency of the pulse with distressing palpitation as a frequent accompaniment. The rushing of blood to the head and the throbbing of the vessels in the neck are much dreaded by the patient. Abdominal pulsation is not unfrequent, and a similar sensation is sometimes experienced over the greater part of the body. Further reference will be made to the cardiac symptoms in the chapters on neuroses of the heart.

The organs of respiration are less commonly affected, but they sometimes exhibit manifest evidences of disordered function. There are certain changes in the voice which Dr. Beard regards as characteristic; words are pronounced in a low tone and hesitating manner; any special effort to express thoughts causes dryness of the mouth and throat, and this in its turn renders speaking impossible. Nervous cough is another symptom of this character, and one which annoys and alarms the patient. It is apt to be very troublesome at night, and the loss of rest thus caused tends still further to reduce the strength. In such cases a suspicion

of consumption is often excited. In a case of this kind, occurring in a young lady, an intractable cough had been very frequent at intervals during two years. It was undoubtedly due to nervous irritation, and disappeared after a few days' treatment with quinine, bromide of potassium, and hydrobromic acid. A desire for air is sometimes noticed in these patients. When indoors they complain of a feeling as though they were being stifled, and sit before an open window in order to obtain relief.

Disorders of the digestive organs are very common in neurasthenic subjects, and occur in various forms. Indigestion is sometimes the first symptom, and its manifestations are almost endless in number. Loss of appetite, pain, and a sensation of fulness in the epigastrium, eructations, vomiting, flatulent distension, obstinate constipation, alternating with diarrhœa, in which the food passes through the bowels but slightly changed, are the most prominent symptoms referable to the stomach and bowels. Nervous dyspepsia is characterized by its sudden appearance and rapid subsidence; by its alternating with other nervous symptoms, and by the relief afforded by sedatives and by articles of food which would increase the symptoms of gastric catarrh.

It is a remarkable fact that in some cases of this kind the appearance of the patients is that of good health, and their nutrition seems to be unaffected. In another class the evidences of ill-health are unmistakable, in spite of a fair appetite and a good supply of nourishing food.

The urinary secretion varies, but it generally presents some abnormality. Sometimes it is scanty, high-coloured, and deposits urates; in other cases it is pale and deposits oxalate of lime or the amorphous phosphates; in others, again, it is abundant and contains traces of sugar.

Symptoms referable to the organs of generation are seldom absent. In men, these take the form of nocturnal emissions and impotence, while women are apt to suffer from various disorders of menstruation.

In order to complete this sketch of the symptoms of neurasthenia some account must be given of those evidences of psychical disorder which are rarely absent. In one class of cases these symptoms appear to predominate, inasmuch as the patients constantly dwell upon them in conversation and show by their actions and manners the influences by which they are swayed. Such symptoms as apathy, hopelessness, morbid excita-

bility and irritability, groundless anxiety and fear, indifference and want of resolution are, if not characteristic of neurasthenia, at least seldom dissociated from it. The various kinds of morbid dread are among the most striking of the mental phenomena. Some patients fear to be alone, others have a horror of society and of certain localities; others again are in constant fear of being attacked by disease, while in another class there is a constant but undefined dread of impending danger or misery. Some of these patients are averse to remain in rooms with windows and doors closed; others are in perpetual fear of being injured by lightning or some convulsion of nature. Hallucinations and illusions are rare in these cases, and some of the patients are fully aware of the groundless nature of their fears. Intense excitement and anxiety about the merest trifles are other common symptoms indicative of perverted action of the sensorium.

In almost every form of nervous disorder, disturbed sleep, often amounting to utter sleeplessness, is very generally observed, and it tends, perhaps, more than anything else to exaggerate all the other symptoms. In some cases the patients remain awake for hours after going to bed; in others, they fall asleep easily, but wake

in an hour or so and continue in that condition till it is time to get up. Even the sleep that is obtained is apt to be troubled by dreams and nightmare, and the patients rise from their beds more languid and tired than when they sought them. In some patients the sleep is abnormally profound, but the patients are so little refreshed by it that they remain drowsy and lethargic during the day, unable to attend to business, and falling fast asleep after making the slightest effort. The memory is apt to be affected in many cases of neurasthenia, and the patients are much worried at finding that after reading a short paragraph in a book or newspaper they fail to remember its contents. In some cases arithmetical calculations, previously quite easy, appear impossible; any attempt of this character is followed by confusion, headache, swimming before the eyes, and other troubles.

It need hardly be said that all the above-mentioned symptoms of neurasthenia are never met with in a single patient; the manner in which they are grouped and distributed varies to an almost unlimited extent.

The symptoms of neurasthenia may last for an indefinite time, and in slight cases are apt to subside and recur at irregular intervals. In more severe cases the condition, in the absence of proper care and treat-

ment, gradually becomes worse, and is a source of much anxiety to the patient and his friends. Here, again, improvements and relapses are wont to alternate, and it is difficult to forecast the duration of the symptoms. The condition is not serious so far as danger to life is concerned, but it may be the starting-point of grave nervous disease. When an obvious cause is discoverable and capable of removal, a hopeful prognosis may be given. It is, of course, necessary to take into consideration the state of the patient, the surrounding circumstances, and the duration of the symptoms.

Diagnosis. This is sometimes easy, especially when a causal connection can be established between the symptoms and their antecedents, but in other cases it can be made only *per viam exclusionis*, and by carefully watching the patient and noticing the effect of treatment. In some severe cerebral diseases, *e.g.*, tumours, the symptoms closely resemble those of neurasthenia. The recognition of the temperament of the patient will sometimes aid the diagnosis. The duration of the symptoms and the occurrence of relapses and improvements are other points of importance. In some respects the symptoms resemble those of hysteria, but there are decided differences between the two conditions. The

sudden appearance of the phenomena, their rapid subsidence, and the manner in which they are excited are sufficient to distinguish hysteria from neurasthenia. The former is liable to assume the more serious aspect, inasmuch as paralyses and spasmodic attacks are prone to occur; but severe cases of neurasthenia would appear to be connected with graver states of disorder of the nervous system.

Treatment. Provided that no organic disease is discoverable after careful examination (and I am treating only of such cases), the physician should do his utmost to comfort and reassure his patient at the same time that he impresses upon him the necessity of obeying all injunctions. The patient's fears must be allayed, though it will be often difficult to do this, especially in hypochondriacal cases. The physician must frequently see his patient and assure himself that his prescriptions are attended to in all respects. In cases in which sleeplessness is a marked symptom, and is evidently causing great distress, it is necessary to deal with it at once before attending to the general condition. Much caution must, however, be used in the employment of hypnotics. We may choose between chloral and the bromides, and a combination of these remedies is often

better than either taken singly. Twenty grains of bromide of ammonium with fifteen of chloral may be given every night for three or four nights. If the effect be satisfactory the medicines should be discontinued, or given for a few nights in half doses. The production of sleep greatly assists the action of other remedies.

Freedom from mental exertion is the next point of importance, though it is often necessary to find some employment for the mind. The brain will not suddenly take rest; trains of action set going in the cerebrum refuse to come to a full stop, and the best thing to be done is to divert the cerebral activity into other channels. How to effect this object, depends, of course, upon the individuality of the patient; but some real *amusement* (in the true sense of the word) should be carefully sought for. The patient's tastes must be consulted, and they will often guide the physician in selecting the best forms of recreation. The same remark holds good of bodily exercise. Patients even of weak muscular power are apt to think that violent exercise will cure their nervousness. This idea is, of course, a mistaken one, and should not be allowed to be acted upon. The exercise should be strictly proportioned to the strength and should never be such as to cause fatigue. Short walks,

carriage exercise, riding on horseback, boating, etc., will find their appropriate uses. A change to fresh air, either in the country or by the seaside, or in mountainous districts, will always be beneficial, and it is hardly necessary to add that all causes of debility should be carefully avoided. In phlegmatic subjects, with fair muscular development, exercise is often an important part of the treatment. Besides the forms above recommended, some kinds of easy gymnastics may be had recourse to; Dr. Zander's instruments are very suitable for such cases.

The diet also demands very careful attention. The majority of the patients are thin and anæmic, with poor appetites and weak power of digestion. The condition of the stomach must be improved by tonics of various kinds, of which nux vomica is generally the most useful. The tincture should be given in small doses (ɱv-x) about half-an-hour before each meal. The food should be of an easily digestible nature, and it is well to provide these patients with a diet-sheet telling them what they *may* eat and what they *must* abstain from. Mutton and beef, white fish, game, chicken and eggs, butter, milk, good bread, and green vegetables well cooked, will constitute the principal articles of diet. Late dinners

should be avoided; the principal meal should be taken at 2 p.m., and a light supper at seven o'clock. Where loss of flesh has been a marked symptom, increase of weight is one of the best indications of recovery. Tobacco-smoking should be forbidden, especially in cases in which the symptoms are attributable to excess in this respect. Extreme caution is required in recommending alcoholic drinks; if allowed, they should never be taken except with food. A glass or two of sound sherry, claret, or Burgundy will be serviceable in most cases, and particularly when the digestion is feeble and the appetite poor. A little brandy or whisky, well diluted, may also be given at bedtime; it often aids in procuring sleep.

With regard to drugs, tonics, of course, are generally indicated; nux vomica has been already alluded to; quinine and coca wine or pastils are likely to be useful, and various preparations of iron are indicated in anæmic cases. Cod-liver oil is one of the best roborants that we possess; if tolerated by the stomach it will almost certainly do good in these cases. The hypophosphites (in various combinations) are medicines of great efficacy in some cases of nerve-prostration. When oxaluria is present the nitromuriatic acid is the best remedy; it should

be combined with nux vomica and the tinctures of henbane and hops. Mild laxatives and regulation of the diet should suffice for the relief of constipation if present. Strong purgatives are quite out of place, and the patient should be warned against the use of those aperients which are so freely advertised. The skin should be carefully attended to; few of these patients can bear a cold bath, but a tepid bath, or sponging with tepid water, should never be neglected. If the patient can be sent to the seaside, a warm salt-water bath taken daily will constitute an excellent tonic.

As in many other nervous ailments, electricity has been often used in the treatment of neurasthenia, and in not a few cases with very good results. For this purpose the galvanic current of moderate strength may be applied to the spine for about ten minutes daily. General faradization is another method; the patient, stripped of his clothes, places both feet on a large flat electrode, while the other conductor, covered with a sponge, is applied to various parts of the body. It has also been recommended that the physician should take the second electrode in one hand and apply the other to the patient's body. The faradic brush may likewise be applied along the spine and to the extremities; it will

be found especially serviceable when there are symptoms of spinal irritation. The electric bath presents another method of using electricity.

In a somewhat large class of neurasthenic subjects a mode of treatment introduced and perfected by Dr. Weir Mitchell is followed by the happiest results. The main elements of this method, as described by its author, are entire rest and excessive feeding, rendered possible by passive exercise obtained through the steady use of massage and electricity. This treatment is especially suitable for anæmic women with little or no appetite, always tired, spending their days in bed or on a sofa, and with no power of volition or action. Various hysterical manifestations and more or less spinal tenderness are often present in these cases. Such a condition sometimes follows a season of trial or prolonged anxiety, or it may be due to some severe illness, from which the patient has never entirely recovered. In another class of cases there has been some local uterine disorder, the symptoms of which remain, though the affection itself has been cured. In all such patients it frequently happens that stimulants, opiates, and the bromides have been tried, but only with the result of aggravating all the symptoms.

Dr. Mitchell describes another class of cases for whom the treatment is equally suitable. In these the principal symptoms are loss of flesh and colour, various aches and pains, but no organic disease, and no indications of hysteria. All that clearly appears is that the patient is considerably below the normal standard of health. Such cases, as well as the more severe ones just mentioned, are hard to cure. Tonics of all kinds are of little, if any, value. The treatment must be directed towards increasing the weight of the body (and notably the quantity of fat), and the number of red blood-corpuscles. If these objects can be effected the disorders of the stomach, bowels, and uterus will rapidly subside. Dr. Mitchell sums up his directions thus:—"Alter the moral atmosphere, add to the weight, and fill the vessels with red blood."

The principal details of this treatment are as follows:—

1. The patient must be isolated from her friends, and placed in the charge of a trustworthy nurse. This seclusion is absolutely necessary for emotional women fond of dwelling upon their ailments, exaggerating everything that they really suffer in order to gain sympathy and indulgence, and to whom a state of ill-health

has become perfectly natural. Isolation is less necessary for feeble anæmic women whose loss of vitality is due to obvious causes, such as over-work or prolonged anxiety.

2. The patient must be kept at rest, which to be effective should be absolute, and continued for six weeks or two months. Occupation should be provided for the mind, and for this purpose the patient should be read aloud to for several hours daily, but all sources of excitement should be carefully guarded against. Dr. Mitchell points out that nervous and anæmic women take kindly to the absolute rest. The day is filled up with the massage, the use of the galvanic battery, the administration of food, and the doctor's visits, and by the fifth or sixth day a feeling of ease is generally experienced. The patient must not leave her bed for any purpose whatever; all excreta should be passed while she is lying down. There are many moral benefits attached to this enforced rest and isolation. The patient is not allowed to discuss her symptoms, save with her medical attendant, and she cannot fail to profit by the substitution of quiet and order and simple diet, with absence of drugs, for irregular hours, frequent use of remedies, and the too often mischievous sym-

pathy of her immediate friends. Such absolute rest would, however, be attended by various untoward consequences and difficulties, and steps have to be taken to counteract these. The muscles require to be exercised, for if not the circulation will become feeble, the appetite will fall off, and the digestion will suffer.

3. To avert the consequences just mentioned the muscles should be thoroughly shampooed in order to produce tissue waste. Before commencing this process the patient should be placed on milk diet for a few days; the rubber should then be instructed to shampoo the muscles of the limbs, thorax, and abdomen twice daily, at first for half-an-hour, and by degrees for an hour or an hour-and-a-half each time. After these rubbings the patient at first feels somewhat exhausted, but when they have been practised for a few days a pleasant feeling of lassitude is all that is experienced. Either galvanism or faradism is had recourse to in order to improve the nutrition of the muscles, and to stimulate the cutaneous circulation. Either current may be used for about twenty minutes twice or three times a day. The rubbings and the galvanism produce a considerable amount of waste of the muscles thus exercised, and this has to be compensated by excessive feeding.

4. As a matter of course in prescribing the diet the condition and previous history of the patient have to be borne in mind. Following Dr. Weir Mitchell, we begin with milk, which is especially suitable wherever anæmia and obesity are combined. As much as two quarts may be given daily to begin with, and this diet generally relieves all the symptoms of indigestion. In from four to seven days some light solid food may be given with breakfast, and then a mutton chop as midday dinner, and bread and butter thrice a day. About the tenth day, supposing that the rubbing and galvanism have been properly applied, three full meals should be taken daily with three or four pints of milk. One or two ounces of malt extract should be given before each meal. At the close of the first week it is well to supplement the diet still further by giving one pound of beef daily in the form of raw soup. Stimulants are not desirable, and should, as a general rule, be avoided. If, however, they have hitherto been taken in strict moderation a small quantity may be allowed without disadvantage. This enormous amount of food, associated as it is with the exercise involved in the rubbings, seldom causes any gastric or intestinal troubles. The usual results are increase of appetite, assimilation of

increased quantity of nourishment, and a rapid growth of flesh. If symptoms of indigestion should occur, the substitution of milk diet for a day or two will generally be sufficient to relieve them.

When the treatment has been continued for a sufficient length of time the patient should not be allowed to get up and stand on her feet too suddenly. She should first sit up in bed for a few minutes at a time, then take food in a sitting posture, and then, after a day or two, be allowed to sit in a chair. If these precautions be neglected and the patient attempt to walk about or even to stand without previous preparation, she is almost certain to be troubled by attacks of giddiness and palpitation of the heart. At the end of ten or twelve weeks she should still spend three or four hours in bed daily, and for some time afterwards should make a rule of lying down and resting after exercise, which should be taken with the utmost care.

It is seldom necessary to administer any medicines; but in highly anæmic cases the solution of dialysed iron may be given with advantage. Should the bowels become constipated, recourse should be had to mild laxatives. When the patient sits up, Dr. Mitchell recommends that she should take one-thirtieth of a grain of

strychnine thrice daily. As a matter of course, the room in which the treatment is carried out should be large and well ventilated.

In properly selected cases the course of treatment as above described yields the happiest results. The symptoms rapidly disappear, flesh and strength are gained, and within a few weeks or months the patient is restored to complete health. Several of such cases have lately been under my care. As examples, I may cite three cases of hysteria with malnutrition in women, two over thirty years of age, and bedridden for many months previous to my being called in. Case A, age 32, unmarried, bedridden for fifteen months, and weighing seven stone four pounds. After seven weeks' treatment she had increased 22 pounds in weight, and was thenceforward able to walk and resume her ordinary habits of life. Case B, age 34, married 15 years ago, and had one child, age 14. The death of the latter, after a short acute illness, was soon followed by the development of hysterical and neurasthenic symptoms in the mother. She became emaciated and bedridden, her weight falling from 11 stone 12 pounds to eight stone two pounds. She practically recovered her health after eight weeks' treatment, and was able to

walk and resume her ordinary habits of life, though subject to occasional fits of despondency. She gained 21 pounds in weight during the treatment. Case C was that of a young lady, age 19, who had been overworked at school. When I first saw her she had been bedridden for three months, and had become reduced from nine stone ten pounds to seven stone nine pounds. She was full of fancies, and at times her mind wandered. Her weight rose to ten stone, and she made a perfect recovery after six weeks' treatment.

One or two points have to be carefully borne in mind in connection with the Weir Mitchell treatment of neurasthenia. The attention of the profession has lately been called to them by Dr. Playfair. In the first place the method is unsuitable for cases in which organic lesions exist: its employment for such would be harmful, and would raise hopes which would assuredly be disappointed. An accurate diagnosis is therefore an essential preliminary, and no pains should be spared to determine the nature of the case. It is, however, quite true, as pointed out by Dr. Playfair, that obscure cases from time to time occur, the real nature of which can be determined only by the effects of treatment. In another class of cases, viz., in those in which there are

marked evidences of mental disorder, the method is inapplicable as a general rule. In hysterical cases there may be much difficulty in deciding as to the nature of symptoms of mental perversion, and a cautious trial of the method may sometimes be advisable. The last point to be attended to is that the method, to be effective, must be carried out in its entirety. If, for instance, the patient be allowed to get up from time to time, to receive friends, to read, do needlework, or otherwise employ herself, a satisfactory result cannot be anticipated.

CHAPTER II.

NEURASTHENIA SPINALIS—SPINAL IRRITATION.

NEURASTHENIA SPINALIS, A FUNCTIONAL DISORDER—ITS PRESUMED NATURE — SPINAL IRRITATION — CAUSES OF SPINAL NEURASTHENIA—SYMPTOMS—CAUSES OF SPINAL IRRITATION—SYMPTOMS —PRINCIPAL DIFFERENCES BETWEEN SPINAL NEURASTHENIA AND IRRITATION—DIAGNOSIS AND COURSE OF THE TWO CONDITIONS — THEIR TREATMENT — DR. BROWN-SÉQUARD'S METHOD OF TREATING SPINAL IRRITATION.

IT was stated in the preceding chapter that symptoms of cerebral neurasthenia are often associated with various indications of spinal disorder, which were briefly described. In a somewhat numerous class of cases, however, the cerebral symptoms are either almost or entirely wanting, while those referable to the spinal cord are especially prominent, and constitute the whole of the complaint. The symptoms referred to may legitimately be attributed to functional disorder, inasmuch as the objective indications of organic lesions in the cord are not discoverable; and the development, course, and frequent curability of the symptoms further tend to support the belief that no decided anatomical changes exist in any part of the nervous system.

As to the condition of the cord in these cases, we can only hazard a guess that there is either some derangement in the nervous mechanism, some change in its molecular state and action, or some disorder of the circulation due to abnormal vaso-motor action, and interfering with nutrition. A persistent condition of anæmia is scarcely probable. Some authorities have supposed that the symptoms of spinal neurasthenia might possibly be due to functional disorder of the cerebellum. Whatever may be the actual condition of the implicated parts, the symptoms require careful study, inasmuch as they are liable to be attributed to the presence of grave lesions.

The symptoms in these cases of functional disorder of the spine may be classified under two heads: (1) Those in which debility is the prominent feature, and (2) those in which the sensory nerves of the spine are in a state of morbid excitability indicated by severe pain and tenderness. To the former group the term *spinal neurasthenia* may be conveniently applied, while the latter constitutes the disorder known as *spinal irritation.* It is impossible, however, to draw a very strict line of demarcation between the two classes, as cases often occur in which weakness and pain are combined

in varying proportions. In the description which follows an attempt will be made to point out the similarities and the differences that exist between the two conditions; they will first be described separately and then compared.

SPINAL NEURASTHENIA is more common in males than in females, and the patients are generally young adults or in early middle-age. Hereditary predisposition to nervous disorders is sometimes traceable. The exciting causes are over-fatigue of all kinds, sexual excesses, undue indulgence in alcohol and tobacco, late hours, and insufficient rest. Sexual excesses are the most potent as well as the most common of these causes, and their effect is, of course, heightened by the simultaneous operation of any of the remainder. In some cases the onset of the symptoms is traceable to previous severe illness, and it not unfrequently happens that slight injuries to the spine are followed by symptoms closely resembling those about to be described.

The symptoms of spinal neurasthenia are for the most part gradual in their mode of invasion, and, for some time after their commencement, indefinite in character. The first is usually a feeling of undue weariness after moderate or even slight exertion, such as a

short walk. The patient finds that his legs especially soon get tired, and by degrees he becomes conscious of the fact that exercise is no longer a source of enjoyment. If, as is sometimes the case, he tries to get rid of this feeling by "walking it off," he is soon made aware of his mistake. A disagreeable sensation of pain and stiffness in the muscles and joints is added to the debility, and these symptoms are out of all proportion to the exercise taken. The pain is apt to become localized in the back and loins, it is of a dull, heavy character, and is sometimes associated with a sensation of heat in those parts. There is seldom any decided tenderness along the spine. The extremities, and especially the feet, are generally cold and numb, and even when the patient is at rest pains like those of neuralgia are often felt in those parts. Loss of sleep is another symptom common in these patients, and when present it greatly aggravates the feelings of debility, and the patient's appearance rapidly becomes altered for the worse. When, on the other hand, a fair amount of sleep is obtained, no such alteration may be observed. Gastric and intestinal disorders are often superadded, though they seldom become very prominent. The appetite may remain good, and indeed may become

almost voracious, but the digestion goes on slowly and is often attended with more or less pain. Constipation is generally present. Palpitation of the heart, giddiness, and a feeling of weight in the head are less commonly noticed. After the symptoms have existed for some time the patient is liable to fall into a desponding, hypochondriacal condition. In the male subject, involuntary seminal emissions and loss of sexual power are often complained of.

SPINAL IRRITATION is far more common in females than in males, and the majority of the patients are between fifteen and thirty years of age. Hereditary tendency to neurotic disorder can often be ascertained. The exciting causes are anæmia, however produced; lactation unduly prolonged; insufficient and improper food; over-fatigue (especially in persons unused to much exertion); insufficient rest; excessive sexual intercourse; slight injuries to the spine; carrying heavy weights, etc. Marked symptoms of spinal irritation are sometimes noticed in women who for weeks or months have been engaged in nursing, and have paid little or no attention to their own comfort and requirements. Besides the above-mentioned causes, morbid states of the mucous membranes may, as pointed out by Dr. Quain, give rise to spinal pain and

tenderness. Thus pain in the cervical spine sometimes attends congestion of the pharynx; pain and tenderness in the dorsal region are common in cases of gastric disorder, while the lumbar and sacral regions are apt to be affected in diseased states of the intestinal mucous membrane and of the urinary and genital organs. Hysterical patients often complain of tenderness and pain along the spine, and are especially prone to aggravate any abnormal sensation of this kind, however slight, by keeping the attention fixed upon it, and investing it with the gravest importance. It is well known that subjective sensations may be actually called into existence by fixing the attention on parts of the body, and by the belief in the existence of objective causes for such sensations.

The symptoms of spinal irritation are of a multiform character. It would appear, indeed, as if almost any derangement of function in parts of the body supplied with nerves from the spinal cord might originate from spinal irritation. The tenderness on pressure is, however, the only essential symptom; those which are superadded vary in character and severity in almost every case. The tenderness is elicited by making careful pressure over the spinous processes; its most

common seat is the middle and lower part of the dorsal region, but it may be discovered in almost any part of the spine. It may be confined to one or two or several vertebræ, or diffused over the entire column. The tenderness is sometimes slight, but more often exquisitely keen, so that the least touch causes uneasiness, and firm pressure sets up excruciating pain. In some patients, nausea and faintness accompany the pain thus caused. A far less common symptom is spontaneous pain in the spine; when present it may correspond with the tender spot, or may be felt elsewhere. The skin for some distance around the tender part is often morbidly sensitive; neuralgic pains are common in various parts of the body and in the abdomen. Various other abnormal sensations, such as tingling, itching, feelings of cold, etc., are sometimes complained of; loss of sensation is rarely noticed.

Indications of motor disorder are generally present though they are seldom very marked. They appear in the form of lassitude after exertion and weakness of the muscles of the limbs, sometimes amounting to paresis. In rare cases there are fibrillary twitchings, and even clonic spasms of various muscles, producing movements like those of chorea. A state of fixed contraction of

the muscles of the fore-arm, remaining even during sleep, has been noticed in some cases. Coldness of the hands and feet, and flushing of the face, alternating with paleness, are indications of vaso-motor disorder, and are usually prominent symptoms. Other signs of functional disorders often accompany spinal irritation. The most noticeable of these are difficult deglutition, morbid appetite, excessive thirst, copious eructations, vomiting, palpitation of the heart, dyspnœa, a spasmodic cough, spasm or irritability of the bladder, with frequent and copious discharge of pale urine, spasm of the sphincter ani, uterine and ovarian pains, and menstrual irregularities. One or other of these symptoms may become so severe as to demand special attention; the varieties which occur in a given case depend upon the localization of the disorder in the spine.

Indefinite symptoms of psychical disorder are met with in some cases. Irritability and restlessness, disturbed sleep, and decided insomnia are the most common features of this character.

The principal differences between spinal neurasthenia and spinal irritation would appear to be as follows: The former is most common in males; the predominant symptoms are those of debility, no marked tenderness

in the spine, no special abnormal sensations except neuralgic pains; in the male subject, disorder of the generative organs; indigestion, and constipation often present. Spinal irritation is most common in females under thirty years of age, tenderness in some portion of the spinal column is the principal symptom; neuralgic pains and abnormal sensations are frequent; general weakness, symptoms of disordered action of the thoracic and abdominal organs are more or less commonly present.

The diagnosis of spinal neurasthenia is to be made chiefly *per viam exclusionis.* There are no evidences of any organic lesion of the spine, and the condition of the limbs is one of weakness only, not of paralysis. The electrical reactions of the nerves and muscles are normal, and there is no tenderness on pressure over any of the nerve-trunks. Exaggerated tendon-reflexes are noticed in some cases, but this symptom is not persistent.

The diagnosis of spinal irritation is less easily made, inasmuch as the account given by the patient is apt to be misleading. This complaint is frequently met with in hysterical subjects, and in such cases it is by no means easy to discover the amount of pain that is

really felt. A little observation will, however, show that evidences of organic disease are entirely absent. Pain and tenderness in some portion of the spine are common symptoms of meningeal inflammation, but in this latter affection there is always more or less fever and such other indications of serious mischief, as retention of urine and fæces and paresis or decided paralysis of the limbs. In reference to diagnosis, it must be admitted that cases presenting the symptoms of spinal irritation are not unfrequently placed in the category of hysteria. In like manner spinal neurasthenia, with symptoms of dyspepsia, is often regarded as a form of indigestion; and when the patient is decidedly hypochondriacal, the nomenclature of the affection depends upon the view taken by the physician.

The course of the two affections under consideration is almost invariably chronic; improvements alternate with relapses, and even under the most favourable circumstances and judicious treatment the symptoms may last for months or even years. The prognosis, however, is almost always favourable, provided that the necessary remedies be adopted.

The treatment of spinal neurasthenia consists first in the careful avoidance of all causes likely to produce

debility, and secondly in the adoption of measures calculated to improve the general health. Rest of body and mind is absolutely essential, and excesses of all kinds must be scrupulously interdicted. As in many other affections of the nervous system, a proper amount of sleep is of the highest importance; in the absence of this desideratum, little or no progress will be made. Sleeplessness and the various methods of dealing with it will be discussed in a succeeding chapter; it is sufficient here to say that in these cases of neurasthenia narcotics must be used with the greatest caution. They are often indispensable, but patients are only too apt to continue their use until a so-called "habit" results, and the end is worse than the beginning. For procuring sleep the physician has to choose between morphine, chloral, and the bromides, and a combination of the three drugs in small doses sometimes acts better than any one of them given singly. On the whole the bromides are the safest, but their use most not be prolonged. If they fail, a little chloral should be added, and the morphine held in reserve, to be tried if necessary. The diet should be generous and easily digestible; stimulants in moderation should be allowed according to circumstances. Burton ale is one of the best, and among

wines sound Burgundy is perhaps the most suitable. Fresh air, either in a good country district or at the sea-side, will greatly assist all other remedies; and when the patient has gained a little strength mountain-air is likely to be of service. The skin should be properly attended to; tepid baths and even cold sponge-baths are to be advised according to circumstances. With regard to drugs, tonics of various kinds are always indicated. Iron, quinine, and strychnine are the most potent remedies of this character, and may be given separately or in combination.

The treatment of spinal irritation resembles in general details that of neurasthenia, but certain local measures require to be superadded. It is necessary to relieve the pain and tenderness, and for this purpose the subcutaneous injection of morphine or atropine is most efficacious. It should, however, be reserved for severe cases; the anodyne liniments (opium, belladonna, aconite, and chloroform), variously combined, will suffice to relieve lesser degrees of pain, and should be first tried in all cases. Should the local use of the anodynes prove unsuccessful, counter-irritants may next be thought of. When the pain is confined to two or three vertebræ, a small blister (about the size of half-

a-crown) may be applied over the transverse processes on each side. It is sometimes necessary to apply several blisters in succession over new portions of skin; but it is undesirable to produce more than slight vesication. The application of croton-oil or tartar emetic ointment is not to be recommended. Sometimes a rubefacient liniment will answer as well as blistering, and Liniment. Sinapis Comp. may be used for the former purpose. Ice applied in one of Dr. Chapman's bags for a few minutes daily will sometimes prove successful after other means have failed. When the tenderness and pain are not localized, but more or less diffused over the whole spine, the application of the actual cautery in the manner recommended by Dr. Brown-Séquard is often followed by the best results. It would, however, be difficult to use the cautery to a highly nervous patient, though the amount of pain it causes is really quite insignificant. Unless marked hyperæsthesia exists, a little burning or tingling sensation, lasting for a few minutes, is all that is generally complained of. The Paquelin cautery is a very convenient instrument for the purpose, and Dr. Brown-Séquard's rules for its application should be closely observed. They are as follows: A small instrument should be selected and

raised to a white heat; it should be drawn firmly, but very quickly, over the skin for two or three inches on each side of the spine, making several linear cauterizations parallel to each other. It is well to begin in the cervical region, and to repeat the operation daily or every other day until the whole length of the spine has thus been treated. Some eight or ten applications will thus be required. If the cautery be properly used, the result will be that the superficial layers of the epidermis become dry and yellowish; vesication should never be produced. This plan of treatment is adapted for severe cases, and if carried out as above directed will yield excellent results.

In cases in which the spinal symptoms form part of the phenomena of hysteria and there are marked evidences of profound nervous exhaustion, the plan of treatment known as Weir Mitchell's, and described in a previous chapter (see p. 47), is well worthy of adoption. Every care should be taken in the diagnosis, for, as already stated, the treatment referred to is not suitable for any form of organic disease.

CHAPTER III.

SLEEPLESSNESS.

SLEEPLESSNESS IN NERVOUS DISORDERS—CONDITIONS REQUISITE FOR NORMAL SLEEP—CAUSES OF SLEEPLESSNESS—VASCULAR EXCITEMENT—PRESENCE OF IMPERFECTLY OXIDIZED MATERIALS IN THE BLOOD—INDIGESTION—ANXIETY AND EXCITEMENT—COLD AND HEAT—SLEEPLESSNESS IN ELDERLY PERSONS—EXTERNAL CAUSES OF SLEEPLESSNESS—WANT OF EXERCISE—TREATMENT OF SLEEPLESSNESS—IMPORTANCE OF ASCERTAINING CAUSE—QUESTION OF DIET—TREATMENT OF GOUTY SUBJECTS—HYPNOTICS FOR CASES DUE TO ANXIETY—VARIOUS PLANS FOR DEALING WITH DIFFERENT CASES.

SLEEPLESSNESS in varying degrees is a common symptom of nervous disorders, and when present decidedly aggravates the patient's condition. On the other hand, rest of body and mind is a most important part of the treatment of all affections of the nervous system, and particularly of those which exhibit the symptoms of neurasthenia. This latter affection has been described in the preceding chapters, and the present would appear to be a fitting place for discussing the causes and treatment of sleeplessness. There is another reason why this symptom deserves to be separately described. At the

present day physicians have to deal with not a few cases in which wakefulness or sleeplessness *seems* to constitute the whole of the disorder; they are, at all events, the symptoms for which advice is sought.

The amount of sleep necessary for individuals in health varies within certain limits, but for adults 7 to 8 hours may be said to be the average. Some persons require more, while others can do with less, though it is certain that injury often follows protracted mental activity carried on with perhaps only 4 or 5 hours rest daily. A periodical suspension of the activity of the brain and its ganglia is a necessary condition for their repair. During sleep a diminished supply of blood is received by the brain, and the movement of the blood in the vessels is less rapid than during the waking hours. Dr. Hughlings Jackson has observed that during sleep the optic disc is whiter in colour, the arteries smaller, the veins somewhat larger, and the neighbouring portion of the retina more anæmic. Unless this comparatively anæmic condition of the brain exists, normal sleep is impossible.

The causes of sleeplessness are many and various, but vascular excitement is the result which most of them produce. Thus, in many cases the immoderate use of

alcohol, coffee, tea, or tobacco is a direct preventive of sleep. Another, and a common cause of sleeplessness, is the accumulation in the blood of imperfectly oxidized materials. This condition is frequent in gouty subjects, and especially in those whose kidneys are affected. The cardiac hypertrophy, so common in these cases, is associated with excessive tension in the cerebral arteries. The effect of an attack of indigestion in preventing sleep is well known; it is produced in a two-fold manner, a distended stomach interferes with the heart's action, and imperfectly assimilated products present in the blood cause cerebral hyperæmia and probably irritate the cerebral cells.

Sleep is often prevented by anxiety or excitement. At the present day, when so many, either from choice or necessity, spend their time in passing from one form of excitement to another, when such an enormous amount of work or play has to be got through in a limited number of hours, it is not to be wondered at that sleeplessness is so common a trouble, or that specifics for its relief should be so eagerly sought after and so recklessly employed. In some cases comparatively slight causes are sufficient to render the individual sleepless, and especially if they operate late in the day.

I have now a gentleman, aged 47, under my care, in whom sleeplessness is invariably caused by the receipt of an important letter or telegram during the evening. If such news be received earlier in the day there are no ill effects.

Sleeplessness is sometimes induced by the discomfort arising from cold. In winter time persons leaving a warm room where, perhaps for an hour or two previously, they had scarcely been able to keep their eyes open, sometimes find themselves quite unable to sleep on going to bed in a room without a fire. The warmth of the sitting-room relaxed the skin, caused its blood-vessels to become filled, and produced an opposite state of things in the brain. The cold of the bed-room reversed these conditions, and if the difference between the two temperatures be very great, perhaps 20 degrees or more, the waking state may be prolonged for hours.

Great heat, again, may prevent sleep; in this case the supply of blood to the brain is increased, owing to the more frequent action of the heart.

Sleeplessness is sometimes a great trouble to elderly persons, in whom the smaller cerebral arteries are in a state of degeneration. The elasticity of the vessels is

much diminished, and they remain in a more or less dilated state. It is almost unnecessary to add that pain of any kind may keep a person awake the whole night through. Persons are often rendered wakeful or sleepless by external causes, such as too much light or noise; both act as direct stimulants, whereas silence and darkness have a calming and soothing influence, and predispose to sleep. In some cases, however, monotonous noises tend decidedly to produce sleep; the ticking of a clock, and the sound of distant waters are usually favourable in this respect. Much, however, depends upon habit; many persons would lie awake for hours if a loud ticking clock were introduced into their room, and to most the noise of a water-mill would be unbearable; whereas persons accustomed to these sounds will find themselves unable to sleep when the noises are no longer present.

In some cases of sleeplessness the question arises, whether the sleep has been earned? Have the muscles or the brain been so exercised that sleep is demanded for their restoration? A person can hardly expect that refreshing sleep should come at night-fall after passing the day in an easy-chair, listlessly turning over the leaves of a novel or a newspaper. Exercise is necessary,

and not a few persons who complain of sleeplessness and take various drugs to make themselves drowsy must be well aware that exercise of any real kind is almost unknown to them.

In dealing with a case in which sleeplessness is a prominent symptom, and in urgent need of relief, every attempt should be made to ascertain the cause. It is too much the fashion to give narcotics as a matter of course; these should never be used unless other means fail. Remembering that vascular excitement is the condition which obtains in most cases of sleeplessness the physician should trace this to its real cause. If it be due to indigestion, the treatment is obvious. The state of the stomach and bowels should be carefully attended to, and suitable diet and time for meals prescribed. Inquiries should be made as to the patient's occupation, especially as to whether sufficient exercise is taken, and the manner in which the evenings are spent. If it be discovered that a somewhat heavy meal is taken late in the evening by way of dinner, and the patient goes to rest with an overloaded stomach, it is obvious that a decided alteration is required. The evening meal must be a light one, consisting of very little meat, and taken three hours before bedtime. Any

excess as regards alcohol or tobacco must be, of course, strictly interdicted.

In the treatment of sleeplessness occurring in patients of the gouty diathesis the regulation of the diet is again all-important. It is well to supply such patients (and, indeed, many others) with printed diet rules. For some time past I have been in the habit of employing a set of forms on which the hours for meals and the articles that may be taken and those that must be avoided are clearly specified. I am constantly meeting with such cases; careful attention to diet invariably gives relief. Next to diet, exercise, fresh air, and attention to the functions of the skin and bowels are the principal points to be thought of. A course of saline purgatives, *e.g.*, Carlsbad salts, is often the best remedy for gouty insomnia. Other purgatives, as colocynth or rhubarb, with a little blue pill, are likewise suitable, and if these remedies fail to relieve the sleeplessness the bromides may be tried, but their use should not be persevered with.

Cases in which sleep is prevented by anxiety or excitement are often very difficult to deal with. The cause, perhaps, cannot be removed, and it is necessary to relieve the symptom. Hypnotics of some kind are

indispensable for such cases, and the choice generally lies between opium, or some one of its preparations, chloral, and the bromides. Each of these has its drawbacks; opium checks all the secretions except that of the skin and produces constipation and dyspepsia. Chloral is apt to weaken the heart, and when taken regularly for any length of time it sometimes produces great depression, irritability, and even a suicidal tendency. The drawbacks connected with the bromides are of a much less decided character. For sleeplessness due to mental causes, a combination of chloral, with bromide of potassium or ammonium, often acts satisfactorily. Fifteen grains of each of these drugs should be given at bedtime, and repeated, if necessary, for several nights. After two or three doses have been taken, and have afforded relief, it is well to discontinue the medicines for a night or two, so as to see whether a fair amount of sleep can be obtained without them. If, on the other hand, the sleeplessness continues in spite of the drugs, either the dose should be increased or some preparation of opium should be added to the mixture. One of the best is nepenthe in doses of fifteen or twenty minims, and a combination of the three drugs sometimes acts better than any one of them separately. If constipation

occur, it should be remedied by aloes. As in all other cases of sleeplessness, directions must be given on such points as diet, exercise, avoidance of all unnecessary excitement, etc. Such measures as a dark and quiet room, not too hot, but raised, if necessary, to a suitable temperature, a comfortable bed, and other details, to be found in a subsequent paragraph, will always repay attention.

The sleeplessness which results from cold or from cold feet is for the most part easily relieved. A fire in the bedroom will bring the temperature to the necessary height, say from 55° to 60°, and there are several ways in which the feet can be kept warm. Sleeping socks, hot water bottles, and wrapping the feet in a piece of flannel are the ordinary means of this description. Sponging the feet with cold water and subsequent friction is another useful remedy. Sleeplessness caused by heat is best dealt with by cold or tepid sponging of the body before going to bed; and cold applications to the forehead, retained while the patient is lying down, will often induce sleep in hot weather. In some hot countries sleep is often induced in native children by allowing a tiny stream of water to fall upon the forehead; under the soothing and cooling influence of the

water children will sleep placidly for hours while their mothers are at work.

The sleeplessness of elderly people can generally be relieved by the bromides, combined with henbane. The precaution as to warmth is very necessary in these cases. Eczema is sometimes a very troublesome complication, especially as the itching is made worse by a high temperature. Under these circumstances the resources of the physician are liable to be severely taxed; one remedy after another has to be tried until the right one is met with. Sponging the body with vinegar and water before going to bed is sometimes efficacious; zinc ointment, boric acid ointment, and white precipitate ointment are all likely to be useful. Sleeplessness in anæmic persons is best combated by a liberal diet, iron, and stimulants; for the generality of these cases oatmeal biscuits with some hot wine and water or spirits and water are the best sleeping draughts.

There are a few other points of universal applicability in dealing with sleeplessness. Strong light acts as a mental excitant and checks sleep; on the other hand, darkness, especially when accompanied by silence, has a calming effect, and disposes to sleep. Brushing and combing the hair has a sedative effect,

and is resorted to by some patients. Some of the popular measures recommended for inducing sleep are more apt to produce the opposite result. Among these may be mentioned the mental repetition of numbers, or lines of poetry, attempts at mental calculation, and the picturing to the imagination of a field of waving corn, or of a number of animals—such as sheep—rushing in single file through a gateway. A more efficacious plan is to get out of bed and drink a little cold water, or bathe the face and neck, or remain at the bedside until a sensation of chilliness is experienced. An old-fashioned remedy for sleeplessness was a pillow of hops, on which the patient placed his head. The benefit said to have been obtained from it by George III., for whom it was prescribed by Dr. Willis in 1787, brought it into very general use.

CHAPTER IV.

HYSTERIA.

Hysteria, Definition of the Term—Historical Notices and Geographical Distribution—Causes—Age and Hereditary Predisposition to Nervous Disorders—The Uterine Theory of Hysteria—Local Irritation and the State of the General Health—Exciting Causes of the Paroxysms—Morbid States of System, as in Gout—Symptoms of Hysteria, their Great Variety—Signs of Mental Perversion—Alterations of the Moral Character—Peculiarities of the Symptoms—The Hysterical Paroxysms—Hystero-Epilepsy, Symptoms and Peculiar Features of the Attacks—Other Forms of Motor Disorder—Paresis—Permanent Contraction and Rigidity of Muscles and Limbs—Disorders of Sensation, Hyperæsthesia, the Clavus Hystericus and Neuralgia—Anæsthesia, its Forms—Disorders of the Special Senses—Disorders of the Function of Digestion—of Respiration—of the Circulation—of Secretion—The Urine—Course, Duration, and Results of Hysteria—Prognosis—Diagnosis—Treatment, Prophylactic, Curative, and Symptomatic—Removal of Young Subjects from Home Influences—Attention to Uterine Complaints and to General Condition—Treatment of Mental Disorders—Hygienic Measures—Medicines—Relief of Prominent Symptoms—Treatment During the Paroxysm—of the Complications—Metallo-Therapeutics—Galvanism and Faradism—The Weir Mitchell System—Hydropathic Treatment.

HYSTERIA consists of a group of symptoms, occurring mainly in females, and indicative of functional disturbance of the nervous system in general. It is characterized by evidences of mental perversion, and by disorders, more or less marked in different cases, of all the functions of the body. The term "hysteria" implies the idea of a close connection between the symptoms thus designated and the uterus; but however close this relationship may be in some cases, there are many others in which it cannot be shown to exist. Moreover, the fact that symptoms of hysteria are sometimes witnessed in male subjects proves that the occurrence of the disorder is not necessarily dependent on the state of the organ from which the term is derived.

According to Dr. Hirsch,* hysteria is remarkable among the neuroses for its frequency and generality of diffusion at all times and in all parts of the world. It is described in the very oldest Brahminical writings and by the Greek and Arabian physicians, some of whom regarded it as the effect of spasmodic contractions of the uterus or of displacement of that organ,

* "Handbook of Geographical and Historical Pathology," New Syd. Soc. Transl., Vol. III., p. 516.

this latter condition being supposed to account for the sensation long known as the "globus hystericus." Others thought it was due to retention of the menstrual blood or of the semen. These and similar views prevailed until the beginning of the 18th century, when the idea was first propounded that hysteria, like epilepsy, was an affection of the brain. Sydenham considered hysteria to be the most frequent of all chronic diseases, and stated that, though most common in women, it was sometimes seen in men; hence uterine disorders could not be its real cause, but its origin must be sought in an affection of the nervous system. Later on another English writer, Dr. Whytt, asserted that hysteria was often dependent on uterine disorder, but might occur in its absence, and that it was really due to "a too great delicacy and sensibility of the nervous system."

With regard to its geographical distribution, hysteria would appear to be a common disorder in many parts of the world. It is found in the Arctic latitudes of the Eastern Hemisphere; it is said to be common in Central Europe, and especially frequent in the southern parts of that continent. In Turkey it is reported to be "the heritage of women and the scourge of men." So far

as is known, Asiatic women are much less liable to the complaint; it is very rare indeed among the Hindoos. On the other hand, in parts of Africa, *e.g.*, the Cape, Mauritius, and Madagascar, Egypt and Tunis, hysteria is said to be unusually common. In the Western Hemisphere it is, as might be expected, "very prevalent among women of the upper classes in the United States, particularly in the South." It is also common in Mexico and Brazil and among the Creole women of the West Indies.

Causes. It has been already stated that hysteria is almost entirely confined to the female sex. Males very rarely present symptoms that can justly be described as hysterical, though some French authors assert that one case of hysteria occurs among males to every twenty among females! The first symptoms of hysteria are wont to appear at the time of puberty; but in not a few cases they show themselves even at an earlier period, though not in a very marked form. In the large majority of hysterical subjects the symptoms are developed before the 20th year; in a smaller proportion they come on between 20 and 30. After the latter age, and until the menopause, the proclivity becomes gradually lessened. Symptoms are occasionally

developed in women during "the change of life;" but this once passed immunity is the almost universal rule. Hereditary predisposition to nervous disorders plays a conspicuous part in the causation of hysteria, and the predisposition thus derived is too often fostered by constant association with the affected parent and by defective education and training. A mother subject to hysteria is a bad example to daughters, and is generally incapable of adopting any measures calculated to lessen the inherited tendency. Other circumstances often tend to confirm the predisposition. Sedentary habits, idleness, indulgence in sleep, vicious practices, and that premature development of the emotional side of a girl's nature which often follows excessive devotion to sensational literature are potent factors of this character.

The uterine theory of hysteria has been already referred to. There is no doubt that local disorders of the genital organs often take a considerable share in the causation of hysteria. Malpositions of the uterus, erosions or ulceration of the os or cervix, and other chronic sources of irritation are capable of producing and perpetuating hysterical symptoms, especially in the subjects of hereditary predisposition. The connection is demonstrated by the fact that the symptoms often

subside after the local disorder has been cured. The relationship is still further evidenced by the frequency with which hysterical attacks are wont to occur during pregnancy and at the catamenial periods. The condition of the ovaries is also connected with the disorder. In many cases pressure over these organs causes severe pain or even an acute attack. In hysterical males it is alleged that symptoms may be induced by compressing the testicles. Unsatisfied sexual desire has been thought to be a cause of hysteria. Be this as it may, it is certain that hysterical symptoms are common and severe among the victims of sexual excesses. In the case of women living in a state of celibacy there is often much in their surroundings tending to produce emotional disorder ; the want of congenial occupation, a feeling of loneliness and neglect, disappointment, vexations, and anxiety as to the future, these and many other circumstances tend to produce an unhealthy state of mind which is a primary condition for the development of hysteria.

Irritation of other parts besides the sexual organs may induce symptoms of hysteria. Thus they are sometimes noticed to occur after injuries, and to show themselves most prominently in the affected part.

Hemianæsthesia has been known to set in after a fall in which one side was slightly injured ; a bruised finger has been followed by paralysis of the upper extremity. Neuroses of joints, a common symptom in hysterical subjects, are often attributable to previous injury.

The development of hysteria is more or less favoured by all circumstances tending to impair the general health. Thus the debility of convalescence from exhausting diseases, such as fevers, pneumonia, etc., and the anæmic state in general predispose to attacks. Hysterical symptoms are sometimes witnessed in children, the subjects of latent tuberculosis.

Of the exciting causes of the paroxysms anything capable of strongly impressing the nervous system is by far the most active. The first attack is liable to be induced by mental shocks of various kinds, *e.g.*, terror, anger, grief, or even surprise, and when the hysterical condition has been established, slight causes of this kind will suffice to provoke a paroxysm. The imitative impulse is another powerful exciting cause ; the sight of one woman in hysterical convulsions has often induced similar paroxysms in others who had previously shown no signs of the disorder. Epidemics of hysteria form one of the most curious chapters in geographical and

historical pathology. With regard to various morbid states of the system, as causes of the affection, there is much reason for believing that hysterical symptoms in middle-aged women are sometimes referable to the presence of the gouty diathesis, and are to be classed among the irregular gouty manifestations. It is easily conceivable that the accumulation of sodium-urate in the blood, acting as an irritant to the nervous system, should give rise to attacks in those in any way predisposed to them.

Symptoms. It is well nigh impossible to give a succinct and connected account of the protean manifestations of hysteria. The most striking symptoms occur simultaneously or in quick succession, constituting the hysterical paroxysm; but there are various other phenomena incident to the complaint, many of them closely simulating real and serious affections. In typical cases signs of mental perversion are usually the first to appear, and these are followed by paroxysms and other motor, sensory, and sympathetic disturbances of the most varied kind, and grouped together in every conceivable manner. The greatest possible differences exist in the symptoms presented by hysterical patients; in some they are so slight as to be scarcely recognizable,

in others the convulsive paroxysms are of the most violent character, and various other phenomena are scarcely less marked. Moreover, the same patient may exhibit very different symptoms at different times. In order to give as clear an account as possible, I propose to consider first the signs of mental perversion so common in hysteria; secondly, the paroxysmal attacks and other motor disorders; and thirdly, the symptoms indicating disturbances of sensation, digestion, respiration, circulation, and secretion.

I. The signs of mental perversion vary in kind and degree, but the majority of them point to a disordered state of the emotions. In the most common form of the complaint there is at the commencement an exaggeration of ordinary emotional excitement; for example, laughter and crying are induced by very slight causes, are repressed with difficulty and recur on the slightest provocation. Lowness of spirits is another common symptom. Without any assignable reason, or for one which is totally inadequate, the patient will remain for hours or even for days in a depressed, listless state, which perhaps suddenly passes off, to be succeeded by the normal condition, or by symptoms the reverse of those so recently exhibited. Any peculiarities

of temper are apt to become emphasized; impatience, capriciousness, and irritability make themselves unpleasantly manifest. The slightest cause may be sufficient to excite a paroxysm of anger, which cannot be allayed, and soon passes into a convulsive attack. Alterations of the moral character are very common, and are among the most painful features of the complaint. Some patients become listless and indifferent, caring little or nothing for what is going on around them; others become inquisitive, fussy, and morbidly anxious for others. More often, however, the patient's attention is concentrated upon herself; she makes the most of any little ailments or discomforts, recapitulates them to her friends, and loses her temper or falls into a paroxysm if anyone ventures to question the accuracy of her statements. Whims of the most varied kind are invented from time to time; those who point out their absurdity are regarded as enemies. By degrees the patient may get into such a state of obstinacy as to cling with the utmost firmness to any idea that she has formed with regard to her own condition. Attempts to convince her of her error only make her worse; if she can find a sympathetic listener, there is no limit to her delight. It is obvious that these and similar manifesta-

tions approach, if they do not pass, "the borderlands of insanity;" and it is often very difficult to determine whether the latter condition has been reached.

In a large number of hysterical subjects a marked tendency to deceive others is one of the most prominent features, and stories of the most extraordinary character are invented by the patients for this purpose. The state of the urinary and genital organs is a very common topic for their complaints; retention or even suppression of urine is often asserted to exist; fragments are shown, alleged to have been passed from the bladder, or urine is declared to have been ejected from the stomach. Some hysterical patients take great pains to injure themselves in various ways, and profess the most complete ignorance of the cause of a wound thus made. As to the motives which induce them to perform these acts of deception, some patients wish to become objects of notoriety, to have their cases talked about by as large a circle as possible; others desire to attract commiseration and sympathy, and others, again, are influenced by motives of pruriency.

There are still other modes in which the mental disorder is exhibited. Sometimes the patients are obstinately silent, refuse to answer the simplest ques-

tions, and shut themselves up in their rooms so as to be able to indulge their propensity. The silence may be succeeded by a fit of volubility, in which the strangest and most improbable stories are told. When this volubility is a prominent feature in the complaint, those who are compelled to associate with the patient are in a most unenviable position.

The symptoms as above described often display this peculiarity, that they come on at intervals between which the condition of the patient appears to be perfectly rational and normal. In some cases the patients know when the symptoms are threatening, and assert that they make a prodigious effort to check their onset. Partial success is sometimes attained in this direction, but the power of self-control generally becomes less and less, while that of the emotions steadily increases until the patient is unable to resist even the slightest impulse. When this stage is reached, the patient can scarcely be regarded as responsible for her actions.

II. Though a greater or less degree of mental perversion is to be found in most hysterical subjects, there is a somewhat numerous class in which such symptoms never attract much attention, as compared with those which constitute the hysterical paroxysm. This is

characterized by violent convulsions of a tetanic or epileptic character, induced by various kinds of stimuli, and especially by anything which appeals to the emotions. These paroxysms are wont to occur at irregular intervals; in some patients they are the chief, if not the only, signs of disorder; in others, they are merely the prominent features of the protean complaint.

The paroxysm may come on suddenly, without any premonitory symptoms; or it may be preceded by some of the symptoms of mental disorder, already indicated, or by various distressing sensations, *e.g.*, pressure at the epigastrium or in the chest, or a feeling as if a ball were rising from the abdomen to the throat. Then perhaps a vacant stare, or rolling movements of the eyes, lasting for a few seconds, are followed by a loud scream; the patient falls to the ground, or finds her way to a sofa, throws her limbs about and twists her body in various directions, sometimes tries to tear her hair and strikes herself, though without doing any serious injury. While these movements are going on the patient often shrieks or cries or laughs, or perhaps raves about some one whose presence or memory has excited the paroxysm. After lasting for a variable

period (in some cases only a few minutes, in others half-an-hour or more) the convulsions subside, a flood of tears, a fit of laughter, or a confused mixture of laughing and crying affords the necessary relief, and the patient is gradually restored to her usual condition. After long-continued and severe convulsions the patient is apt to fall into a lethargic state, as if quite exhausted, or even to go to sleep for some hours. The convulsions present innumerable variations; sometimes only an arm or leg is flexed or extended at irregular intervals; sometimes every muscle of the body appears to be in action, and the united force of several persons is insufficient to restrain the patient. In some cases the convulsions alternate with, or are replaced by tonic spasms; one or more limbs are firmly contracted, or the body assumes the form of an arch as in cases of poisoning by strychnine. In severe and exceptional cases (which belong to the category of hystero-epilepsy) the consciousness is entirely lost during the height of the paroxysm; but more often the patient is, to some extent at least, aware of what is going on, her appearance showing that she is alive to the absurdity of her performances.

The paroxysms usually occur at very irregular

intervals; they may recur daily or not until weeks or even months have elapsed. Their frequency depends greatly upon the surroundings of the patient and the condition of her nervous system. In some cases the attacks come on at the monthly periods, and they are usually most severe at these times. It is worthy of note, as showing the resemblance between hysteria and other forms of nervous disorder, that the patient often feels decidedly better after a severe paroxysm, the explosion apparently relieving the overburdened nervous system.

The term *hystero-epilepsy* is applied to designate severe convulsive attacks exactly similar to the paroxysms of epilepsy, but occurring in hysterical subjects, and to be classed among the phenomena of hysteria. The condition has been regarded as a combination of the two disorders, sometimes the one, and sometimes the other assuming the greater prominence. The symptoms are, however, best interpreted by adopting Charcot's view, that in these cases hysteria alone is present, and that it takes on the semblance of epilepsy.

A typical attack of hystero-epilepsy is generally preceded for some days by various uncomfortable feelings, such as loss of appetite, nausea or vomiting, headache,

etc. Some patients are unusually quiet and taciturn, others excited and noisy. If hemianæsthesia be present, it becomes more marked and is apt to spread to the other side of the body. Finally the aura is felt, beginning in the epigastrium or in the iliac regions; it lasts for some time, and the patient is therefore generally able to seek a place of safety before the convulsions come on. These begin as in true epilepsy; the patient screams, turns pale, becomes unconscious and falls if standing. The body and limbs become perfectly rigid. In some cases the body is arched upwards like a bridge, and rests only upon the feet and head. The rigidity, according to Charcot, is seldom followed by the clonic convulsions, not very extensive, but most marked on one side of the body, as in true epilepsy. On the other hand, the limbs and the entire body are violently contorted; the patient makes the strangest gesticulations and assumes extraordinary postures. Delirium then supervenes, during which the patient has horrible visions, as of animals or thieves attacking her, of fire and the like. She raves furiously, or shouts, or screams as if in imminent danger. The termination of the attack is ushered in by tears and laughter, and after these have subsided the patient is apt to remain for some time in a

state of melancholia, with hallucinations, and sometimes painful contractures of various joints. During the convulsions the tongue may be bitten, and bloody foam may, therefore, appear at the mouth. The paroxysm lasts on an average about a quarter of an hour; it may recur again and again at short intervals, the attacks in this way extending over several hours or even days.

According to Charcot, the paroxysms are distinguishable from true epilepsy by the fact that they can be modified or sometimes even arrested by compression of the ovary. Moreover, in hystero-epilepsy the temperature never rises above 101·3° F.; whereas, after a series of true epileptic fits a height of 105·8° F. may be attained, and may continue for some time. There is another and a most important difference between the two affections; attacks of hystero-epilepsy may follow each other in rapid succession at the rate of a hundred or more in the twenty-four hours, and yet the patient's general state may be but little affected. Oft-recurring paroxysms of true epilepsy with the accompanying high temperature would place the sufferer in a very critical position. It is only in very rare instances that death has occurred as a result of hystero-epilepsy.

III. In addition to the convulsive movements, various other forms of motor disturbance are liable to occur in hysterical subjects. Paresis of the extremities is a somewhat frequent phenomenon, and presents many degrees of intensity. In some cases there is only a feeling of weight and immobility, but this suffices to make the patient believe that she has lost the use of her limbs. Such patients may remain in bed or on a sofa for months or years, or until some startling incident, or a physician, who understands the nature of the case, restores the powers of motion. In other cases the motor power is slightly diminished, while in a third class it is very considerably reduced; the patient may be able to move the legs while lying in bed, but can neither stand nor walk. Complete paralysis is very rare indeed, except in connection with secondary changes in the cord.

In cases of hysterical paralysis the electrical excitability of the muscles and nerves remains undiminished; but the electro-cutaneous and the electro-muscular sensibility are generally more or less reduced. Cutaneous anæsthesia is usually associated with paralysis, and is apt to become converted into the opposite condition after the application of the interrupted current. Other

peculiarities are connected with hysterical paralysis; rapid improvement sometimes takes place, to be followed sooner or later by a return to the former condition. Very slight causes, especially those of an emotional character, are sufficient to increase the weakness; a woman able to walk with comparative ease may be suddenly seized with paralysis which lasts for days or weeks, and then as suddenly passes off. In some cases the paralysis changes its seat; first the arm, then the leg suffers, or weakness on the right side is followed by paralysis of the left. Hemiplegia and paraplegia are the most common forms; the upper extremities are less often affected. Paralysis of some of the laryngeal muscles is not uncommon; it gives rise to aphonia, which may come on suddenly, last for a time, and then subside.

These attacks of paralysis occur in some cases after the hysterical paroxysms, but in others they supervene independently of any marked explosions. In the latter class the most common immediate cause is sudden shock, or a fit of anger, or anything that appeals to the emotional susceptibilities of the patient. Violent muscular exertion has been known to be followed by paralysis, and in other cases this latter symptom has

come on after the sudden subsidence of various hysterical manifestations. Hysterical hemiplegia when rapidly developed closely simulates the result of cerebral hæmorrhage, but differs from it in the fact that consciousness is preserved and neither the tongue nor the face is affected. Rigidity is also a common symptom of the functional disorder. The onset of paralysis is by no means always sudden; in not a few cases it seems to grow, as it were, out of ordinary muscular weakness. Nothing definite can be said as to the duration of these paralyses; they may go on for months, or years, or even for life; and recovery may take place suddenly or very gradually. Complete restoration is the rule, but in cases of long standing the wasting of the muscles from disuse may be very great, and degeneration may become developed. Under such circumstances perfect recovery of the use of the limbs cannot be anticipated.

Permanent contraction and rigidity of muscles and limbs are not unfrequent in hysterical subjects, and may either supervene upon paralytic conditions or may occur independently of them. The rigidity, in some cases, affects one side of the body; in others, the legs are fixed in various positions; while in a third class one

or more muscles of the face, neck, or extremities are firmly contracted. The distortions of the foot are apt to simulate the various forms of talipes. These contractions are not always spontaneous; they sometimes follow slight injuries to the part. Hysterical contractions of single joints are often very troublesome to deal with. The knee is most liable to be thus affected, and next in order of frequency come the hip-joint, the wrist, the foot, and the shoulder. In some cases the contraction takes place suddenly; it is always attended with severe pain, which according to the patient's description closely resembles that of severe inflammation of a joint. The suffering, however, does not prevent sleep; it is, moreover, not increased by firm pressure, though a slight touch may be described as causing intense agony. The ordinary signs of inflammation of a joint, *e.g.*, heat, redness, and swelling, are altogether absent. The joint remains immovably fixed; the patient asserts that she cannot alter its position, and she resists any attempt to do so on the part of the nurse or physician. When the patient is placed under the influence of an anæsthetic the contraction disappears, but the limb returns to its old position when consciousness is regained. These contractions may last for months or

even years, and then suddenly subside in a manner apparently spontaneous. Excitement of various kinds has been known to cure these patients. In some cases the disappearance is final; in others the contraction recurs.

IV. Disorders of sensation are among the most important phenomena of hysteria, and appear in two principal forms of varying degrees—(*a*) hyperæsthesia, and (*b*) anæsthesia. The hyperæsthesia may show itself in almost any part of the body, but some portions, *e.g.*, the hypogastric, iliac, and epigastric regions, are especially liable to be thus affected. Many hysterical patients complain of a dull, aching pain in the hypogastrium, and in one or both iliac regions, increased by slight pressure, but sometimes diminished or abolished when pressure is firmly and steadily applied. The seat of this sensation may be either in the abdominal muscles or in the ovaries. Pain referable to the latter organs may constitute the principal complaint of an hysterical subject, and in such cases even the slightest touch may provoke the severest paroxysms. The epigastrium is likewise often the seat of painful sensations, localized in the skin, abdominal muscles or stomach; pressure aggravates the pain and may pro-

duce hysterical paroxysms. Severe pain in the stomach is generally accompanied by such other symptoms as vomiting, loss of appetite, or aversion for ordinary food, and in some cases the condition becomes so severe as to give rise to suspicion of gastric ulcer. Colic is another abdominal affection frequent in hysterical subjects; the accumulation of gas in the intestines is sometimes enormous.

Of the pains and aches which beset hysterical subjects, a form of headache is one of the most common. It is well known under the name of *clavus hystericus.* The pain is fixed in one spot, generally over the eye; it is described by the patient as though a red-hot nail were being driven into the head, and there is sometimes increased temperature around the painful spot. In other cases the sensation is said to be that of intense cold; in others, again, the pain is diffused over the head, or takes the form of hemicrania. Equally common as the headache are pain and tenderness in the spinal column; the group of symptoms known as spinal irritation is, indeed, most fully developed in hysterical subjects. Pains in various muscles are of frequent occurrence, the sensation not following the course of the nerves, but diffused among the muscular fibres. Every form of

pain is increased when the patient's attention is directed to the part.

The hyperæsthesia is sometimes quite superficial, involving the skin alone, and either extending over large areas or confined to small patches. In the former case the weight of the clothes may be pronounced unbearable. The condition termed *anæsthesia dolorosa* is sometimes noticed in these patients; the sense of touch is abolished, that of pain considerably heightened. The external organs of generation are apt to be very sensitive, but the skin of the breast is the most common seat of the cutaneous hyperæsthesia. This, in some cases, is so severe and obstinate as to give rise to suspicions of cancer; especially when, as sometimes happens, small hard nodules are discoverable in the gland. Neuralgic pains of all kinds are very frequent in hysterical subjects; the intercostal spaces and the joints being the parts most often affected.

The hyperæsthesia not unfrequently affects the organs of special sense; the patient complains that she cannot bear an ordinary amount of light, and that she is distressed by the slightest sound. There is, of course, often much exaggeration in these and similar statements; the auditory nerves of the patient are never inconvenienced by the noises she herself makes.

The opposite condition of anæsthesia has attracted considerable attention of late years; it has been found to be one of the most common symptoms of hysteria. It may affect only the skin and mucous membranes, but in most cases the muscles are also involved. Hemianæsthesia is the most common form, and the left side is more frequently affected than the right. The symptoms closely resemble those due to cerebral hæmorrhage; sight, hearing, taste, and smell are unilaterally involved. In nearly all these cases the sense of pain is lessened, or even abolished, and less frequently the sense of temperature is similarly disturbed. There is no doubt as to the reality of the loss; the skin may be pricked, or pinched, or heat may be applied to it without the patient's knowledge, provided that her eyes are covered. The anæsthesia usually comes on after a paroxysm; it may last only a few hours, or may continue for weeks or months. The temperature of the anæsthetic portions is always lowered, and the skin is usually whiter than natural. The loss of sensation is sometimes confined to a few small areas, and may then be easily overlooked. The organs of special sense are occasionally implicated in these cases of anæsthesia; thus, various derangements of sight, hearing, smell, and taste are sometimes noticeable. Of the disorders

of vision, intermittent colour-blindness, either complete or incomplete, is the most remarkable. Other patients assert that articles of food, well known to be sapid, are tasteless or the converse; others, again, that they are unable to distinguish odours. Subjective gustatory and olfactory sensations are sometimes complained of. Deafness is less common, but tinnitus aurium and other subjective auditory sensations are seldom absent in well-marked cases of hysteria.

V. Disorders of the function of digestion are very common in hysterical subjects, and assume various forms. The symptom known as the *globus hystericus* is probably due to spasmodic contraction of the œsophagus and intestines. The patients are wont to state that they feel, as it were, a ball rising from the epigastrium toward the throat, where it remains, and causes a distressing sensation as if a foreign body were actually there, or as though the throat were compressed by a cord or by fingers. Some patients assert that they are unable to swallow, and this inability may continue until symptoms of inanition become prominent. The stomach is liable to show various indications of disorder. Obstinate longing for strange articles of food, loss of appetite, flatulence, pain, and vomiting,

sometimes excessive, and continuing for lengthened periods, are among the most prominent of these symptoms. The vomiting, which is due to spasmodic contraction of the muscles of the stomach and œsophagus, occurs in severe cases every time food is taken, and the efforts continue even when the stomach is completely emptied. It is often a matter for surprise that these patients, ejecting nearly all the food they take, should yet appear to be well-nourished, or at all events show no marked signs of wasting. The explanation, however, is supplied by the facts that little or no exercise is taken, metabolism goes on very slowly, and the contents of the bowels are retained for considerable periods. This explanation will also serve to account for those cases in which vomiting is absent, but the amount of food actually taken seems insufficient to support life. As a matter of course the statements of the patients with regard to their food can rarely be depended upon; the tendency to deceive is often manifested in this particular. The stories of complete and prolonged fasting have been proved to be utter fabrications; the patients may stoutly refuse to take food, but they always manage to find some means of obtaining it. Besides the constipation, other symptoms of abdominal

disorder are collections of gases in the intestines, and colicky pains. The distension is sometimes enormous, and such as to resemble pregnancy and various tumours, and the rumbling noises, which the patient is unable to check, greatly add to her discomfort.

VI. Disorders of respiration are less frequent than those of digestion, but some of them are occasionally prominent. One of the most troublesome is a dry, hard cough, which is apt to worry the patient all day, but fortunately ceases at night. In not a few cases this cough gives rise to the suspicion of phthisis, in which, however, the nights are usually the worst. Painful feelings in the larynx are not uncommon; and the voice may be quite suppressed or so modified as to be unrecognizable. Uncontrollable hiccough is sometimes a very prominent and disagreeable symptom, especially when the patient voluntarily adds to the explosive noises. Laboured breathing, yawning, sneezing, and sighing are other symptoms of this character, and in some cases precede the convulsive paroxysms.

VII. Symptoms of disorder of the circulation are always met with in hysterical subjects. More or less violent palpitation is very frequent, is induced by very slight causes, and may last for hours or even days.

The heart's action is sometimes irregular, sometimes attended with severe neuralgic pain; in anæmic cases a bellows murmur is frequently audible. Epigastric pulsation is an occasional symptom, and one which greatly alarms the patient. The pulse is subject to many variations; but is usually more frequent than natural; the state of the cutaneous circulation changes rapidly from time to time, the skin being sometimes pale, and sometimes turgid with blood. The abnormal excitability of the vaso-motor centres is shown by other symptoms, such as marked coldness of the feet and hands, which are often covered with a copious perspiration; a sensation of heat over the head, particularly along the course of the sagittal suture, and accompanied by real elevation of temperature. In chronic cases of hysteria the face is often the seat of various eruptions. When anæsthesia exists, the affected parts are apt to be cold and anæmic. Under an opposite condition, patches of congestion sometimes give rise to hæmorrhage not only from the skin, but also from internal organs. Such hæmorrhage, *e.g.*, from the stomach, is to be regarded as vicarious when it occurs at the menstrual periods. Blood is sometimes discharged from the bowels; but the patient's account of symptoms of this character is always to be received with caution.

VIII. Various disorders of secretion are common phenomena in hysterical subjects, and among these, functional derangements of the urinary organs are often prominent. The discharge of a large quantity of pale urine generally takes place after a paroxysm, and in some patients after excitement of any kind. On the other hand, the secretion may be deficient in quantity, or almost if not quite suppressed. This partial suppression may last for an indefinite period, during which a fluid more or less resembling urine is discharged from the stomach. In some cases urea has been detected in the vomited matters; but statements of this kind must always be received with caution. A much more common symptom is retention of urine, due either to spasm of the neck of the bladder or to paralysis of the detrusor urinæ. In not a few cases the retention is a purely voluntary act. Irritation of the bladder, shown by constant desire to pass water, is a very troublesome symptom in many hysterical patients. If the habit of frequent micturition be indulged in the bladder soon becomes intolerant of its contents.

Other secretions are less frequently disordered; but in some cases the liver becomes inactive, and the biliary secretion is lessened. Pale stools, constipation, and symptoms of melancholia are the ordinary results.

In comparatively rare cases the breasts become swollen and even a little milk is secreted during the attacks.

One of the most extraordinary facts connected with hysteria is that, notwithstanding the many and various disorders, the patient's general health often remains good, and the nutritive functions appear to be properly discharged, even when the amount of food taken is very small indeed.

Course, Duration, and Results. Hysteria is in almost all cases a chronic affection, and unattended by any danger to life; once developed, some of its manifestations may recur at intervals during the life-time of the patient. In rare instances, after a few acute paroxysms, combated by suitable measures, the disorder comes to an end. The differences in its course depend in great degree upon the psychical condition of the patient and the circumstances and influences by which she is surrounded. In the early stages much improvement can generally be effected by judicious treatment perseveringly carried out. In chronic cases, *e.g.*, those in which the symptoms have been manifested during twelve months or more, complete recovery is decidedly uncommon. Even in favourable cases the morbid excitability of the nervous system is apt to betray itself

under the influence of very slight causes, and recurrence of the symptoms, perhaps at very long intervals, is the ordinary rule. The symptoms, however, generally become milder and less frequent with advancing years. There are certain forms of hysteria which merge gradually into moral insanity, or monomania, and other varieties of mental unsoundness. With regard to other results of the complaint, in rare instances the patients sink into a low anæmic state and die from inanition and exhaustion. Death has also occurred from suffocation during the paroxysm, but in such cases some of the phenomena of epilepsy are generally superadded to those of hysteria.

Prognosis. Hysteria very rarely involves any danger to life, though it often causes much trouble and anxiety to the patient and her friends. When the symptoms begin early, and do not subside at puberty or after marriage, they are apt to last for life; when they first show themselves during the third decade they are more likely to disappear eventually. When dependent on slight lesions of the genital organs the symptoms usually subside after the cure of the local disorder. Weak anæmic subjects presenting symptoms of hysteria are more amenable to treatment than full

blooded, vigorous women. Hysteria may terminate (1) in complete and permanent recovery; (2) in recovery for a time, to be followed by a return of some of the symptoms; (3) the complaint may merge into decided insanity or the patient may become phthisical. In the absence of complications, death is a very rare termination. A few hysterical subjects have been allowed to starve themselves to death, and others have died from dyspnœa during a paroxysm. Such instances are, however, quite exceptional.

Diagnosis. Epilepsy is the affection with which the paroxysms of hysteria are most liable to be confounded, and it is sometimes a little difficult hastily to determine the real nature of the symptoms in a given case. The distinction is, however, of extreme importance in view of the gravity of epilepsy and the often trivial character of hysteria. When the two disorders coexist the symptoms of epilepsy may be very prominent, but the manner in which the attack comes on and subsides is generally sufficient to guide the diagnosis. The principal features which distinguish the hysterical paroxysms from those of epilepsy are as follows:—In the former, unless as the result of shock, the paroxysm is not sudden, but comes on after other symptoms have shown

themselves; the premonitory cry or scream is less common; when the patient falls, a chair or sofa is usually at hand to receive her; the features are seldom distorted, the tongue is not bitten; the pupils react to the influence of light; respiration never ceases, and the face, though red, does not become livid; laughing, sobbing, and perhaps talking go on continuously, or at intervals; and throughout the paroxysm there are evidences of a concealed will, and in not a few cases an unmistakable degree of consciousness; the subsidence of the paroxysm is not followed by coma. In epilepsy the attack comes on suddenly; the patient usually utters a loud cry; the features are much distorted, the tongue is often bitten; the pupils are insensible to light; respiration ceases at intervals, and the face is livid and turgid; the convulsions are less extensive, but injuries often result; the patient does not laugh, cry, or talk, but is absolutely unconscious from the beginning, and a comatose state follows the paroxysm. In hysteria the convulsions may be extremely violent, and may go on for hours, but they are more or less under the control of the patient, and can often be arrested, inasmuch as some degree of consciousness is preserved. In epilepsy consciousness is lost, and the patient has no control over the convul-

sive movements, which are generally of short duration. The differences between hystero-epilepsy and true epileptic convulsions have been already mentioned (see page 97).

The distinction of hysterical hemianæsthesia from loss of sensation due to cerebral lesions is a matter of considerable importance. In the former condition an account of other hysterical symptoms will rarely fail to be elicited on careful inquiry, and the hemianæsthesia is never permanent, though it may last for long periods. Moreover, the symptoms may from time to time disappear and then recur. Such changes are, of course, never observed in organic hemianæsthesia. It has been stated that derangements of the special senses accompanying hemianæsthesia are indicative of hysteria. This, however, is not correct, for in hemianæsthesia, due to organic causes, similar derangements are occasionally observed.

Nerve-prostration or "neurasthenia" more or less resembles hysteria in some of its features. The two disorders may coexist; the former, indeed, is a predisposing cause of the latter, but either may be present alone. In neurasthenia, convulsions, paroxysmal attacks, the *globus hystericus*, and other symptoms of local

spasm are absent; there is never any decided amount of anæsthesia; the patients generally have a weak and depressed look, and their condition neither fluctuates from time to time nor improves in the absence of proper remedial measures. In hysteria, on the other hand, the paroxysms are generally prominent symptoms; anæsthesia is common; the patients frequently appear strong, healthy, and full of energy; the condition varies greatly, and often changes in the most unexpected manner, and complete recovery may take place, with or without treatment.

The effects of sub-acute myelitis of the anterior cornua of the spinal cord more or less resemble the symptoms of hysterical paraplegia. The chief points of distinction are as follows:—In hysteria the patellar reflex is retained and sometimes exaggerated; the electro-muscular contractility is either normal or only slightly diminished; the reaction of degeneration is never observed; there is no interference with micturition and defæcation; the temperature of the limbs is not much reduced, and bed-sores are not liable to form. In polio-myelitis the patellar reflex is diminished or lost; the reaction of degeneration can always be detected; the functions of the bladder and rectum are interfered

with; the temperature of the limbs is reduced and bed-sores are common. Other differences between organic paralyses and those of hysterical origin have been already referred to (see page 98).

Treatment. Three classes of remedial measures are required in the treatment of hysteria: first, those which are of a prophylactic character; secondly, those which are calculated to cure the disease; and, thirdly, those which are required for the cure or relief of the prominent symptoms.

1. In all cases of hysteria minute inquiry should be made into the family history of the patient. If, as is usually the case, there be an inherited tendency towards nervous affections, the symptoms may be expected to prove much more obstinate than when such tendency is absent. When hysterical manifestations appear in a young girl whose mother is, or has been, similarly affected, there can be no doubt as to the plan which *ought* to be pursued. The child should be removed from its home and placed under proper care and treatment. Kind, but firm, management; plain, but nutritious, diet; plenty of exercise in the open air; regular hours; tepid or cold baths; attention to all the bodily functions, and mental occupation of an interesting but

not irksome character, will afford the best chance of eradicating the seeds of the nervous disorder. Excitement, whether in the form of work or play, should be scrupulously interdicted. These measures act by improving the general state of nutrition of the nervous system and lessening its excitability, and they are applicable to all cases of hysteria in young subjects.

2. The measures calculated to cure the disease require to be considered at some length. In the first place, every endeavour should be made to ascertain the cause, and to deal with it as completely as possible. If there be symptoms of uterine disorder a proper examination should be made and the necessary treatment adopted for the cure of any lesion or displacement that may be detected. Great caution is, however, necessary with regard to an examination in all these cases; it should never be undertaken unless there are the strongest reasons for anticipating that benefit will result. On the other hand, it is bad practice to allow an hysterical patient to suffer continuously from symptoms of a displaced uterus without suggesting an examination. It is useless to prescribe tonics, antispasmodics, and the like, while the local cause of the disorder remains in full operation.

The general condition of the patient is the next point for consideration. Hysteria is not connected with any one state of the general health; some hysterical patients are weak and anæmic, others are robust and plethoric. For the former, rest, tonic treatment and regimen are of course indicated; the latter will be benefited by purgatives, a reduced diet, and plenty of exercise. Saline purgatives, *e.g.*, sodium or magnesium sulphate, are generally suitable for these patients, and the salts may be conveniently given in the form of the Carlsbad waters. The springs of Marienbad and of Kissingen are also serviceable.

The treatment of the mental condition of the patient is of the highest importance, but much difficulty is often encountered in this particular. The physician should endeavour to gain the confidence of his patient; he should assure her that he quite understands her ailment, and that her recovery is certain if his directions are properly attended to. Notwithstanding the exaggeration which is so prominent a feature of this complaint, it must always be borne in mind that much of the suffering is real, and not imaginary. It seldom answers to treat the patient harshly; to tell her that her ailments are non-existent and that she is shamming

is almost certain to make her worse; she broods over and exaggerates her troubles, and probably develops new symptoms. On the other hand, nothing can be more mischievous for the patient than to treat her as though she were as ill as she believes herself to be; the adoption of this course by well-intentioned but misguided friends and relatives may constitute a serious obstacle to the efforts of the physician. Hence it is that in many cases the most effectual plan of cure is to change the circumstances under which the patient is placed, and to bring a fresh set of influences to bear upon her. Such a plan is not always feasible, and in mild cases it can scarcely be regarded as necessary. For these latter, after due inquiry has been made into all the circumstances which may have contributed towards the development of the symptoms, the measures described on page 117 should be sedulously adopted. What the patient should do and what she must not do should be very clearly specified. All causes of emotional excitement, and especially the reading of sensational literature, so mischievous to many girls, must be absolutely shunned. Equal care should be taken in the selection of amusements and occupation, the great object being to divert or repress emotional excitement, to induce the patient

to interest herself in rational and useful tasks, and to strengthen the power of the mind and the control of the will. Having thus attended to the mental features of the disorder, the hygienic remedies may be applied with every prospect of success.

With regard to drugs, tonics, anti-spasmodics, sedatives, and stimulants may be required as adjuvants, or as special remedies in certain cases. Among tonics, quinine, iron, the salts of zinc and of copper may be given with the view of lessening the irritability of the nervous system. Among anti-spasmodics must be mentioned the old remedies, asafœtida and valerian, aromatic spirit of ammonia and camphor. These are sometimes useful in the treatment of the milder symptoms. Something has to be given, if only to relieve the anxiety of the patient and her friends; and medicines which appeal strongly to the nerves of taste and smell serve to occupy her attention and to divert it from herself. Sedatives, anodynes, and narcotics are often necessary in dealing with hysteria; but their use requires great caution. The bromides are the best remedies of the sedative class; they are especially indicated for cases in which the symptoms of motor disorder are very prominent. Anodynes are often required for the relief

of pain, and narcotics to produce sleep; for the former purpose opium and its various preparations, henbane, and cannabis indica are the best remedies; for the latter the bromides, chloral, butyl chloral, and opium are at the disposal of the physician. As a general rule opium should be avoided in hysterical cases. It must always be borne in mind that the symptoms for which it is adapted are liable to frequent recurrences which would necessitate increased doses. Moreover, in many hysterical subjects opium is apt to produce an effect quite opposite to that which is desired; instead of calming the patient it often causes great excitement. It may, however, be absolutely necessary, *e.g.*, for the relief of severe neuralgic pain. Under such circumstances the subcutaneous injection of morphia will probably be the best method of employing the drug; but the application of the remedy must never be entrusted to the patient or her friends.

3. For the relief of prominent symptoms remedies and measures of the most varied kind are liable to be required. During a convulsive paroxysm the patient should be placed in a recumbent position, with her dress loosened, especially about the neck; if necessary, enough restraint should be employed to prevent her from injur-

ing herself. To rouse the patient, and to make her exercise such power of self-control as she possesses, cold water may be dashed over the face and neck, and further treatment of this kind should be promised whenever exaggeration is manifest. To fulfil a similar purpose it is often sufficient to apply irritant substances to the nostrils; the vapour of burnt feathers is an old remedy of this class, but smelling-salts are equally efficacious and more convenient. If the patient can swallow, a little ether, ammonia, and asafœtida may be administered; but, as a general rule, it is better not to give medicines by the mouth until the movements have finally subsided. Difficulty of swallowing, with irritation of the throat and larynx, is likely to be set up and to aggravate the paroxysm. In adult patients, when, as sometimes happens, the convulsions subside and recur at short intervals, and the condition threatens to be indefinitely protracted, the administration of a turpentine enema will generally be found the best means of arresting the symptoms. Another method, which has lately been recommended for the same purpose, is that of making firm and sustained pressure by applying the hands over one or both ovaries. In some cases the convulsions immediately cease when pressure

is applied, but the effect may be only transient. Inhalations of chloroform or ether may be cautiously tried when the convulsions are very severe. It is not necessary to induce complete insensibility; as the convulsions become less violent, the patient will probably fall into a quiet, sleepy state of some hours' duration.

In addition to the free use of cold water to the head and neck it is sometimes advisable to adopt other measures likely to produce a decided effect on the patient's mind. Thus the physician may assert in a very emphatic manner that unless the symptoms cease at once, or that if they recur, it will be necessary to shave the head and apply a blister, or to adopt some other disagreeable measures. Even when the patient appears to be insensible a remark of this kind will often be appreciated and produce a good effect. When scissors are asked for, for cutting the hair, as a preliminary to the shaving process, an improvement will generally be noticed. If in a very severe case these or similar measures prove successful it must not be hastily assumed that all the symptoms have been counterfeited. The presentation of a powerful motive for restraining the paroxysms and the sedative influence of fear are sufficient to counterbalance the reflex excitability of the

automatic centres, and the force of the will, previously in abeyance, is set free to act in the necessary direction.

The treatment of the other prominent symptoms of hysteria does not require a very lengthy description. The derangements of the stomach and intestines, the palpitation, cough, urinary disorders, etc., must be treated on general principles, due attention being paid to the condition underlying the various manifestations. The hyperæsthesia, which is often so great a trouble, is best treated by full doses of the bromides, massage, and the application of the galvanic current; for anæsthesia, faradism and the metallo-therapeutic treatment is likely to yield the best results.

The treatment of hysterical anæsthesia and other symptoms by the application of metals to the surface of the body has attracted considerable attention of late. The method was known and practised in early times, and has recently been experimented upon by Charcot, who was led to investigate the subject by the reputed successes of a certain Dr. Burg, in Paris. In dealing with a case of anæsthesia, various metals have to be tried in order to discover the particular one to which the patient is sensitive. A piece of the metal in the

form of a disk is then applied to the skin of the anæsthetic part, and kept in position for about twenty minutes. If the plan succeeds it will be found that the normal sensibility is restored in the immediate neighbourhood of the disk, and that the improvement gradually spreads until restoration is complete. In a similar manner it is alleged that colour-blindness and other disorders of special senses may be cured by applying the disks to the skin in the neighbourhood of the affected part. Disks of gold are said to be efficacious in the largest number of cases; but in some more benefit results from the use of silver, zinc, or copper. In order to strengthen the action of the metal it is recommended that one of its soluble salts should be given internally for a shorter or longer period. Thus, if the patient prove sensitive to gold the chloride of that metal and sodium is administered daily, and the same plan is adopted with silver, zinc, copper, etc. It is not a little curious that similar effects have been produced by the application of disks of wood and other non-metallic substances. It is impossible to do more than speculate as to the manner in which the effects are produced. Some assert that the metals themselves exercise a specific influence, or that they generate electric cur-

rents, but this theory is scarcely tenable in view of the similar effects alleged to have been produced by non-metallic substances. It is more probable that such applications produce their effect by directing the attention of the sufferer to the affected part, and by keeping alive and stimulating the expectation of the cure. In hysterical patients it is scarcely possible to assign any limit to the influence of "expectant attention." Another remarkable phenomenon has been reported as resulting in some cases from the application of the metals; the hemianæsthesia has disappeared from the affected side and transferred itself to the other half of the body which was previously normal.

For paralyses of hysterical origin galvanism and faradism are the chief remedies; the latter is especially indicated whenever there are any signs of muscular atrophy. These forms of paralysis are apt to prove very obstinate, but unless connected with some organic cause the symptoms in not a few cases disappear suddenly and spontaneously. It is in many of these cases that the Weir Mitchell system of treatment acts satisfactorily. Full particulars with reference to this plan of treating the worst forms of hysteria will be found in the chapter on Neurasthenia. In its principal

details it may be described as consisting of seclusion, rest, high feeding, massage, and electricity. It yields, according to Dr. Playfair,* the most satisfactory results in the thoroughly broken-down and bedridden cases. "It is my experience that the worse the case is the more easy and certain is the cure, and the only disappointments I have had have been in dubious, half and half cases." It would seem that for hysterical patients whose appearance is that of good health some hydropathic form of treatment is more suitable. If the patient can be induced to take them, cold shower-baths sometimes produce an excellent tonic effect; moreover, the "bracing up of the mind to the shock of the cold shower-bath is a capital exercise for the weak-willed power of the hysterical patient." To obtain the full benefit of hydropathic treatment it is often desirable to remove the patient from her home and place her in an institution where the necessary appliances are available. The discipline, the diet, and the close personal supervision are all helpful adjuncts to the cure.

* "The Systematic Treatment of Nerve Prostration and Hysteria," p. 5.

CHAPTER V.

EPILEPSY.

Epilepsy, Definition and Forms of—Historical Notices and Geographical Distribution of the Disorder—Causes—Influence of Hereditary Predisposition—Date of First Attacks—Drunkenness—Sexual Excesses—Lesions of the Nervous System—Dr. Brown-Séquard's Experiments—Reflex Epilepsy—Ocular Defects as a Cause of Epilepsy—Dr. Stevens' Views—Exciting Causes—Epilepsy and Gout—Morbid Anatomy and Pathology—No Special Lesion—Seat of the Disorder—The Epileptic Change—Dr. Hughlings-Jackson's Views—Dr. Brown-Séquard's Views—Symptoms of the Paroxysm—The Phenomena in Detail—The Milder Forms of Epilepsy—Irregular Forms—The Epileptoid States—Reflex Epilepsy—Jacksonian Epilepsy—The Course of the Disorder—Mental Symptoms—Diagnosis—Epilepsy Distinguished from Apoplexy, Syncope, Hysteria, and Infantile Convulsions—Prognosis—Treatment—During the Intervals—Hygienic Measures—Medicines—The Bromides, Atropine, Zinc, Silver, Vegetable Tonics; and Antispasmodics—Empirical Remedies—Electricity—Hydrotherapeutics—Treatment During the Paroxysm.

Epilepsy is a chronic nervous affection, without known anatomical basis, and characterized by attacks of loss of consciousness, which in typical cases are associated with general or partial convulsions of a more or less

violent character. This combination of phenomena is regarded as constituting "true epilepsy," the *haut mal* of the French writers; but there are many other anomalous and milder forms of the disorder in which motor symptoms are absent. These constitute the *petit mal* of the French, the "abortive epilepsy" of English writers. The term "epileptoid" is applied to conditions of a still more anomalous character, and observed in persons of a distinctly epileptic tendency. Such symptoms as migraine, vertigo, syncope, hallucinations, and other indications of nervous disorder occurring periodically and paroxysmally in persons of this description have been thus classified.

Epilepsy has been known from very early times. Dr. Hirsch says: "Of all the diseases included in the group of neuroses none shows a prevalence so general in time and place as epilepsy; none is so constant a presence in the morbid life of humanity; none has so markedly the ubiquitous character." The affection is very common even in Arctic latitudes; in central and southern Europe its average frequency is said to be about 1 or 1·5 per 1,000. Its geographical distribution and relative frequency are uninfluenced by conditions of climate and soil. According to the authority already

quoted, epilepsy is as frequent in tropical and sub-tropical countries as in cold and temperate latitudes. "Peculiarities of race and nation have no influence whatsoever on the occurrence of epilepsy;" the same types of the disorder are to be found everywhere; the natives of New Zealand are the only race for whom immunity has ever been claimed.

The causes of epilepsy are of a very indefinite character, and their respective values cannot be accurately estimated. As a predisposing cause heredity is the most important. It is often noticed that among the children of an epileptic parent one or more exhibit symptoms of the disease. In another set of cases a history of some other nervous disorder is all that can be ascertained, and in both classes it sometimes happens that the immediate progeny escape and that their descendants suffer. Habitual drunkenness in the parents is a predisposing cause of epilepsy in their descendants; it has also been stated that children begotten by a father in a state of intoxication are very liable to become epileptic. Besides nervous disorder, other morbid conditions in the parents contribute towards the production of epilepsy in the offspring. Of these the most important are: exhaustion from ex-

cesses, sexual or otherwise; neurasthenia resulting from excessive mental labour; a low state of system from want of proper nourishment; anæmia, rickets, and scrofula. Epilepsy is not unfrequent in women hereditarily predisposed to gout.

When the hereditary predisposition exists the disorder generally manifests itself before the twentieth year. In such cases it is often noticed that the patients have suffered from convulsions in early life. First attacks are most frequent during the period of puberty; seventy-five per cent. of all cases occur in persons under twenty years of age. When epilepsy appears for the first time after that age has been reached the disorder is not to be attributed to hereditary predisposition alone. In liability to suffer there is little, if any difference between the sexes. With regard to other causes, epilepsy may doubtless be acquired; certain influences appear to be capable of inducing the epileptic change or condition in the nervous system, while other influences, of a more definite character, are capable of provoking an attack.

Drunkenness plays a decided part in the production of epilepsy, and some intoxicating agents appear to be more powerful than others in this respect. In France

epileptic attacks are often traceable to the use of absinthe; symptoms closely resembling those observed in man have been produced in dogs by the continued administration of this fluid. Sexual excesses and masturbation are supposed to explain the occurrence of epilepsy in a somewhat numerous class of cases. It is, however, probable that the influence of these causes has been over-estimated. If it were as great as some authorities have imagined, epilepsy would be a much more common disorder than it really is. Many epileptics practise masturbation; but the vice may be regarded as the consequence rather than the cause of the disorder. Syphilis is, beyond doubt, an occasional cause of epilepsy, and should always be suspected when in a male subject the first attack occurs after the twentieth year.

In some cases of epilepsy a causal connection can be shown to exist between certain lesions affecting various parts of the nervous system and the development of the epileptic change. Such cases are especially interesting from the light they throw upon the pathogeny of the disease. The symptoms are, moreover, closely analogous to those which can be artificially produced in animals. About thirty years ago Dr.

Brown-Séquard showed that epileptic attacks could be induced in guinea-pigs by injuring certain portions of the nervous system—the spinal cord, the medulla oblongata, the cerebral peduncles, and the corpora quadrigemina—and even by section of one or both sciatic nerves. In from four to six weeks after the injury epileptic attacks occurred either spontaneously or as a result of irritating the cheek and the antero-lateral region of the neck, supplied by the fifth and the occipital nerves. This so-called "epileptogenous zone" is on the same side as the injury, except when the cerebral peduncle is affected; it is then on the opposite side. The epileptic state can also be produced in guinea-pigs by giving them a succession of slight blows on the head. General convulsions are caused, but soon subside, and the animal appears to be in a normal condition. In about six weeks it is found that irritation of the face and neck, as before mentioned, induces an attack of epilepsy. It is worthy of note that the progeny of such guinea-pigs often suffer from epileptic convulsions, and that when both parents have been experimented upon, few, if any, of the offspring escape. In other experiments epileptic convulsions were produced by removing the cortical centre for the anterior

extremity, and also by applying a strong faradic current to the cerebral cortex on one side.

These experiments serve to explain the causation of epilepsy in those cases in which the disorder is consequent upon lesions of nerves and nerve-centres. In the case of injury to peripheral nerves the local irritation induces by degrees central changes which constitute the epileptic state. Many cases are on record in which permanent irritation to a nerve, caused by the presence of some foreign body, *e.g.*, a fragment of glass, has induced convulsive attacks, which ceased after the removal of the offending substance. In like manner the irritation has been known to spread from cicatrices in which small branches of nerves were included. The cessation of the symptoms after removal of the cicatrix was sufficiently indicative of their origin. The term "reflex epilepsy" is applicable to all these cases and likewise to those in which irritation is presumed to spread from disease situated in various parts of the body. Injury of the brain from external violence has been known to give rise to symptoms of epilepsy. It is probable that in young subjects the complaint is sometimes attributable to overlooked or forgotten causes of this character.

When, however, due allowance has been made for the influence of heredity, injuries and other causes, there still remain many cases whose origin cannot be discovered.

The artificial production of epileptic symptoms by rapidly depriving the brain of arterial blood would seem to indicate that a condition of cerebral anæmia is at least one requisite for the development of the complaint. It is found that when the supply of blood to the brain is cut off or reduced to a minimum coma and general epileptic convulsions are produced, and that these symptoms cease when the blood-supply is re-established. The phenomena are probably due to some change in the nutrition of the cells. They are not the result of diminished pressure, inasmuch as removal of the cerebro-spinal fluid does not cause convulsions. It has further been proved by experiment that irritation of certain peripheral sensory nerves produces reflex contraction of the cerebral arteries, anæmia, and epileptic convulsions. Dr. Stevens, of New York, asserts that certain ocular defects play a considerable part in the production of an epileptic tendency in young subjects. He reports that an examination of ocular conditions in 144 cases of epilepsy demonstrated the

existence of refractive anomalies in a far greater proportion than that which exists among children in general. Insufficiency of the motor muscles of the eyes was also discovered. The results of treatment served to confirm the supposition that epileptic influences might arise from ocular defects. Of twenty-nine cases treated by supplying proper glasses all but two were either cured or considerably improved.

A reference to the exciting causes of epileptic attacks will conclude this part of the subject. In some patients the attacks are apparently spontaneous ; in others they result from mental excitement of various kinds. The first attack is sometimes induced by fright, and the same cause often induces paroxysms in persons subject to the complaint. Sexual causes have some influence in producing an attack ; thus in women the occurrence of the complaint has often been observed to coincide with the menstrual periods, and with pregnancy. In both sexes attacks have been known to occur during sexual intercourse. Disorders of the stomach, intestinal worms, diseases of the ear, and irritation from disease of various parts of the body are sufficient to excite paroxysms when once the epileptic change has become established. In another class of cases the

attacks supervene upon such affections as scarlet fever, measles, whooping cough, small-pox, and diphtheria. In some patients epilepsy would appear to be connected with gout, the convulsive attacks either ceasing or becoming much milder after the development of acute symptoms in the toe. It has been already stated that epilepsy is not unfrequent in women hereditarily predisposed to gout. In these cases the attacks are doubtless excited by the accumulation of sodium urate in the blood, and the consequent irritation and spasm of the cerebral vessels. It has been alleged that epileptic seizures have sometimes occurred from imitation, children, and girls especially, having been attacked by the complaint while *merely witnessing* the convulsive paroxysms in others. Such a result might follow in a person hereditarily predisposed to the complaint, but in the absence of such tendency such a causation of true epilepsy is at least very improbable.

Morbid anatomy and pathology. The most carefully-conducted post-mortem examinations have revealed nothing that can explain the pathology of epilepsy; they only show that the disorder does not depend upon any special lesion of the brain. In some cases no change whatever has been discovered; in others the

autopsy has revealed thickening and induration of the bones of the skull, opacity, thickening, and adhesions of the cerebral membranes, effusions into the ventricles, induration of the grey and white substance. All these may be regarded as consequences of the oft-recurring hyperæmia during the convulsive attacks. Various alterations in the shape of the skull have been noticed in a few cases, and regarded of ætiological importance. Of these perhaps the most interesting is defective symmetry of the cranium, as a result of imperfect development of one-half of it. This condition has been observed in persons subject to epilepsy from early childhood. In the majority the defect has been found on the left side, and it is interesting to notice that in these patients there were evidences of general want of development of the right side of the body, and that the convulsions commenced and were most violent on that side. The capillary dilatation in the medulla oblongata detected in some cases of epilepsy cannot be regarded as having any definite relation to the disorder. It has been noticed in non-epileptic cases, and is probably a secondary result, and due to the attacks of congestion.

Until within the last few years the pons Varolii and the medulla oblongata were looked upon as the parts

especially implicated in the production of epilepsy; but according to the view most in favour at the present day the seat of the disorder is to be found in the cortex cerebri. The principal facts adduced in support of the first-mentioned view are as follows:—The pons Varolii contains the spasm-centre, a mass of ganglion cells, reflex irritation of which causes contraction of all the muscles of the body, even of those which are supplied by cerebral nerves. The medulla oblongata contains the chief vaso-motor centre, irritation of which causes contraction of the muscular coat of the arteries, especially of those of the brain. The characteristic symptoms of the epileptic attack, the loss of consciousness and convulsions, can be evoked by irritation of these centres. The former symptom results from the anæmic state of the brain suddenly produced by the constriction of the vessels. The abortive attacks, in which there is loss of consciousness without convulsions, are explained by supposing that only the vaso-motor centre is irritated; and when convulsions occur without loss of consciousness the spasm-centre alone is supposed to be affected.

In order to explain the condition of the brain in epilepsy it is assumed that some portions of it, notably the pons Varolii and the medulla oblongata, are in a

state of abnormally increased irritability—the so-called "epileptic change." The attack results when the activity of the nerve-centres situated in these parts is called into play by appropriate stimuli. It is doubtful whether both centres are acted upon at once or whether the vaso-motor centre is first irritated, the spasm-centre being secondarily affected by the resulting anæmia. This latter condition soon gives place to venous congestion, and the continuance of the insensibility and the convulsive movements is to be explained by the fact that the amount of oxygen in the cerebral blood is much below the normal amount. The condition of the cerebral veins is clearly indicated by the marked cyanosis, which is due in great measure to compression of the jugular veins by the spasmodically-contracted muscles of the neck.

According to Dr. Hughlings-Jackson's view the epileptic attack originates in the cerebral cortex, which contains motor, and probably also vaso-motor, centres. As a result of disturbance of equilibrium, a violent discharge of the nervous force accumulated in the ganglion cells suddenly takes place. If the motor centres are stimulated by pathological processes the convulsions begin in the corresponding groups of muscles, and often

extend to the limb of the opposite side, and thence to the muscles generally. The abolition of consciousness results from the temporary exhaustion of the ganglion cells which follows the discharge.

That an epileptic attack may originate in the cerebral cortex has been conclusively proved by experiments. If the cortical areas for both limbs on one side of an animal be removed, the epileptic attacks which subsequently occur are limited to the muscles of the head and face on both sides. In another and still more demonstrative experiment general convulsions were caused in a dog by continuous irritation of a portion of the cortex. The irritated portion was then removed by means of a horizontal incision, when the convulsions immediately ceased. Moreover, during an epileptic attack artificially produced in a dog, the motor area of one extremity can be excised with the effect of excluding this limb from the attack, while the convulsions continue in the remainder of the body.

According to Dr. Brown-Séquard, the theory that epilepsy depends on disease of any *special* part of the nervous centres has not been established. He thinks that the true seat of epilepsy is to be found in nerve-cells capable of producing morbid reflex muscular con-

tractions, and that these cells are located chiefly in the base of the brain. Epileptiform convulsions can, however, take place after the removal of the brain, cerebellum, pons Varolii, and a portion of the medulla oblongata. It would, therefore, appear that the spinal cord has a share in the production of epileptiform convulsions, "and as we know that it can in man, as well as in animals, arrest the activity of the brain under some stimulation, we may easily admit that it may help in producing in man an arrest of cerebral activity during a fit of epilepsy."

We know nothing with regard to the anatomical character of the changes in epilepsy, whether located in the cortex cerebri or in the basal ganglia. When we speak of the pathological irritability of the affected centres we use words which convey little meaning. The authority just quoted does not think that alterations in the cells will ever be detected. "It is quite likely that the change in them is more dynamical than physical, and that no more microscopic differences could be detected between two of them, one normal and the other possessing great morbid reflex power, than there are visible differences between two pieces of magnet—one poor, the other rich in magnetic power."

With regard to the kind of irritant which excites the activity of the nerve-centres our notions are but vague. In cases of reflex epilepsy the irritation of a sensory nerve may well be the cause of the movements; while mental impressions produce excitement in the cerebral cortex, and this is communicated to the cells in the base of the brain and in the upper part of the cord.

Symptoms. The phenomena of a typical epileptic fit are as follows:—After certain precursory abnormal sensations, or suddenly without any premonition whatever, the patient turns pale, utters a loud cry, loses consciousness, and falls down, one side or the whole of the body becomes rigid, and the breathing ceases for some seconds. Then the colour of the face changes, it becomes red, and finally purplish; the eyeballs start from their sockets, and clonic, sometimes unilateral convulsions of the muscles take place; the contents of the bladder and bowels are often evacuated. The movements continue for several minutes, and then gradually abate; the blueness of the face passes off, the limbs become flaccid, and consciousness returns either at once or after an interval of stupor or coma. When this latter condition has passed off the patient usually complains of headache, weariness, and soreness of the

limbs: he has no recollection of the incidents of the attack.

Some of the phenomena require to be examined more in detail. The premonitory symptoms differ considerably in their character and duration. Sometimes the patient is conscious of various alterations of his usual state of feeling, or of confusion of thought, or of failure of memory. At the present time I am treating a patient who is thus warned of an impending attack. In other cases giddiness, headache, drowsiness, and a feeling of fulness in the head are complained of. Various disorders of the special senses, tingling in different parts of the body, and nausea are occasionally experienced.

Some patients are able to predict that an attack is coming on. In others the warning is very short, perhaps just sufficient to afford opportunity for the patient to place himself on a sofa or chair. The phenomenon termed the *aura epileptica* occurs in a small proportion of cases. It consists of strange sensations, *e.g.*, as of a stream of cold water falling on the skin. This may begin in any part of the body, and it gradually spreads to the head, when loss of consciousness takes place. The *aura* may last for several seconds, or even for some minutes. When the

attack is at its height consciousness is completely abolished, and the severest injuries are unfelt by the patient. At the same time the reflex excitability is much reduced, and in some cases altogether in abeyance. The eyelids do not close when the cornea is touched, neither do the pupils contract on exposure to strong light. Injuries are not unfrequently received during the fall and the subsequent convulsions. The tongue, which is protruded from the mouth, is often badly hurt between the teeth. Owing first to the rigidity, and afterwards to the irregular contractions of the muscles, respiration is imperfect, and performed with difficulty; the glottis is contracted, and the lungs are not fully distended. The struggles for breath and the movements of the lower jaw cause the air to be mixed with saliva and the mucus of the mouth, and white or bloody foam often appears at the lips. The first stage of the attack, that of tonic spasm, is always the shortest. It never lasts for more than a minute, and is sometimes over in a few seconds. The clonic convulsions have a longer duration; they may go on for several hours, but their average length is from ten to fifteen minutes. The urine passed after their subsidence sometimes contains albumen and hyaline casts. The frequency of the attacks varies considerably. Daily

occurrences are observed in some cases; in others a year, or even several years, elapse between the paroxysms. A rapid succession of attacks during several days or weeks, followed by a complete immunity for a lengthened period, is not unfrequent. Definite periodicity is very rarely observed except in women, in whom the attacks sometimes coincide with the menstrual periods. In most cases there is an absence of regularity, and the attacks come on quite unexpectedly.

It is somewhat difficult to give a succinct account of the milder forms of epilepsy. They are manifested by occasional attacks in which consciousness is either completely lost or much diminished, but power over the muscles is generally so far retained that co-ordinate movements can still be accomplished. The spasmodic element is wanting, or is represented only by a few twitches. The symptoms exhibited differ greatly in different patients. The unconsciousness may last for a few seconds, or for several minutes. Recently, in consultation with Dr. Hughlings-Jackson, I saw a patient in whom the unconsciousness lasted only a few seconds, and several similar cases in persons of both sexes have come under my notice. During its continuance automatic actions, *e.g.*, walking, painting, etc., may still be performed. In other cases the patient

stops suddenly when talking, stares vacantly for a few moments, and then finishes his sentence without any further difficulty. If these and similar slight attacks occur when the patient is sitting or lying down they may pass off almost without notice. In cases of a more severe form the loss of consciousness is complete and more prolonged. The patient falls down, perhaps when walking, and remains unconscious for several minutes. Giddiness is sometimes complained of, especially when the loss of consciousness is not complete. Partial convulsions, as of a few muscles of the face, arm, or hand, are noticed in some cases.

Attacks as above described are included under the term "epilepsy" for the following reasons:—They sometimes precede the more severe paroxysms, and sometimes alternate with them. They are often ushered in by the precursory symptoms of the graver attacks, and are followed in some cases by drowsiness and stupor. Moreover, as regards severity of symptoms, epilepsy presents innumerable grades between the mildest and the most violent, and the various "abortive" forms of the disorder pass by imperceptible degrees into the pronounced type.

Other irregular forms of attack are sometimes noticed. It occasionally happens that the convulsions

are somewhat violent, while consciousness and sensation are but very slightly affected. On the other hand, the convulsions may be absent, their place being taken by co-ordinate movements of walking or running. In a case recently brought to my notice, a young man, who suffered from ordinary epileptic attacks of a very severe character, would sometimes in a state of unconsciousness rush out of the house and run up and down the main street of the village until he fell from exhaustion. In other cases the paroxysms are from time to time replaced by various forms of mental disorder. These symptoms, when of a severe type, resemble those of acute mania. Like the convulsive attack, they come on suddenly, and after their subsidence the patient has no recollection of what has occurred. Conditions of this kind sometimes follow the paroxysm, and the mental affection may last for several days. In a less marked form, the utmost variety may be presented by the symptoms. Acts of senseless violence, acts indicative of mental confusion, of complete disregard of decency, etc., would appear in some cases to replace the convulsive paroxysms. After the accomplishment of the acts the patients are ignorant of what has occurred, and express more or less surprise when the details are related to them.

A full description of the so-called *epileptoid states* would transgress the limits which the author has prescribed for himself. To classify the conditions thus designated would be a task of much difficulty, more especially as authors are by no means agreed as to the boundaries of the definition. Nothnagel's explanation is as follows: "Those states should be regarded as epileptoid, *i.e.*, as caused by a central epileptic change, in which symptoms show themselves paroxysmally, for the development of which the same physiological processes, according to our present knowledge, should, or at any rate may be assumed, as produce (when developed in greater intensity or extent) the usual epileptic attacks. . . . The certainty as to whether the case be one of genuine epilepsy or not is to be gathered from the occurrence, sooner or later, of real paroxysms in place of or alternating with these questionable seizures."

The main clinical features of the epileptoid states are attacks of giddiness and abnormal sensations of various kinds, which when associated with corresponding mental symptoms more or less closely resemble the phenomena of hysteria and hypochondriasis. Such conditions may easily pass into real mental disorder, paroxysms of which take the place of the convulsive

attacks. The attacks of giddiness are the most characteristic. Nothnagel cites the case of a clergyman, in whom frequently recurring attacks of vertigo, extending over some years, were succeeded by others in which there was complete loss of consciousness and muscular rigidity. Other cases recorded by the same author presented totally different symptoms, *e.g.*, obscuration of the visual field, the supervention of a kind of dreamy condition, lasting for some time, during which sight and hearing were more or less disturbed, and hallucinations of the most varied kind. The paroxysmal character of these phenomena, and their occurrence in persons exhibiting from time to time other symptoms more commonly referred to epilepsy are regarded as sufficient reasons for connecting them with this disease.

There are certain forms of epilepsy which yet remain to be noticed. The most important of these are: epilepsy of reflex origin and the so-called "Jacksonian" epilepsy. The condition termed hystero-epilepsy has been already described in the chapter on hysteria.

The term *reflex* epilepsy is applied to those forms of the disorder in which some anatomical lesion of the

peripheral nerves has caused the development of the symptoms. The course of events in a case of this kind is somewhat as follows: The patient receives an injury, such as a wound on any part of the body, but in most cases on one of the extremities. Healing takes place, and perhaps nothing more is thought of the wound; after an indefinite interval painful sensations are experienced in the cicatrix, and twitchings in the neighbouring muscles begin to be noticed. In some recorded cases a feeling of numbness preceded the twitchings. These movements become more and more troublesome, and extend in an upward direction to other muscles. The feeling of discomfort likewise spreads towards the head, and finally provokes an attack of epilepsy. This recurs from time to time, and can generally be excited by irritating the cicatrix. It is in these cases that a paroxysm can sometimes be averted by applying a ligature or tourniquet to the limb above the cicatrix, whence the epileptic aura proceeds.

That secondary form of the disorder which has been termed "Jacksonian epilepsy" is connected with the presence of lesions in the cerebral cortex. The convulsions occur on the opposite side of the body, and may be limited to certain groups of muscles, to a limb, to the

head or neck. After each attack a paretic condition is apt to be set up in the affected muscles; this at first is of a temporary character, but it sooner or later becomes permanent, and finally merges into complete paralysis. The convulsive movements come on at very uncertain intervals, and they may be altogether absent for long periods. They are generally unattended by loss of consciousness, and this symptom, when present, is less marked than in cases of typical epilepsy.

The course of the disorder varies greatly in different cases. It is generally chronic, and not a few epileptic patients live to a somewhat advanced age, without exhibiting any material impairment of their bodily or mental faculties. Even the frequency and severity of the paroxysms are not of such ominous import as was formerly supposed. Only in very rare cases do the paroxysms terminate fatally in consequence of cerebral hæmorrhage or from apnœa. The majority of fatal cases are caused by accidents of various kinds, to which epileptics are peculiarly liable. Accidental death from falling into fire or water or from a height is not an unfrequent occurrence.

In about forty per cent. of all cases of epilepsy, indications of mental disorder sooner or later exhibit them-

selves. After these have appeared the patient's condition invariably becomes worse and worse. For some time the general health between the convulsive attacks may appear to be perfectly good, and a very close examination may be required to discover any signs of derangement. Constant pain in the head, a feeling of confusion, inability to fix the attention continuously on any given subject, and frequent muscular twitchings are the most common evidences of incipient deterioration. Certain mental peculiarities are likewise apt to become prominent. In some patients, without obvious cause, excitement alternates with depression; marked obstinacy and capriciousness are sometimes exhibited; in other cases the memory becomes deficient, and mental exertion is felt to be more and more irksome. As time goes on, the signs of deterioration become more obvious; not only are the paroxysms more frequent, but the condition during the intervals changes for the worse. All the intellectual powers become more or less impaired. In some cases violent attacks of mania constitute the prevailing feature; in others the patient relapses into a state of dementia. Under such circumstances the features and manner of the patient are considerably changed, and the animal propensities are

wont to become very prominent. A condition of imbecility is the last stage of the disorder, and, in the absence of organic disease in the chest or abdomen, may continue for many years.

Diagnosis. The affections with which epilepsy is likely to be confounded are apoplexy, syncope from cardiac weakness, hysteria, and convulsions occurring in children.

An ordinary epileptic attack can be easily distinguished from apoplexy. The violent convulsions of the former contrast strongly with the motionless phase of the latter. When, however, the paroxysm is over and profound coma has supervened, there may be some difficulty in distinguishing between the two conditions, especially when the previous history cannot be obtained. The appearance of foam mixed with blood about the mouth, the absence of paralysis and of stertorous breathing are usually sufficient to determine the diagnosis, but it may be necessary to watch the case for some little time before coming to a positive conclusion.

Attacks of faintness may be mistaken for epilepsy. In the former, however, the loss of consciousness is, as a general rule, not sudden, but gradual, and preceded by a feeling of depression or nausea. There are no con-

vulsions, and no involuntary discharges, and the patient after recovery feels anxious and giddy, but not lethargic. His condition, moreover, is relieved by stimulants. Until thoroughly recovered his face continues pale.

The diagnosis between epilepsy and hysteria has been given in a previous chapter (see p. 113). It is only necessary to add that it has become more difficult to distinguish between the two affections since we have learnt to recognize hystero-epilepsy as a connecting link between them. The loss of consciousness was thought to be characteristic of epilepsy, but this may also occur in the mixed disorder. The abolition of reflex movements points decidedly to epilepsy, but the latter may exist in the absence of this symptom. The more any given attack differs from the typical form, the greater the difficulty of diagnosis.

Convulsions in children, whether arising from intestinal irritation or other similar cause, or occurring during the course of a febrile affection, may so closely resemble epilepsy as to be incapable of being distinguished from it. If the convulsions passed away after the removal of the cause, it would be unnecessary to refer them to the state in question, but if they recurred from time to time, the child's health being good in the

interval, they might justly be classified as epileptic. Whether the "epileptic change" had taken place or not could be determined only by the subsequent history of the case.

Epilepsy is occasionally feigned, and a clever impostor who has carefully studied its most striking phenomena may easily deceive all but a well-practised observer. There are, however, certain symptoms which cannot be counterfeited, viz., the initial pallor of the face, the dilatation of the pupil, the insensibility of the eye to light, the changes in the pulse, and the ultimate purplish or livid hue of the face. In a real epileptic patient there are often marks of injury on the face or hands, resulting from falls in previous attacks, and likewise scars on the tongue. The impostor generally chooses a convenient place for falling, and his attacks always occur in the presence of others. He sometimes produces the foam at the mouth by means of a piece of soap. A London policeman has been known to expose the counterfeiter by wrenching open his mouth and removing the source of the foam.

Prognosis. Epilepsy is a very serious disease, and rarely admits of a favourable prognosis. The abortive attacks are less amenable to treatment than the ordinary

type of the complaint. As a general rule it may be stated that permanent recovery takes place in about five per cent. of all cases. It is, however, often possible to reduce the severity and frequency of the attacks by proper treatment, but the improvement is generally of temporary character. In not a few cases the progress of the disease appears to be unchecked by any remedies. When a marked hereditary tendency is present, either to the disease itself or to other forms of nervous disorder, the prognosis is always very unfavourable. In the absence of any such tendencies, and when the attacks occur in a patient under 20 who appears perfectly well during the intervals, there is much room for hope that recovery may take place. The longer the complaint continues the more likely is it to prove irremediable. Recovery is almost out of the question if the mind has become impaired, or if any symptoms of paralysis are present. As in other forms of nervous disorder, it not unfrequently happens that a change in the treatment is attended with apparent benefit, and the same result often follows any change for the better in the patient's surroundings. The mental condition of the patient always exerts more or less influence on the progress of the complaint.

Treatment. In dealing with a case of epilepsy every endeavour should be made to discover any possible cause of the disorder. Remedies should not be used in a haphazard fashion, but the state of the system and any irregularity of function should be carefully observed. Subject to these general provisions the treatment divides itself into that which is required in the intervals and that which is adapted to the paroxysms. Cases of reflex epilepsy are sometimes very amenable to treatment. The removal of cicatrices, including fibrils of nerves, which formed the starting-point of the aura, has been followed by the happiest results. In another class of cases a cure has been effected by the operation of trephining, whereby diseased portions of the skull, exostoses, or spicula of bone were removed. As a matter of course improvement is not an invariable result even where the cause of the disease has thus been removed; the changes in the central organs set up by the irritation at the periphery are apt to become permanent and independent of the lesion which originally produced them. The lesson to be drawn from the success which has been obtained in such cases is that every epileptic patient should be very carefully examined in order to learn whether any peripheral causes of irritation, such

as cicatrices, exostoses, necrosed bone, etc., are discoverable. The examination should not be confined to the superficial parts, but should extend to all the organs of the body, and especially to the lungs, stomach, ovaries, and uterus.

The general state of the patient should next be considered, and any deviation from the healthy condition should be remedied as far as possible. If the patient be plethoric, saline purgatives and a restricted diet are indicated. Anæmic cases will be benefited by iron, quinine, a nutritious diet, and a general tonic regimen. The condition of the digestive organs should receive especial attention; constipation in particular should be corrected by appropriate remedies. Symptoms of gastric catarrh when present will require alkalies and vegetable bitters, and the possibility of tape-worm being the exciting cause of the attacks should not be forgotten.

In the treatment of confirmed epilepsy the regulation of the diet and of the patient's general habits is of the utmost importance. The rules to be laid down in these particulars must, of course, be adapted to each individual case; only general principles can here be given. In the first place excesses of every kind must be abandoned. The diet should be nutritious and non-stimulating;

especial attention should be paid to the quantity of animal food, for, as a general rule, the attacks become more frequent when articles of this description are too largely used. Some patients are improved by a diet consisting principally of vegetables and milk. Regular and moderate occupation, exercise short of fatigue, early hours, in fact, hygienic measures of all kinds, are indispensable for the satisfactory treatment of an epileptic patient; if they cannot be secured drugs will prove of little or no avail.

An enormous number of remedies have been recommended for epilepsy, but the reputation acquired by most of them has been only of a temporary character. At the present day the bromide of potassium is the remedy which yields the best results; it is, however, sometimes useless, but it always deserves a thorough trial, for though it may fail to cure the disease it will generally cause more or less improvement. Diminished frequency of the paroxysms and improvement in the mental condition of the patient are results which are often witnessed. To afford any prospect of success it must be given in full doses, viz., from one up to three or even four drachms per day. A convenient method of exhibiting it is to dissolve it in seltzer-water

or milk, and sometimes it is better tolerated by the stomach if taken with some bitter infusion and a few grains of bicarbonate of potassium. Concentrated solutions of these large doses should never be employed, as they are apt to irritate the stomach. To obtain the full effects of the drug it should be given for two or three months; if no improvement take place its administration should be stopped. It must not be forgotten that prolonged use of the bromide of potassium is apt to be followed by very untoward results, such as a condition of utter passiveness, lethargy, and inability to perform any mental operations. If there be any appearance of these symptoms the use of the drug should be discontinued, and we may then have recourse to atropine. This powerful drug should be given in doses commencing with the $\frac{1}{120}$ of a grain, gradually increased up to $\frac{1}{50}$, or even $\frac{1}{30}$. The quantity prescribed should be administered in a single dose at bed-time, and slowly increased, week by week, until the maximum is reached. This is to be continued for a fortnight, and then steadily reduced to the minimum dose. This plan of treatment may be persevered in for a year or more, the patient, of course, being very carefully watched during the whole time, and the medicine stopped on the appearance of any toxic symptoms.

Other remedies used for epilepsy require only a brief notice. The oxide of zinc, nitrate of silver, and the ammonio-sulphate of copper, although much lauded from time to time by various authorities, would seem to possess little, if any, real efficacy. They may, however, be tried if the bromide and atropine prove useless. They are supposed to strengthen the nervous system, and to lessen abnormal excitability. The nitrate of silver is given in doses of one-quarter or one-third of a grain three times a day, to be gradually increased to one or even two grains. It is best administered in a pill, with kaolin ointment as an excipient. The risk of permanent discoloration of the skin should always be borne in mind; the remedy should never be continued longer than six weeks or two months without an intermission of an equal length. The oxide of zinc, to be of any use, must be given in large doses, but these are not always tolerated by the stomach. From two grains at first, three times a day, in the form of a pill, the dose may be increased up to ten, fifteen, or even twenty grains in the absence of marked gastric symptoms. The sulphate of copper is given in doses of from half-a-grain to two grains, and the ammoniated copper in doses of from one to five grains. The latter drug is said to be more efficacious in adults than in

children; the reverse holds good with regard to zinc. It is also said to be more suitable for torpid, phlegmatic persons than for those of an irritable, nervous temperament. Many vegetable remedies have been employed in the treatment of epilepsy; some for their tonic, others for their antispasmodic properties, and others, again, have been given quite empirically. Of the vegetable tonics quinine is worthy of trial when the attacks assume a decidedly periodical form; it may also be given with the view of improving the digestion. Among the antispasmodics valerian is one of the oldest remedies. Its real efficacy may be doubted; yet it would appear to possess some power of lessening nervous excitability. In some experiments made a few years ago upon frogs the administration of oil of valerian (gr. $\frac{3}{10}$) was found to produce a quiet and apathetic state, followed by complete stupor. Reflex irritability was considerably diminished, and the change appeared to depend upon an influence affecting the spinal cord, as well as the spasm-centres in the brain. The drug would seem to be best adapted for cases of hystero-epilepsy; its infusion will also serve as a vehicle for the bromide of potassium. Of the purely empirical remedies it is sufficient to mention the cotyledon

umbilicus, indigo, sumbul, and artemisia vulgaris. These and many other drugs are said to have effected improvement, and even cures in some cases. It is probable that any change for the better, observed after their use, has been due mainly to the influence of novelty or hope on the mind of the patient, and to alterations in his manner of living enjoined by the physician when prescribing the drugs.

Electricity in various forms has, of course, been tried for epilepsy, and cures are said to have been effected. We know nothing of the special conditions for which electricity would be likely to be serviceable, but it may be tried as an auxiliary to other means. A galvanic current of moderate strength is employed; the electrodes are placed one on each side of the upper part of the back of the neck, or over the course of the cervical sympathetic nerves. Currents may also be sent through the cranium; and whenever a decided *aura* follows the course of a nerve, it has been recommended to apply the electrodes to the surface in relation therewith.

Hydro-therapeutic treatment may sometimes be advantageously conjoined with other remedies for epilepsy. The patient should, as Nothnagel recommends, be sent to an institution where the treatment can be methodi-

cally carried out for six or eight weeks, or even longer. It must, of course, be carefully adapted to the condition of the patient; violent douches to the head and spine should be prohibited. Whenever there is great nervous excitement tepid or warm baths may take the place of more decided measures. In cases in which there is pain or tenderness along the spine the application of Dr. Chapman's ice-bags is likely to be serviceable.

Little treatment is generally required during the paroxysm. In cases attended with the epileptic aura it has been recommended to apply a ligature or a tourniquet to the limb, and some patients, when time will allow, are able to avert a paroxysm by inhaling ammonia and other nervine stimulants, or by taking a draught of cold water. In the *Practitioner* for October, 1868, Dr. Buzzard has recorded several cases, which show that when a marked local sensation precedes an attack, the fits may be diminished, and sometimes even cured by applying a narrow blister round the limb above the starting-point of the *aura*. The inhalation of amyl-nitrite would seem to be a rational means of keeping off the attack in cases in which there is sufficient warning of its approach, and whenever decided pallor of the face is the first symptom. During the paroxysm itself the patient should be

placed on his back, with his head somewhat raised; the clothes should be loosened, especially about the neck and trunk, fresh air should be freely admitted, and a piece of soft wood or cork placed between the teeth in order to prevent the tongue from being bitten. The convulsive movements should be so far restrained as to keep the patient from injuring himself. Toward the end of the attack the mucus which may have accumulated about the mouth should be wiped off. In the majority of cases the attack spontaneously subsides in a few minutes, and the patient falls into a deep sleep. If the convulsions recur and a high temperature exists, cupping to the back of the neck, or even the abstraction of a few ounces of blood from the arm, would seem to be the best treatment. For very violent and oft-repeated paroxysms the inhalation of chloroform should be carefully tried, or twenty grains of chloral hydrate may be administered in an enema.

CHAPTER VI.

CHOREA—ST. VITUS' DANCE.

CHOREA, HISTORICAL NOTICES, DEFINITION AND GEOGRAPHICAL DISTRIBUTION OF THE DISORDER—CAUSES—HEREDITARY PREDISPOSITION—IMITATION—AGE AND SEX—MENTAL EXCITEMENT—REFLEX CAUSES—OCULAR DISORDERS, DR. STEVENS' VIEWS—CONNECTION BETWEEN RHEUMATISM AND CHOREA—NATURE OF CHOREA—DRS. BROADBENT, KIRKES, AND DICKINSON'S VIEWS—DR. STRÜMPELL'S OPINION THAT CHOREA IS A FUNCTIONAL DISORDER—SYMPTOMS—EVIDENCES OF MENTAL DISORDER—DIFFERENCES IN SEVERITY—ANALYSIS OF PROMINENT SYMPTOMS—DURATION OF THE DISORDER—PROGNOSIS, DIAGNOSIS, AND TREATMENT—NECESSITY OF INQUIRING INTO CAUSE—SPECIFIC REMEDIES, AS ARSENIC, ZINC, AND STRYCHNINE—COLD TO THE SPINE—CHLORAL—ISOLATION FROM OTHER CHILDREN.

CHOREA is in many respects one of the most interesting disorders which the physician has to study. The name was originally given to the epidemic of dancing madness which appeared in the 14th and 15th centuries in some parts of Western Germany, because the movements were supposed to be cured by the help of St. Vitus, called "Guy" in France, and "Veit" in Germany. The same word (chorea) was subsequently used by Sydenham to describe the spasmodic disorder now universally known under that name; and after-

wards a distinction began to be made between the chorea Germanorum, or chorea magna, as it was called, and chorea Anglorum, or minor.

The two disorders thus grouped under a common name are completely distinct, and have really nothing in common.

At the present day, when epidemics of the dancing mania are unknown, the term chorea signifies a nervous affection characterized by incoherent action of the muscles. It may be more fully defined as a convulsive disorder, most often occurring in early life, and marked by irregular non-rhythmical contractions of the voluntary muscles, at first usually of one side of the body, but afterwards becoming general; the face and arm are more frequently affected than the leg. There is no loss of consciousness, but the will is incapable of preventing the movements, which, however, cease during sleep. As time goes on the affected muscles become enfeebled, the sensibility is sometimes diminished, and there is often impairment of some special sense.

We have no means of judging whether this disorder existed in ancient times; the works of the earlier writers contain no descriptions which can be applied exclusively to chorea. The affection was well known in the 18th century, and often described by medical

writers throughout Europe. With regard to its geographical distribution, chorea is, like many other affections of the nervous system, a disorder of civilized life. Scarcely any part of the world is altogether free from it, but it is far less common in tropical countries than in the temperate zones. It is said to be about equally distributed in the temperate portions of Europe and America; to be very rare indeed in the East and West Indies, and almost unknown in China.

The causes of chorea are many in number and various in character. Hereditary predisposition to nervous disorders is a very important factor, and the frequency with which it can be traced is a measure of the relationship which exists between many affections of the nervous system. Epilepsy or hysteria in the parents predisposes the children to chorea. It must, however, be remembered that when several children of the same family suffer, the development of the symptoms may be due to imitation. Small epidemics, indeed, have been known to arise in institutions for children after a case of chorea had been admitted. Under such circumstances the complaint very quickly spreads, and its progress can be checked only by separation. In these respects it is analogous to hysteria. With regard to age and sex, the majority of cases occur between the

ages of 6 and 15; the disorder is more common in girls than in boys, the proportion being three of the former to two of the latter. The complaint is more often met with in towns than in country places, and among children of the poor than among those of the rich. A very common predisposing cause is debility, especially when due to neglect and want of proper food. Chorea very seldom occurs for the first time in persons over 20 years of age. Among the direct causes the most potent is some form of mental excitement, such as fright or a severe shock. Many cases are on record in which the symptoms have followed immediately upon some sudden alarm. Last year I treated a patient in whom the attack was induced by shock consequent on being run away with in a carriage. Other causes are of a reflex nature, *e.g.*, worms in the intestines, painful affections of the mouth or teeth, and disorders of the genital functions. I am now attending a woman, aged 28, in whom a retroverted womb seems to be the cause of the attack. Symptoms occasionally appear in pregnant women, and subside after delivery. As illustrating the manifold character of reflex causes, it may be mentioned that hemichorea has been known to be associated with fissure of the anus. The movements completely ceased after the fissure had been cured by operation.

Dr. Stevens, of New York, has recently attempted to show that chorea is emphatically a nervous disorder depending upon ocular conditions. He has found that the majority of cases of chorea occur among hyper-metropic children who are attending school, and that the widely dilated pupils, which constitute a very characteristic feature of chorea, become normal when the complaint passes away. When hyper-metropic children are put to any "work where a very marked and continued effort to maintain accommodation is required, the ciliary muscle experiences fatigue, and finally exhaustion, its action is considerably enfeebled, and with it the action of the sphincter pupillæ. The widely dilated pupil is the signal which tired nature gives as a warning to discontinue over-work of the exhausted muscles. If the signal passes unheeded the whole nervous system surrenders." Dr. Stevens' experience leads him to believe that cases which occur without any relation to ocular troubles are rare exceptions to a very general rule. In 118 cases of chorea occurring in private practice simple hyper-metropia existed in 78, and astigmatism with other complications in nearly all the remaining cases. I have seen several patients in whom the chorea depended upon ocular abnormalities of these kinds.

The connection between acute rheumatism and chorea is one of the most interesting features of the latter complaint. Some writers, indeed, go so far as to declare that chorea is always of rheumatic origin, while others assert that rheumatism, heart disease, and chorea are only different phases of one and the same disease, and that these affections may occur in any order of sequence. Chorea is often preceded by an attack of acute rheumatism or by less severe pains of a rheumatic character; and the connection is still further evidenced by the fact that a history of rheumatism can sometimes be traced in the parents of choreic children. It is, however, going too far to say that rheumatism in any form is a necessary precursor of chorea.

Very widely different views are held as to the nature of chorea, but within the last few years considerable light has been thrown upon the pathology of at least some of its forms. More or less serious lesions can be found in fatal cases, especially when the complaint has been preceded by rheumatism; the difficulty is to account for mild cases which rapidly recover under the influence of good food and fresh air. There is apparently much truth in Dr. Broadbent's view that chorea is a symptom rather than a disease, and that the characteristic movements are in relation with the seat of the

morbid change rather than with its nature. "The seat of the disturbance is the corpus striatum, its character probably different in different cases; but the anatomical condition cannot amount to actual breach of structure, since that is known to give rise to hemiplegia, while it must obviously be of a kind to impair the functional vigour of the ganglia."

Nearly forty years ago the late Dr. Kirkes reported a series of cases of fatal chorea, in which on post-mortem examination inflammatory changes were found in the cardiac valves. In a large proportion of these patients there was no history of rheumatism, and in a few of them no cardiac murmurs had been audible during life. Dr. Kirkes advanced the view that the disorder of the nervous centres in chorea is due to the action of the inflammatory products of the endocardium.

In this way the embolic theory of chorea originated, and it has now gained pretty general acceptance. In several recorded cases vegetations on the mitral valve were associated with embolisms in the corpus striatum and thalamus opticus. Various other lesions have been found; the most important of these are interstitial development of connective tissue in the nervous centres; hyperæmia of the brain and spinal cord; serous effusion and extravasation of blood in the spinal canal. Accord-

ing to another view of the pathology of chorea, the morbid processes are of a diffused character, and not confined to any special part or parts of the nervous centres.

The alterations found in the spinal cord and even in the peripheral nerves in some cases are held to support this theory. Dr. Dickinson examined a number of cases and found many small arteries of the brain and cord much dilated, the change being especially marked in the optic thalamus and corpus striatum. Minute extravasations were also visible, but emboli were not detected.

Dr. Hughlings Jackson supports the embolic theory; on the other hand Dr. Strümpell, of Leipsic, states that this theory is destitute of proof, and is even improbable. He regards chorea as a "neurosis," that is, a disease which produces functional disturbances for which an anatomical basis is at present unknown.

The account just given of the changes found in fatal cases of chorea, and of the theories as to the nature of the disease, will suffice to show the uncertainty which exists on this latter subject. It is evident that very different causes must be at work in severe as compared with mild cases.

Irritative processes and capillary embolisms may account for the former class; for the latter some other explanation must be found. The rapid subsidence of the convulsive movements would seem to be incompatible with the presence of organic lesions. At present it seems impossible to do more than assume the existence of nutritive disorder in the brain. Such disturbance may depend upon hyperæmia, with stagnation of blood in the capillaries, or with a form of thrombosis, due to accumulation of masses of white corpuscles. When chorea follows directly upon shock vaso-motor disturbance may be presumed to exist, with contraction followed by dilatation of vessels as a result. When, lastly, the movements seem to be reflex in character (as in the chorea of pregnancy), it must be assumed that the irritation is propagated from the peripheral nerves to the spinal cord and brain. Evidence in support of the view that chorea is essentially a functional disorder will be found in the introductory chapter of this work.

Symptoms. In the majority of cases the choreic movements are preceded by symptoms indicative of disorder of the general health. Fretfulness, irritability, capriciousness, indifference, inattention, etc., are

noticed in a child who had previously exhibited none of these traits. The appetite fails, the sleep is disturbed, the child is disinclined for exertion, avoids his companions, and seems weak and ailing. These symptoms are not invariably noticed, they are, of course, absent in cases of chorea supervening on fright, or following closely an attack of acute rheumatism.

After these symptoms have continued perhaps for some weeks the choreic movements begin to be noticed. There is first a general restlessness and uneasiness; the parents are apt to say that the child has the "fidgets;" he moves about aimlessly, and seems awkward and clumsy in his actions. If he be attending school his inattention and carelessness are complained of; it is perhaps noticed that his handwriting is worse than usual. At home the child is sometimes punished for carelessness during meals, he drops things from his hand, upsets his cup, makes grimaces, and seems not to heed any remonstrances. At this stage there is generally no suspicion as to the real nature of the case. Before long, however, definite convulsive movements occur.

The twitchings usually begin in the hand and arm, and thence extend to the shoulder, face, and other parts

of the body. In most cases they are at first limited to one side, the left being more frequently affected than the right; but sooner or later the affection extends to the other side of the body. The twitchings exhibit every variety of force and character; the fingers are often suddenly flexed, the forearm is alternately pronated and supinated, and these movements are combined in every possible way, so that the limb assumes the most unnatural positions. Many muscles of the neck and face are similarly affected, the head is jerked about, and the mouth, nostrils, and eyebrows are contorted in various directions. All the movements are exaggerated when the patient knows that he is under observation, and especially when he is told to do anything. He is able to perform the action, but he does it hastily, and executes many unnecessary movements. When the twitchings extend to the leg the limb is moved in various directions while the child is sitting or lying down. When he walks he finds that he has imperfect control over the limb; it becomes difficult for him to move in a straight line. One step is taken rapidly, and another slowly, and the steps vary in length and direction.

In the early stages of the complaint the patients often endeavour to disguise the convulsive movements

by voluntarily making others in a similar direction. If, however, the case goes from bad to worse voluntary movements gradually become impossible; the patient can do nothing for himself, but has to be dressed and undressed, fed, and otherwise attended to. Continuous speaking becomes more and more difficult, and at last impossible; owing to inco-ordination of the muscles of the lips and tongue the words are jerked out and cut short. There is often some amount of aphonia, due to implication of the muscles of the larynx. In the large majority of cases the movements cease during sleep, which, however, is often restless and disturbed by dreams.

Evidences of mental disorder are noticeable in many cases of chorea. The irritability and excitement which characterize the early stages are apt to become more and more decided; but later on these symptoms are succeeded by others indicative of depression and mental weakness. The face wears a decidedly fatuous aspect, or a look of utter despondency. Studies have to be given up; the child may completely forget all that he had previously acquired, and appear to be little better than an idiot. In severe cases in adults the patient may become maniacal.

In chorea, as in many other nervous affections,

there are great differences in the character and intensity of the symptoms in different cases. In the mildest forms there are only slight twitchings of the muscles of the face, shrugging of the shoulders, or perhaps some irregular movements of the hands. In severe cases the convulsive movements may extend to the whole of the body, and be so violent as to make it very difficult to keep the patient in bed. Between these two extremes there are many various degrees of severity.

The more prominent symptoms require a somewhat closer analysis. The motor disorders are twofold, and take the form of spontaneous convulsions and subsequently of inco-ordinate movements which result from the patient's attempts to perform common actions. When, for instance, he wishes to hold out his hand, the limb makes a series of movements more or less wide of the mark before the purpose is accomplished. In other cases common voluntary movements are effected in a manner which is almost normal, whereas the more automatic actions, such as grasping and retaining an object, walking, sewing, writing, etc., are accompanied by marked choreic movements. The convulsive twitchings do not seem to cause fatigue, but as time goes on a general weakness becomes developed, and

loss of power in one side, to a greater or less extent, is often observed. When there are evidences of real paralysis the existence of organic lesions in the brain may, of course, be inferred. The galvanic excitability is generally increased, especially on the affected side in cases of hemichorea.

With regard to disorders of sensation, there may be some amount of anæsthesia in one or more limbs, and pain may result from severe spasms. In some cases *points douloureux* can be detected on pressure along the spine, and on the large nerve-trunks of the extremities.

Evidences of derangements of the organs of circulation are often present. The pulse is usually frequent and sometimes irregular owing to the spasmodic contractions of the muscles. Murmurs of various kinds are audible in many cases; mitral systolic is most common in those connected with rheumatism; in anæmic subjects a systolic murmur may be heard at the base, gradually to disappear as recovery proceeds.

In cases of chorea of average severity the disorder lasts from six weeks to three months. Its course, however, is seldom uninterrupted; exacerbations are apt to occur, and relapses are not unfrequent even after a recovery supposed to be complete. Under favourable

circumstances the symptoms gradually subside; the movements of the legs become less and less marked, then those of the arms, and lastly those of the face. In many cases contortions of the features are noticed for weeks or months after the other symptoms have ceased. In children the prognosis is generally favourable, complete recovery is the rule, and sequelæ of any kind are seldom observed. An incurable condition of dementia may, however, supervene, and certain muscles may become permanently weak and atrophied.

In fatal cases, which, unless the disorder supervenes on acute rheumatism, are very rare, death is generally caused by exhaustion due to the severity and continuance of the paroxysms. In adults the disorder always runs a very chronic course, and it terminates fatally in a large proportion of the cases. About 30 per cent. of cases of chorea occurring in pregnant women end in death.

Diagnosis. In the majority of cases, chorea is easily distinguished. The movements may be mistaken for those which characterize disseminated sclerosis, but this affection occurs mostly in adults and is rare in children.

Moreover, in sclerosis the movements consist of fine

rhythmical tremors; in chorea they are much more extensive, and of a jerky character. In doubtful cases the course of the disorder under treatment will aid the diagnosis.

Treatment. Slight cases of chorea often recover under the influence of good food, a proper amount of rest, change of air and scene, and moderate exercise, and these and all other measures calculated to improve the general health should be adopted as far as possible. Every endeavour should be made to ascertain the cause of the attack, or the circumstances under which it originated.

If the condition be one of anæmia and debility, cod-liver oil and iron are especially indicated; if worms be suspected, suitable anthelmintics should be administered; and any existing disorder of the generative organs should be carefully inquired into and treated. Ordinary routine treatment should not be adopted until a thorough examination has been made with the view of discovering a local source of irritation. When chorea occurs in a child attending school the eyes should be carefully examined. If hypermetropia, asthenopia, or astigmatism be found to exist a general tonic regimen should be adopted, and suitable glasses prescribed. Absolute rest of mind must

be enjoined, and no lessons of any kind are to be thought of until the choreic symptoms have completely disappeared, and a decided improvement has taken place in the general health. In cases of chorea following rheumatism, iodide of potassium with alkalies and cinchona is likely to be serviceable, and cod-liver oil may be given at the same time.

When all possible causes have been dealt with as far as possible, it is time to have recourse to certain drugs which have a beneficial action on the symptoms. Arsenic is the most generally efficacious, and Fowler's Solution is the most convenient form for its administration. From three to ten minims may be given in a little peppermint water or infusion of orange three times a day after meals. It is well to begin with a small dose, and gradually to increase the quantity taken by adding one minim to each dose every four or five days. Symptoms of gastric disorder must, of course, be watched for; if the appetite fall off, if there be pain in the stomach or frequent eructations, either the dose must be diminished or the medicine altogether omitted until the gastric symptoms have disappeared.

Sulphate of zinc is another remedy of this kind, but is less efficacious. It is given in doses of a grain two

or three times a day, and these are gradually increased by successive additions, until thirty or forty grains are taken daily. Strychnine, as recommended by Trousseau, may be tried if arsenic fails. Iron has been already mentioned; it may be combined with arsenic, especially in anæmic cases.

With regard to external remedies, cold applied to the spine is sometimes very efficacious in lessening the frequency and extent of the movements. The ether spray or an ice-bag may be employed. The latter should be kept in position for about ten minutes daily, or the spray may be applied to the upper part of the spine for a somewhat shorter time.

As measures of a tonic character, sponge baths, with tepid or cold salt water, followed by friction, are useful auxiliaries. Shower-baths are sometimes recommended, but are seldom advisable on account of the alarm they are likely to cause.

When the convulsive movements are very severe, and so continuous as to deprive the patient of rest, narcotic remedies must be tried. Chief among these is chloroform, but the relief it affords is only temporary. Chloral hydrate is another remedy of this kind; to be of any use it must be given in full doses. Its action is more pro-

longed than that of chloroform, and it has a very decided effect upon the convulsive movements. While the patient is under its influence attempts should be made to administer nourishing food. The bromides and the preparations of opium have a far less potent influence in arresting the movements.

As a matter of course, in all severe cases great care should be taken to prevent the patient from injuring himself. He must be kept in bed and constantly watched.

There is one other point to be attended to in connection with the treatment of chorea. In view of the liability of the disorder to spread from imitation, the patient should, as far as possible, be kept away from other children.

CHAPTER VII.

NEURALGIA.

Pain, its Nature—Sensory and Tactile Nerves, their End-Organs, Fibres, and Nerve-Centres—Varieties of Pain—Essential Features of Neuralgia—Cause of Neuralgic Pain—Changes in Nerve-Centres—Atrophy of Posterior Roots—Vaso-motor Disorder—Predisposing Causes of Neuralgia, Hereditary Predisposition, Debility, Age, Sex—Exciting Causes, Cold and Damp, Injuries, Pressure on Nerves, Constitutional Disorders, Gout, Diabetes, Syphilis, and Malarious Fevers—Symptoms, Peculiarities and Duration of the Pain, Remissions, Intermissions, and Recurrences—Locality of the Pain as a Guide to the Cause—Pain Extending Centripetally and also Radiating Along the Course of Neighbouring Nerves—Points Douloureux—Cutaneous Hyperæsthesia and Anæsthesia—Motor Disorder—Vaso-Motor Disturbances and Disorders of Secretion and Nutrition—Eruptions of Herpes and Erythema—Effects of Neuralgia—Diagnosis—Treatment—Discovery of Cause—Symptomatic Treatment—Quinine, Arsenic, Salicylate of Sodium, Iodide of Potassium—Anodynes, Morphine and Atropine—Liniments—Counter-Irritation—Electricity—Various Tonic Remedies—Neurotomy and Neurectomy—Summary of Treatment.

Pain may be defined as a peculiar form of common sensation, provoked by the action of relatively strong stimuli on sensory nerves. According to the most

recent physiological doctrines, the sensory nerve trunks contain two functionally different kinds of nerve fibres, viz., those which convey impressions of pain, and those which administer to tactile impressions; with the latter group the sensations of temperature and pressure are associated. Landois states that the sensory and tactile nerves have in all probability different end-organs and fibres, and that they have also special perceptive nerve-centres in the brain, although this is not definitely proved. In support of these views he cites among others the following facts. (1). Tactile sensations are absent from all internal viscera; impressions of pain alone are discharged from these organs. (2). The conduction channels of the tactile and sensory nerves are in different parts of the spinal cord. Tactile impressions are conveyed through the posterior columns of the same side, while painful impressions are conducted through the grey matter, and some of the conducting fibres pass from one side of the cord to the other. (3). A small portion of the grey matter, if left undivided, suffices to conduct painful impressions; if the division be complete the conduction does not take place, but provided that the posterior columns are uninjured tactile impressions are still transmitted. Thus one

sensation may be abolished while the other is retained. The irradiation of painful impressions, so often noticed, is explained by the fact that they are conducted by the whole of the grey matter.

Several varieties or qualities of pain are more or less distinguishable from each other, and are often described by such epithets as "burning," "piercing," "cutting," "boring," "pricking," "splitting," "dull," "heavy," etc. The use of these terms implies that there is something superadded to the peculiar sensation of pain. Thus when the hand is exposed to intense heat the sense of temperature is appealed to, and a definite quality is assigned to the pain; in like manner, when a needle is thrust into the finger the sense of touch is affected, and a form of pain distinguishable from other kinds is experienced.

The general meaning of the term *neuralgia* is sufficiently obvious, though it is not easy to suggest a precise definition. Its essential features may, however, be thus described:—

1. Neuralgia is characterized by paroxysmal attacks of more or less violent pain, coming on either at regular or irregular intervals and of uncertain duration, and presenting complete intermissions or decided remissions.

2. The pain extends over distinct areas supplied by sensory nerves, and is likewise felt in the course of the nerve trunks.

3. The attacks of pain come on spontaneously, or as a result of slight irritation.

4. There is no discoverable lesion of any organ situated within the region which is the seat of the pain.

5. The attacks are not followed by any general symptoms.

The various ways in which pain may be provoked are only too well known, but the actual cause of neuralgic pain is still a matter of speculation. According to a somewhat plausible theory this prominent symptom is due to a chemical process or change acting upon the nervous system. Experiments have proved that irritation of a nerve is followed by elevation of temperature in the nerve-substance, and a change in its chemical reaction. Lactic acid and acid sodium phosphate are formed, so that the reaction in the nerve-trunks, previously alkaline, becomes at least neutral, while in the nerve-centre the reaction may be distinctly acid. These changes, however, are only of a temporary character; the acid products are soon neutralized by the alkalies of the blood, and are absorbed and removed. Granted,

however, that this explanation be the correct one, the manner in which the chemical results of the irritation act upon the nerves remains unknown. The periodicity of the attacks may be accounted for in a manner analogous to that by which the same peculiarity of other processes is explained. The inspiratory act, for example, is provoked by the poverty of the blood in oxygen. The respiratory centre is stimulated when the blood has lost a certain amount of this gas, and contains an increased amount of carbonic acid. In neuralgia the attacks are excited when sufficient quantities of the irritating materials have become accumulated. At first and for some time neutralization is effected as above described, and the attacks cease; but after a while, as a result of fatigue of the vaso-motor apparatus, neutralization and absorption are less rapidly effected, and the attacks increase in duration and severity. After a time central changes take place, and these have a tendency to become permanent. It is these changes in the nervous centres which are concerned in the production of the pain. In neuralgia of a mixed nerve, if only the trunk were affected, motor phenomena would show themselves, but this complication is not always observed. The irradiation of

the pain along branches of other nerves is likewise a proof of the existence of central changes.

This theory of the causation of pain has much to recommend it, but it has not as yet been supported either by experimental or pathological evidence. In one case of tic douloureux recorded by Billroth atrophy of the nucleus of the fifth nerve was found combined with dilatation of the vessels.

Other theories of neuralgic pain deserve a brief notice. The late Dr. Anstie considered that neuralgia was due to atrophy, or to processes leading to atrophy, of the posterior roots of the spinal nerves or of the grey substance connected with them. He supposed that certain cells and groups of fibres were, so to speak, congenitally *loci minoris resistentiæ*, under the influence of such agents as exposure to cold, injuries, mental shocks, alcoholic excesses, as likewise during puberty, pregnancy, and senile disorders of nutrition. It is supposed that these and similar causes tend still further to damage cells and fibres originally weak, and ultimately produce a condition of atrophy. Very little pathological evidence has, however, been adduced in support of this theory; on the other hand, in some cases of neuralgia of spinal origin the roots of the nerves and the grey

substance of the cord were found quite normal, whereas the posterior columns showed very decided appearances of irritative changes. The fact that neuralgic symptoms are common in the early stages of locomotor ataxy would appear to indicate that in addition to the roots and the grey substance the posterior columns may be implicated in the causation of neuralgic pains.

According to another view, atrophy of the nerves, due to inflammatory processes, renders them liable to violent attacks of pain, the original seat of the lesion in the majority of neuralgias being within the vertebral canal or in the cranium. Inflammatory affections of the membranes of the cord and brain, slight in extent and otherwise devoid of symptoms, are the principal lesions of this character. In the origination of these excentric neuralgiæ, the vaso-motor nerves play a prominent part, inasmuch as they supply the mechanism which produces an attack of pain, even in central affections. Local disorder of circulation at the seat of pain is the result of the action of these nerves. The same vaso-motor mechanism can likewise be called into action at the periphery by causes acting there, with results similar to those due to central changes. Primary irritation of the posterior roots, caused by local anæmia, hyperæmia, etc., may, by reflex action

upon the vaso-motor fibres, which accompany the anterior roots, play a conspicuous part in the production of excentric neuralgia.

Without discussing these theories any further it is sufficient to remark that vaso-motor changes would seem to furnish a clue to many of the symptoms of neuralgia.

The predisposing and exciting causes of neuralgia are of various kinds. The first-named class includes (1) a nervous constitution, for the most part of hereditary origin; (2) debility; (3) age, and (4) sex. Neuralgia is especially liable to occur in persons who suffer from other nervous affections and in those with a family history of such disorders as epilepsy, hysteria, etc. It is also common in anæmic and debilitated subjects generally, and especially in those whose strength has been reduced by over-exertion, bodily or mental, excesses of all kinds, etc. Neuralgia is an affection of adult life; but it sometimes occurs in old age, though rarely in children. Some forms, notably tic douloureux, are more common in women; others, such as sciatica, are more frequent in men.

Among the exciting causes of neuralgia cold and damp and exposure to draughts occupy the first place.

We have no certain knowledge as to the manner in which cold acts upon a nerve, but it is generally supposed that slight anatomical changes of an inflammatory character are induced. Other causes of neuralgia are injuries of various kinds, the presence of foreign bodies and morbid growths in the neighbourhood of the nerves; and diseases of the bones and periosteum, especially of that lining canals through which the nerve passes. Pressure upon nerves, however, does not always give rise to neuralgia. Various constitutional disorders, *e.g.*, gout, diabetes, syphilis, and malarious fevers, often play an important part in the production of neuralgia. The influence of malaria in this respect is often well-marked, the attacks coming on at regular intervals, and curable only by large doses of quinine.

We are quite in the dark as to the manner in which the malarious poison affects the nerves. Climatic conditions, *e.g.*, rapid changes of temperature, with excess of moisture in the air, determine the prevalence of neuralgia in many parts of the world. Neuralgic pains occurring in gouty subjects may be attributed to the direct influence of the uric acid upon the nervous tissue, but why certain nerves are usually affected while others escape is a mystery which appears to defy solution

In some patients of gouty habit the pain is felt in the course of those nerves which, from their position, are most exposed to the influence of cold and damp. Analogous to these cases of constitutional neuralgia are those in which the symptom is traceable to the presence of lead, copper, or mercury in the system. Some forms of neuralgia are evidently of reflex origin; thus diseases of the uterus often excite neuralgic pains in the lower limbs, and even in the face and head.

Symptoms. Neuralgic pains may be classified under two heads; when due to obvious causes they are known as *symptomatic;* when no cause can be ascertained the term *essential* is used. As instances of *symptomatic* neuralgia may be mentioned the severe shooting pains characteristic of vertebral caries, and of aneurisms in general; in these cases the pain is assumed to be due to inflammation or pressure. In *essential* neuralgia no such causes are discoverable, and we are too ready to assume that they do not exist. On the other hand, analogy would lead to the inference that severe and continuous pain is always connected with changes either in the nerves or nerve-centres, and the term *essential*, as applied to neuralgia, should be only provisionally used. Subject to this proviso, a

description will first be given of the general symptoms of neuralgia, and the various local affections of this character will next be discussed.

Neuralgic attacks are most frequently preceded by symptoms indicative of irritation of the cutaneous sensory nerves supplied to the part. These prodromal symptoms take various forms, *e.g.*, sensations of itching, tingling, cold, warmth, pressure, tension, etc. After these have lasted a variable time pain supervenes and rapidly increases till the maximum intensity is reached. In some cases of neuralgia prodromal symptoms are almost or altogether absent; the attacks come on without any warning. A common feature of neuralgic pain is the lightning-like rapidity with which it shoots through the affected part; it starts, as it were, from a centre, and radiates in various directions to certain points from which it appears to return to its seat of origin. At the height of its intensity it is often described as well nigh unbearable; its special peculiarities are further designated by such epithets as "pricking," "tearing," "burning," "boring," and similar terms. The duration of the pain varies; in many cases after remaining at the same degree of intensity for a few seconds or minutes a remission occurs, or even a com-

plete intermission. This interval again varies in duration; it may last only a few seconds, when the pain recurs with its former intensity. In another class of cases the pain continues for hours or even for several days, with temporary remissions. Even when very severe, and apparently at its height, lightning-like shocks of still greater intensity are often experienced. Recurrences are wont to occur either at regular or irregular intervals; and between the attacks the patient is either quite free from pain or complains only of a feeling of soreness or bruising, which, though it may be severe, is lightly regarded when compared with the previous agony.

The locality of the neuralgic pain may, to some extent at least, be a guide to its origin. Thus gouty neuralgia most frequently appears in the form of hemicrania; and other forms, notably sciatica and facial neuralgia, sometimes alternate with articular gout. Mr. Hutchinson thinks that a gouty origin may be assigned to neuralgic attacks taking the form of sharp explosions of lightning-like pains over the parietal bones, and occurring in quick succession, but unaccompanied by tenderness on pressure. As I have stated in my work on Gout, "such attacks are sometimes to be traced to indulgence in wine and animal

food; they are relieved by purgatives and alkalies. We may assume that the pain is due to hyperæmia and œdema of the neurilemma, but why only certain branches of a nerve should be affected as a result of the constitutional disorder is a question that cannot be solved." Neuralgia due to syphilis may affect almost any sensory nerve; in the early part of the secondary stage pain in the scalp, from the ears to the vertex, and extending over a space two inches in width, is comparatively frequent. Facial and occipital neuralgia and sciatica are also common in the secondary stage, and severe intercostal neuralgia has been noticed in a few cases.

In neuralgia it frequently happens that the pain is felt not only in the parts supplied by the peripheral expansion of the nerve, but in the nerve-trunk itself. Thus in neuralgia of the fifth pair the pain often shoots along the course of the affected branch, usually in a centrifugal direction though sometimes towards the nerve-centres. In the latter case there is generally some tenderness on pressure over the course of the nerve, a symptom which may be regarded as indicative of neuritis. The sheaths of the nerves are supplied with special nerve-fibres, and are thus endowed with sensibility. The tenderness is probably due to irritation

of these nerves, which are the channels for the conduction of painful impressions.

Radiation along the course of neighbouring nerves is sometimes noticed in connection with neuralgic attacks. Thus in facial neuralgia affecting one branch of the fifth, pain is occasionally felt in another branch, in the occipital or cervical nerves, or even in some branch of the brachial plexus. In other cases the pain affects a branch of the fifth on the opposite side of the face. In like manner in intercostal neuralgia branches of the brachial plexus are sometimes affected; abdominal neuralgias are sometimes complicated by pains in the thigh, while other visceral neuralgias are frequently associated with pain in the cutaneous nerves, either of the superjacent surface or at some distance from the affected part. Such radiation is especially apt to occur when the pain is at its height, and is explainable by the fact, already referred to, that the whole of the grey matter of the spinal cord serves for the conduction of painful impressions, the effect of which is in proportion to their intensity. Radiated pain of this character may be described as reflex neuralgia; examples of it are not unfrequently met with in persons with hereditary predisposition to nervous diseases.

Certain other phenomena are often prominently

associated with neuralgic attacks; those most frequently noticed are the so-called *points douloureux,* the cutaneous hyperæsthesia and hypæsthesia and symptoms of vaso-motor disorder. Nearly fifty years ago attention was called by Valleix to the fact that in neuralgia affecting superficial nerves it is often possible to detect certain spots which during the attack are exquisitely painful on pressure. These spots are always to be found in the course of the nerve-trunk, or of its principal branches, and generally correspond with bony foramina and openings in fibrous structures through which nerves pass. The area of tenderness is usually small and well defined, but in some cases a large portion of the trunk of the affected nerve is equally sensitive to pressure. The tenderness is most marked when the pain is at its height, and is either reduced to a minimum or is altogether absent during the intervals between the neuralgic attacks. These *points douloureux* are not discoverable in all cases of neuralgia; it is indeed often noticed that the pain is relieved by firm pressure over the nerve, but aggravated by a gentle touch. *Spontaneous* pain is rarely felt at these points, even during a severe attack, and this apparent anomaly is due to the fact that the integument covering the

affected nerve is often supplied by nerves unaffected by the cause of the pain. For the discovery of the *points douloureux* pressure is always necessary. It has been supposed that the pain thus elicited is due to the existence of local circumscribed lesions, of an inflammatory character, in the course of the nerve, such lesions being either at the painful spots or between them and the nervous centres.

Some amount of cutaneous hyperæsthesia is a frequent concomitant of neuralgia and especially in the early stages; as time goes on the sensitiveness of the skin is apt to become reduced, though not to any great extent. A similar change is sometimes observable in the sensations of temperature, pressure, and locality. The anæsthesia is usually restricted to the part supplied by the affected nerve; but it sometimes extends beyond this limit. Pain of a non-neuralgic character is occasionally followed by one or more of these forms of perverted sensibility, but they are more often observed in connection with neuralgia.

Disorders of motor nerves are not unfrequently associated with neuralgic pain, and the connection between the two affections may be either direct or reflex. In neuralgia of mixed nerves the motor fibres

are liable to suffer from the same causes which act upon the sensory nerves. Hence the pain may be accompanied by symptoms of irritation, such as fibrillary twitchings, or even clonic spasm of muscles, and subsequently by loss of power, seldom amounting to paralysis. Symptoms of irritation may be also of reflex origin; thus the convulsive form is sometimes superadded to tic douloureux, and this is due to reflex irritation of the facial nerve, following upon the irritation of branches of the fifth. In some cases of neuralgia the cardiac and respiratory movements are affected by reflex action.

Evidences of vaso-motor disorder are commonly observed in various forms of neuralgia. Thus at the beginning of the attack there is usually excitement, and later on paralysis, as indicated by contraction and subsequent dilatation of the blood-vessels. In many attacks of tic douloureux the face, conjunctiva and mucous membrane of the nose are at first pale and afterwards flushed. Even the gums are sometimes affected in a similar manner. In sciatica the skin of the leg, especially about the heel, is sometimes observed to be reddened when the pain is at its height.

Evidences of disorders of secretion and nutrition come

next in point of frequency. During neuralgic attacks it is often noticed that the saliva is increased, that the tears and nasal mucus flow freely; and the secretion of milk, perspiration, and urine has been observed to become more abundant. The nutrition of the affected part not unfrequently suffers in chronic cases, the changes being most prominent in the hair, skin, and mucous membrane. In cases of supra-orbital neuralgia single hairs, or even patches of hair, sometimes lose their colour and become white; a similar change has, indeed, been observed during an attack, the hair regaining its normal colour after the pain had subsided. Sometimes the hair falls out; in rare cases it grows more freely and becomes thick and coarse. Changes in the skin itself are likewise common; sometimes there is copious deposit of pigment, more often the skin and subcutaneous tissue are atrophied, and the muscles are apt to be similarly affected in cases of neuralgia of the limbs. The changes in the mucous membranes are, of course, less frequently observed, but in neuralgia of the fifth pair there is often increased growth of the epithelium of the mouth, and especially over the tongue on the affected side.

Other forms of disorder are liable to appear in the integument, the most marked of these being an eruption

of herpes. This, in some cases, is very peculiar; the course of the affected nerve is marked out by a red streak upon which groups of small vesicles become developed; these contain a clear watery fluid, which afterwards becomes cloudy and then dries up. The crusts thus formed drop off, leaving reddened patches, but sometimes small ulcers. The association, however, of neuralgia with herpes is by no means constant; for, as is well known, the eruption often occurs without any accompanying pain beyond a little smarting. When the association exists the pain and the eruption may appear together; but more frequently the latter precedes the former. The most marked form of herpes is seen in connection with intercostal neuralgia.

Patches of erythema and even erysipelas are sometimes noticed along the course of nerves affected with neuralgia, and the redness may extend for some distance on either side. A very decided attack of facial erysipelas has been known to supervene during the course of facial neuralgia, the attacks of which ceased to trouble the patient after the erysipelas had subsided. Pemphigus and urticaria are less frequent, and their occurrence may be taken as evidences of neuritis. The condition known as "glossy skin" is sometimes witnessed under

similar circumstances. The skin is thin, smooth, shining and reddened, and looks as though it had been stretched.

Repeated attacks of neuralgia often produce a very serious effect upon the general health of the patient in consequence of the severity of the pain, the loss of sleep, and of appetite. A condition of profound melancholia is set up in some patients. The attacks are the more trying inasmuch as in many cases there is no security for the sufferers that they will be free from them for any length of time: the intervals of freedom are for the most part irregular and uncertain, and owing to the depression which is set up the pain becomes more and more intolerable as time goes on. Its severity and duration are, of course, influenced by the nature of its cause and other circumstances. The younger the patient, the more likely is the pain to be relieved or cured by remedies; in old people, especially if debilitated, neuralgia is generally very obstinate.

Diagnosis. The diagnosis of neuralgia is for the most part easy. The apparently spontaneous accession of the pain, its intermittent character, its correspondence with the course of certain large nerves, along which painful spots may often be detected on

pressure, are the main points to be attended to. The cause and exact seat of the neuralgia are much more difficult to determine. It is important to decide whether the cause be peripheral or central. In the former case the evidences of vaso-motor disorder and of paralysis (should any such exist) will be confined to the parts adjoining the affected nerve. Neuralgia of central origin is inconstant in locality, apt to wander from place to place, lancinating in character, and often appears to be deeply seated, whereas in the peripheral form the pain follows the course of a more or less superficial nerve. Neuralgia of central origin is a common symptom of some cerebral and spinal disorders, *e.g.*, of tumours of the brain and of locomotor ataxy.

It is important also to distinguish cases of neuralgia due to neuritis from those in which inflammation of the nerve is presumably absent. In all cases complete intermission of pain is evidence against neuritis; continuous pains (even with paroxysmal exacerbations) are in favour of it, and in an especial degree when associated with other phenomena.

The presence of trophic disorders in the hair, nails, or skin is in favour of neuritis, and so likewise is early

anæsthesia, appearing in the course of a few days. Swelling of the affected nerve is another sign of inflammation, but it does not occur in every case, and is often not to be felt, on account of the concealed position of the nerve. It is, moreover, probable that the appearance of herpes zoster along the course of a sensory or mixed nerve is evidence of neuritis, generally of an acute character. In cases of long-protracted neuritis a time may come when the spontaneous pain and the pain elicited on pressure may both disappear, owing to complete destruction of the nerve-fibres resulting from the perineuritis or neuritic processes.

Treatment. A description will first be given of the treatment of neuralgia in general; the remedies more especially suitable for the various forms of this complaint will be mentioned in the ensuing chapters. Having ascertained that any given case is one of true neuralgia, every attempt should be made to ascertain whether there be any obvious cause of the pain, *i.e.*, whether there be any tumour or foreign body or aneurism pressing upon or irritating the nerve. Inquiry should also be made for evidences of constitutional disorder, *e.g.*, gout, diabetes, syphilis, etc. In women, evidences of hysteria should be sought for and noted. If the

attacks recur at regular intervals inquiry should be made as to whether the patient has ever been exposed to malarious influences, and a similar question should be put with regard to lead and mercury in cases in which there is any reason to suspect the influence of these metals.

In many cases of neuralgia the cause remains undiscovered even after the most careful investigation, and the treatment of the symptom is all that can be attempted. For this purpose we have a host of remedies at our disposal; some of these will now be mentioned, but their special uses will be described in the chapter on the various forms of neuralgia. Of all medicines quinine is the one most generally serviceable; in cases due to malaria it often acts like a charm. In other cases also its good effects are often no less remarkable. It should be given in large doses (grains v-xx), and its effects watched. Efficacious as it frequently is in tic, it is seldom of any avail in sciatica. If there be headache the quinine may be advantageously combined with half-drachm doses of dilute hydrobromic acid. Arsenic may be tried if quinine fails; it is best given in the form of Fowler's solution (ɱ v-x) three times a day after meals. If there be any history of

rheumatism the salicylate of sodium may be tried in doses of about twenty grains every four or six hours. A syphilitic history will indicate iodide of potassium, and neuralgia occurring in gouty subjects will often yield to purgatives, alkalies, and colchicum. If the influence of lead be suspected, iodide of potassium and purgatives should, of course, be tried.

Anodynes of various kinds are the main remedies in the symptomatic treatment of neuralgia, morphine being the one most commonly used. It is best administered subcutaneously, the dose being proportioned to the severity of the pain, but half a grain of the acetate should be regarded as the maximum. It is not necessary to make the injection close to the painful spot; the arm or the forearm is generally the most convenient place. Relief is almost invariably experienced, and in some cases the pain disappears after one or two injections. Morphine thus administered is less likely to affect the head and organs of digestion than when given by the mouth; but patients are occasionally met with who can take the drug in the latter way without discomfort, whereas a hypodermic injection produces most distressing head-symptoms. There is a serious drawback connected with the use of morphine in severe and chronic

cases, inasmuch as larger and larger doses are required for the relief of the pain; the so-called morphine-habit is not unfrequently induced, and attended with consequences of a very distressing nature. Under no circumstances should a patient be allowed to inject the anodyne himself. It is sometimes advantageous to add a minute quantity (gr. $\frac{1}{100}$-$\frac{1}{50}$) of the sulphate of atropine to each dose of the morphine used for injection. I have found this combination most serviceable; the atropine counteracts the unpleasant effects of the morphine on the head and stomach. For external application anodynes may be used in a great variety of forms, but it is only slight cases of neuralgia that are thus benefited. The liniments of aconite, belladonna, and opium, either separately or combined, may be thus used, and a little chloroform liniment may be added with advantage. These and other anodynes may also be used in the form of ointment. Aconitine and atropine are powerful remedies thus applied, and veratrine does good in some cases. The local application of butyl-chloral is sometimes very efficacious in facial neuralgia.

In cases in which there are evidences of neuritis, that is when the affected parts, and especially the trunks of the nerves, are very tender on pressure, counter-irrita-

tion is often serviceable. For comparatively slight cases we may employ a small mustard plaister, or the compound liniment of mustard, or the tincture or liniment of iodine; but these remedies are better adapted to remove the soreness and aching which often remain after the subsidence of the acute pain. For cutting short an attack, if neuritis be suspected, it is better to apply blistering liquid along the course of the nerve. When the pain is diffused, and affects any part other than the face, the use of Corrigan's firing irons is often attended with the most satisfactory results. If properly applied, the heated iron causes no pain. In some cases of neuralgia it is sufficient to apply counter-irritation at some distance from the seat of the pain; thus, in tic douloureux, relief is sometimes experienced from a blister placed behind the ear, or even at the back of the neck.

In the list of local remedies electricity occupies a prominent place. Its application often relieves the pain in a marked degree, though we can only speculate as to the manner in which it acts. It is often useful in cases in which it exerts no influence on the cause of the symptom, and in *essential* neuralgias it is often decidedly curative. Opinions differ as to the best method

of applying it, and if it be wished to give electricity a thorough trial in any given case each form should be tried in succession if others fail. In all cases mild currents should be first tried, and the strength gradually increased if necessary. The good effects are sometimes speedily manifested. In other cases several applications are required, while in a third class no relief is procured. It is hardly possible to foretell the result with accuracy in any case of neuralgia, but the remedy is always worth a trial. The induced current is applied by placing one rheophore in the patient's hand or on any convenient part of the body, and drawing the other over the course of the affected nerve. The wire brush is also useful for the latter purpose, and a current of medium strength should be used. When the constant or galvanic current is selected, the anode or positive pole should be placed upon the affected nerve or painful spot and moved gently over it. The negative pole is placed in the patient's hand, and the strength of the current should be gradually raised. Another plan is to keep both rheophores in close contact with the skin over the affected nerve. When a long nerve, such as the sciatic, is the seat of pain, the positive pole should be applied over the spine and the negative over some portion of the course of the nerve.

It may either be kept firmly in one position or moved to and fro over the seat of pain.

Other remedies used in the treatment of neuralgia will be mentioned in the chapter dealing with the various forms of the complaint. It will suffice for the present to enumerate phosphorus and the hypo-phosphites; iron, which is almost always useful in anæmic subjects; gelsemium; the bromides; chloral, etc.

The only other methods of dealing with neuralgia which require notice are of a surgical character, viz., division of the affected nerve (neurotomy) and excision of a portion (neurectomy). Very satisfactory results are sometimes attained by these means, but they should never be resorted to until all other plans have failed. Neurotomy is most successful when some source of irritation which cannot be removed exists at the periphery, but it has been known to succeed in neuralgias apparently of central origin. Neurotomy may be performed subcutaneously, but there is this drawback to the operation, that even if successful at the time, the nerve is apt to unite and the pain to recur. Neurectomy prevents this recurrence, but cannot, of course, be performed subcutaneously, and to be efficient may involve considerable separation of the parts.

Nerve-stretching is another surgical procedure sometimes successful. It is impossible to explain the manner in which forcible stretching of the nerve produces its good effects, but it has been suggested that in rheumatic or gouty cases the operation breaks up or overcomes some deposit which has taken place in the nerve sheath.

The treatment of neuralgia in general as given in the preceding paragraphs may be thus briefly summarized. All sources of irritation should be carefully searched for and dealt with according to circumstances, and every endeavour should be made to find out the cause of the attack. Relief of the pain is the next indication, and for this purpose anodynes are generally necessary. Electricity should then be tried, and likewise such potent remedies as quinine, iron, arsenic, bromide of potassium, etc. The general health of the patient almost invariably requires special attention. The surgical operations are the last resource, but they must not be regarded as altogether desperate remedies, inasmuch as they have proved markedly successful in not a few cases.

Much may be done to prevent the recurrence of attacks, especially when the symptoms have been com-

paratively mild. Tonic treatment of all kinds is generally indicated. Good nutritious food taken at proper intervals, removal of the patient from an unhealthy locality, exercise according to capacity, warm or cold baths are all likely to be serviceable. As a matter of course, the patient should avoid exposure to cold, over-exertion, and excesses of all kinds.

CHAPTER VIII.

VARIOUS FORMS OF NEURALGIA.

I. NEURALGIA OF THE TRIGEMINUS—TIC DOULOUREUX. —II. INTERCOSTAL NEURALGIA.—III. SCIATICA.

I. Causes of Tic Douloureux—Symptoms—Pain—Duration and Frequency of the Attacks—Exciting Causes—Two Kinds of Pain—Motor Disorder—Spasm of the Facial Muscles—Vaso-Motor and Trophic Disturbances—Neuro-Paralytic Ophthalmia—Disorder of General Health—Neuralgia of the Supra-Orbital Branch—Neuralgia of the Supra- and Inframaxillary Divisions—Two Stages often observed in Facial Neuralgia — Diagnosis — Treatment — Causal and Constitutional — Electricity — Anodynes, Morphine, Gelsemium—Specific Remedies, Quinine, Arsenic, Iron, Ammonium Chloride—Liniments — Counter Irritation—Neurotomy—Neurectomy—Nerve-Stretching.

II. Intercostal Neuralgia, Causes and Symptoms—Points Douloureux—Complications and Course—Diagnosis—Irritable Breast or Mastodynia—Symptoms and Differential Diagnosis—Treatment of Intercostal Neuralgia and of Mastodynia.

III. Sciatica, its Frequency and Causes—Symptoms, their Nature and Variety—Points Douloureux—State of the Muscles—Vaso-Motor and Trophic Symptoms—Sugar sometimes found in the Urine—Electrical Conditions of the Affected Parts—Course and Duration of Sciatica — Diagnosis — Prognosis—Treatment — Question as to Causation — Rheumatism — Iodide of Potassium—Blisters — Hypodermic Injections of Morphine and Atropine—Electricity—Flying Blisters—Acupuncture—Hot Baths—Warm Applications —The Scotch Douche—Hot Sand-Baths—Massage—Nerve-Stretching.

THE most frequent form of neuralgia is that in which the fifth pair of nerves is affected. In the last century the complaint was described by Fothergill as "painful affection of the nerves of the face." All three divisions of the nerve are liable to be affected; but attacks are more common in the ophthalmic and superior maxillary than in the inferior maxillary branch. The pain is almost always unilateral. The comparative frequency with which this nerve is attacked is probably due to the fact that its branches pass through bony canals and are liable to irritation or compression as results of periostitis, exostoses, caries, and other processes. Peripheral irritation is a still more obvious cause, and marked instances of this character are those in which the pain is due to a carious tooth or to exposure to cold. Wounds of the face of various kinds and the lodgment of foreign bodies are occasional causes, and they may act either upon the peripheral expansion of the nerves or upon small branches. Lesions within the cranium, *e.g.*, tumours at the base of the skull, and aneurisms, are still rarer causes of neuralgia, and in this category may likewise be included diseases of the nasal fossæ, frontal sinuses, and of the tympanum. The majority of the above-mentioned causes are of an obvious character, but there are many cases of *tic*

douloureux in which there is no evidence of any anatomical lesion. Syphilis, rheumatism, and gout may be mentioned as constitutional causes; and likewise anæmia and chlorosis and conditions of debility in general. The possibility of syphilis as a cause of neuralgia should always be borne in mind. I have lately been consulted by a gentleman, aged 49, a martyr to facial and general neuralgia, which had been altogether uninfluenced by quinine and other tonics. On inquiry I discovered that the patient had had syphilis thirty years previously. I prescribed the iodides and small doses of mercury, and in seventeen days the patient was quite free from pain, and since that time he has had no return of the symptoms. Exposure to malarious influences is another potent cause, and in a few cases excessive use of the eyes has been followed by neuralgia of the fifth nerve. The complaint is very rare in children and not common in young adults, unless in connection with carious teeth; the patients are generally middle-aged or elderly, and females are more often attacked than males. It should never be forgotten that conditions and disorders of organs far distant from the seat of pain may be the actual cause of the symptom. Thus tic douloureux is sometimes associated with obstinate constipation, and ceases at once when the

latter condition is relieved. There are other instances of a similar character, *e.g.*, those in which the pain occurs in persons suffering from disorders of the uterus, bladder, bowels, etc., and lasts until these causes have been satisfactorily dealt with.

Symptoms. In neuralgia of the fifth pair the pain is of a more severe character than in any other form. Its outbreak is often preceded by various abnormal sensations, such as formication, burning, soreness, tension, etc., and sometimes by fibrillary twitching. The paroxysms of pain are liable to come on spontaneously; but speaking and eating are very apt to provoke them. In severe cases the patient appears to be struck down by the pain; he places his hand against his face and expresses the intensity of his sufferings by gestures and signs. The pain, indeed, according to the subsequent statements of many patients, transcends description; it is compared to that caused by a hot iron, a knife, a gimlet, etc. The pain is liable to shoot along other nerves, *e.g.*, the occipital, and sometimes to the shoulder and clavicle. During the intervals there is usually at first more or less hyperæsthesia, but afterwards anæsthesia in the area of distribution of the affected nerve. An eruption of herpes sometimes precedes the loss of sensation.

The attacks vary considerably as regards their duration and frequency. The acute pain may last for a few seconds or for several minutes, or even for some hours. When thus protracted, the intensity of the pain is less than in the shorter attacks, but lightning-like seizures of great severity are apt to occur at short intervals. In some cases many attacks occur during the twenty-four hours; in others the pain comes on daily or every other day, or at still longer and irregular intervals, and there are innumerable varieties in this respect. Most patients can recognize two kinds of pain: the one continuous and the other paroxysmal. When the muscular spasms come on, the continuous pain ceases, but the agony during the paroxysms is very great. Sometimes the shocks are so frequent as to be almost continuous; they are only momentarily interrupted by exhaustion of the nerve. The most trifling causes suffice to induce attacks in some patients, such as speaking, eating, a touch upon the face, combing the hair, changes of temperature, exposure to a draught, etc. I occasionally see an elderly lady who has been afflicted with tic douloureux for many years, and in whom a paroxysm is induced when she is suddenly addressed. In another case a paroxysm comes on when the eyes are exposed to a strong light, either sunlight or artificial. Very

often indeed the attacks come on spontaneously, *i.e.*, without obvious causation. In some patients mental excitement is enough to cause an attack. Unless due to syphilis, the pain is usually less troublesome at night. In warm summer weather the patient may remain free from pain; the attacks are generally more severe and common in the winter and in damp weather. Even when pain is absent there are often abnormal sensations in the area of distribution of the affected nerve.

Symptoms indicative of motor disorder are often present in the form of convulsive spasms of the muscles supplied by the facial nerve. These generally precede the attack, increase in degree and extent when the pain is at its height, and subside during remission. It is sometimes noticed that the convulsions do not occur until the pain has existed for several days or weeks. In severe cases the muscular movements may resemble those of convulsive tic. Sometimes the muscles of visual accommodation are similarly affected, and spasms, both tonic and clonic, of the muscles of mastication (supplied by the motor branch of the fifth) are occasionally observed. These, however, are far less common than similar affections of the muscles supplied by the facial nerve, and this fact would seem to indicate that the nuclei of origin of the sensory portion of the fifth are

more closely connected with the nuclei of the facial than with those of the motor branch.

Vaso-motor disorder shows itself by redness and swelling of the affected side of the face during the attack; the eye is often suffused, and the gums swollen. Tears may flow down the cheek, and the salivary and nasal secretions are apt to be increased in amount. These latter symptoms may remain for some time after the pain has subsided. Symptoms indicative of trophic disorder are frequent results in chronic cases. Sometimes the face remains swollen, and the features are enlarged on the affected side. An eruption of herpes is a frequent complication; a streak of the integument becomes swollen and reddened, and is covered with groups of tiny vesicles. A similar appearance is sometimes seen on the conjunctiva covering the cornea, and the result of such an eruption may be permanent opacity of the latter structure, and even destructive inflammation has been known to supervene. Another very serious lesion of this character is the so-called *neuro-paralytic ophthalmia*, which takes the form of an ulcerative keratitis generally in the lower part of the cornea, and sometimes leads to purulent disintegration of the eyeball. It is doubtful whether this affection is the direct result of disordered nutrition. It seems more

probable that it is due to mechanical causes and irritants of the presence of which the patient is unconscious, owing to the loss of sensibility. It may be that the condition of the nerve lessens the capacity of the part for resisting irritation. Deafness sometimes occurs in connection with facial neuralgia, and subsides when the pain is relieved. A very common phenomenon is loss of colour of the hair, especially of the eyebrows. In the intervals the hair that grows is generally normal in colour, but sometimes the entire hair remains permanently white or grey.

The general health always suffers in cases of severe tic douloureux. The pain and loss of sleep are apt to cause great depression of spirits and irritability. A condition of profound melancholia sometimes sets in, and not a few of such patients seek relief from morphine and alcohol, both of which, but particularly the latter, tend eventually to aggravate the neuralgia, besides causing their own deleterious effects.

Having given this general description of tic douloureux, it seems desirable to indicate the peculiarities of the symptoms connected with neuralgia of each of the three divisions of the nerve.

The supra-orbital branch of the ophthalmic division is the one most frequently attacked. The pain sometimes

takes the form of ciliary neuralgia, and occurs in combination with such symptoms as spasm of the eyelids, intolerance of light, and profuse lachrymation. Neuralgia with these symptoms is not uncommon in scrofulous children. Catarrh of the frontal sinuses is another cause of neuralgia of this branch. The pain is probably due to the pressure of the accumulated secretion upon the nerves distributed to the membrane lining the sinuses. In this form the pain may extend from the eyelids to the vertex, downwards to the tip of the nose and laterally to the temple. Pressure over the supra-orbital foramen will elicit pain, and other *points douloureux* may generally be detected on the side of the nose and on the upper eyelid.

When the second division of the nerve is affected the pain is usually felt in the infra-orbital branch, and pressure over the foramen of the same name causes severe pain. Other *points douloureux* are to be found over the malar bone, and on the upper lip, and the alveolar process of the superior maxillary bone. In old people this latter part is sometimes the seat of very severe pain, due to irritation of the nerve from deposit of bony substance. The palatine and naso-palatine branches are seldom the seat of neuralgia.

In neuralgia of the inferior maxillary nerve the pain

is usually felt in the inferior dental branch, and the internal opening of the inferior dental canal and the mental foramen are the ordinary *points douloureux*. The auriculo-temporal branch is less commonly affected. This branch supplies the meatus auditorius and the articulation of the jaw, and a painful point may be found over the temporal bone. Only in very rare instances is the lingual branch the seat of neuralgia. The symptoms are acute pain or a sensation of pins and needles at the tip of the tongue. Salivation is a prominent symptom in neuralgia of the inferior maxillary nerve. In such cases one side of the tongue is often thickly coated, and there may be irregular movements of the muscles of mastication and also of the tongue itself.

It rarely happens that all the three divisions of the nerve are simultaneously affected, but whenever this is the case the *points douloureux* are to be found in a line from above downwards, viz., at the supra-orbital notch, and the infra-orbital and mental foramina.

The uncertain course which neuralgia takes has been already alluded to; but it not unfrequently happens that at least two stages can be recognized. In the first, there is more or less severe continuous pain with frequent exacerbations, during which muscular twitch-

ings come on. After a while the continuous pain subsides, but the severity and frequency of the paroxysms remain as before. Later on, however, the latter become less frequent, and are no longer spontaneous, but occur only as the result of movements, or of bringing something into contact with the face. In the absence of these causes of excitement the patient enjoys immunity from pain, and shows no signs of the suffering which characterized the previous period. This phase of the disorder may last for some weeks, and precede the complete cure; its supervention shows that the hyperæsthesia of the affected nerves is so slight as to be insufficient to cause spontaneous pain. It still, however, exists, though in a latent condition, and rises to such a degree as to cause pain when either movement or contact with a foreign body sets up the slightest amount of excitement. Speaking and eating are both liable to cause acute suffering; the swallowing of fluids is accomplished with less pain, but the contact of a glass, cup, etc., with the lips is almost certain to produce a paroxysm. As time goes on, it is found, perhaps almost suddenly, that paroxysms are no longer provoked as above described; perhaps a little tingling is all that remains, but this, too, disappears in the course of time.

Diagnosis. This is for the most part easily made, the distinguishing points being (*a*) the paroxysmal and spontaneous character of the pain, and the facility with which it is excited by slight causes; (*b*) its correspondence with the trunks or branches of large nerves, and (*c*) the existence of *points douloureux*. Pain in the head and face may likewise be due to inflammatory affections of the bones or periosteum, to inflammation of the temporo-maxillary articulation, etc., but such cases are easily distinguishable from those of neuralgia. It is important to determine whether the cause of the pain is situated within or outside the cranium. As a general rule implication of several or many branches of the nerve is indicative of a central origin, while the restriction of the pain to one or two branches points rather to a peripheral cause. The determination of the cause, however, of cases in which several branches are affected may be very difficult; absolute incurability is, perhaps, the only indubitable sign of an intracranial cause. Neuralgia affecting simultaneously all three divisions of the nerve is by no means necessarily of central origin.

Treatment. The general principles of the treatment of neuralgia have already been described (see page 208). Every attempt should be made to discover the cause. When the lower part of the face is the seat of the pain

carious teeth will often be found, and these should be removed or otherwise dealt with. When the teeth are not carious, and painful only during the attacks, it is useless to remove them. When there is a history of syphilis or of exposure to malaria, iodide of potassium and quinine are respectively indicated. Affections of the tympanum should be remembered as possible causes of facial neuralgia, and likewise catarrh of the frontal sinuses in cases where the supra-orbital branch is the seat of pain. The catarrh may be relieved by a nasal douche of tepid water, containing gr. v of Sod. Bicarb. and Ammon. Chlorid. to ℥ j, and by restoring the communication between the nose and the frontal sinuses, the pressure on the nerves will be lessened, and the pain will subside. I have seen many cases much benefited by these measures.

When the neuralgia appears to be connected with constitutional conditions, such as various forms of debility, the preparations of quinine and iron will be of marked service. When, on the other hand, there are symptoms of plethora and of cerebral hyperæmia, saline purgatives are indicated, and may be given in the form of the various mineral waters, *e.g.*, Friedrichshall, Marienbad, etc.

For the direct treatment of tic douloureux, we have at

our command electricity in various forms, and certain anodynes and so-called specific remedies. Surgical aid may also be sought for cases otherwise intractable.

The continuous current is generally to be preferred to the induced; its application is more efficacious, and causes less pain. The negative pole should be pressed against the back of the neck, and the positive applied to the various painful points for from two to five minutes, the strength of the current being gradually increased. In severe cases two applications may be made daily, and it is sometimes of advantage to apply the current to the sympathetic in the neck. The efficacy of galvanism is sometimes very marked in cases of recent origin, and sometimes even old-standing cases, which have resisted all other methods of treatment, are relieved or cured by this remedy. If it fails, the induced current may be tried. A well-moistened sponge electrode is placed on a painful spot, and the other at the back of the neck, while the secondary current is gradually brought into operation.

Of remedies belonging to the anodyne class, morphine is the most useful, and is best administered subcutaneously. Large doses are often required to produce any effect upon the pain. The butyl-chloral is another

valuable remedy; about three grains should be given in a pill with mucilage of tragacanth every two hours up to six or eight doses, if required. Gelsemium has an almost specific action in some cases; it is given in the form of the tincture ♏ x-xx every hour or two hours. There are, unfortunately, no special indications for its use; but it seems to be more efficacious when the second and third divisions are affected than in neuralgia of the ophthalmic division. Aconitine may be used hypodermically, in doses of ♏ j-iv of a solution containing gr. j in ʒ iv of distilled water with a little sulphuric acid.

As specific remedies we may choose between quinine, salicylate of sodium, arsenic, and iron. Whenever periodicity is a feature of the attacks, quinine in full doses (gr. x-xv) should be given several hours before the pain usually comes on. It may be advantageously combined with the hydrobromic acid. For similar cases the salicylate of sodium may be employed in doses of thirty or forty grains. Arsenic comes next in efficacy and should be tried whenever quinine and the salicylate fail. Fowler's solution should be given in doses of from ♏v-x three times a day. Iron is most generally useful whenever there is marked anæmia, but

it sometimes does good when the latter is not a prominent symptom. Chloride of ammonium in doses of gr. xx-xxx, several times a day, is also recommended. Anodyne remedies, applied externally, are sometimes useful as palliatives. A stick of menthol, the liniments of aconite, belladonna, opium, and chloroform are available for this purpose. Counter-irritation, by means of blisters at the back of the neck or behind the ears, sometimes affords relief.

When all other measures have failed to afford relief, and the pain renders the patient's life very miserable, operative treatment may be had recourse to in the form either of neurotomy, or simple division of the nerve, neurectomy, or excision of a portion, or nerve-stretching. Of these neurectomy yields the best results. Before performing either this operation or simple incision, it is desirable to ascertain as far as possible the existence and position of any local cause for the neuralgia, for to be successful the operation must be performed on the central side of any such spot. In nerve-stretching we are able to act from the periphery upon the more central portions of the nerve; but this operation in cases of facial neuralgia has seldom been followed by satisfactory results. With regard to neu-

rectomy, it has been noticed that after an operation on one division of the nerve another division has become the seat of very severe pain.

II. Intercostal Neuralgia.

This is the name given to neuralgic pain affecting the nerves in some of the intercostal spaces; it is most frequently felt on the left side, and in the spaces from the fifth to the ninth downwards. It rarely occurs on both sides, or in a single space; generally two or three neighbouring nerves are affected at the same time. The reason for the left side being more commonly affected is said to be that the venous blood of its lower intercostal spaces passes by a more circuitous route into the vena cava, viz., by the small vena azygos. This form of neuralgia is most frequent in persons between twenty and forty years of age, and is much more common in women than in men, but I have seen several cases of severe intercostal neuralgia in male subjects. It is especially apt to occur in those who sit closely at work and take little exercise, but it is also noticed in persons living under different conditions, viz., in those whose rest and food are alike deficient. Certain constitutional disorders predispose to intercostal neuralgia, and among them may be mentioned syphilis, gout, and anæmia,

especially when due to prolonged lactation, or to chronic gastric catarrh. In some instances the pain may be traced to exposure to cold. Local affections, such as injuries to the ribs, caries and morbid growths, diseases of the pleuræ and lungs, especially tuberculosis, disorders of the liver, affections of the spinal cord and its membranes, are all likely to cause pain in the intercostal spaces, though not necessarily of a purely neuralgic character.

There is a close connection between affections of the uterus and ovaries and neuralgia in the intercostal spaces. In some patients suffering from profuse menstruation the pain invariably comes on during the monthly periods, and ceases with the discharge. In cases, too, of dysmenorrhœa, dependent upon stenosis of the cervical canal, intercostal neuralgia is sometimes present, and is cured by dilating the cervix. Pain in the intercostal spaces is a common symptom of spinal irritation. The affection termed "irritable breast" is a form of intercostal neuralgia, the pain being localized in one or other of those organs. This complaint occurs almost exclusively in young women, and is apt to complicate hysteria and various uterine disorders.

Symptoms. The pain is felt in the course of the

nerves affected, and may be either continuous or paroxysmal in character. In the former case there are generally sharper twinges at irregular intervals; there is often some amount of cutaneous hyperæsthesia in the affected region, and pressure over the spinous processes of the corresponding vertebræ sometimes produces severe pain. Sometimes the pain is confined to one or more points, and these are usually in the axillary lines or just below the breasts. Tender points are frequently discoverable in one or more of the following situations:—1. Over the spot where the nerve escapes from the intervertebral foramen. 2. At a point midway between the vertebral column and the sternum, where the superficial branches are given off. 3. Near the sternum, or further down at the edge of the rectus muscle, where the nerve ends in cutaneous branches. The pain is aggravated by movements of various kinds, and especially by coughing and sneezing. Difficulty of breathing is sometimes complained of; the patient finds that full inspirations increase the pain or cause a paroxysm. In not a few cases the affected nerves are very sensitive to pressure throughout the whole length of the intercostal spaces; sometimes, indeed, the slightest touch causes the side to be forcibly retracted.

On the other hand, it may happen that firm pressure relieves or even removes the pain for a time.

Irradiation of the pain towards the back and to the scapula is of frequent occurrence, and the arm and breast are also liable to be affected. The second intercostal nerve communicates with the internal cutaneous nerve of the arm, and several of these nerves send lateral branches to the breast. Frequency of respiration sometimes occurs in connection with intercostal neuralgia, and painful attacks of palpitation of the heart are occasionally associated with this latter affection. I have recently had under my care a man, age 28, of gouty habit and family history, suffering from occasional paroxysms of intercostal neuralgia. These were accompanied by severe burning pain in the cardiac region, and palpitation of the heart. The patient went from one physician to another, fully convinced that he had heart disease and angina pectoris. All his symptoms disappeared under iodide of potassium, gr. v, t.d., flying blisters, and a carefully regulated diet. It would seem probable that through reflex action such local attacks of pain may not only influence the function, but by degrees produce alterations in the structure of the heart.

With regard to complications, herpes zoster is the one most frequently observed. It is not, of course, to be regarded as the cause of the neuralgia, inasmuch as the latter may exist alone, and often precedes the eruption by several weeks. On the other hand, the herpes may appear along the course of one or more intercostal nerves without any accompanying pain, and this is generally seen in children. In old people the herpes is apt to precede the neuralgia, which continues after the sores, left by the eruption, have healed, and is often extremely obstinate.

Nothing can be definitely asserted with regard to the course of intercostal neuralgia. It is always tedious and sometimes very protracted: patients are apt to become very anxious, and often imagine that some severe disease of the lungs or breast is the cause of the pain. The prognosis is therefore not very favourable, and the older the patient the more obstinate the complaint.

Diagnosis. The points to be determined are: 1st, whether we have a case of intercostal neuralgia to deal with; and, 2ndly, the cause of the suffering. With regard to the first point, the pain might be due to pleurisy, but careful examination with the stethoscope

will prevent any such mistake. In so-called rheumatism of the muscles of the chest the parts will be very sensitive to pressure. When the heart itself is the seat of the pain, the latter will be felt principally in the precordial region, and will be accompanied by evidences of weakness (small pulse, feeble heart sounds), and great irritability of the organ. In all cases the ribs should be very carefully examined in order to determine the presence or absence of fracture, caries, or periostitis. The vertebral column, too, should not be neglected, for incipient caries often gives rise to intercostal pain, which if felt mainly in the front of the thorax may be attributed to the heart, lungs, or stomach. By passing the finger backwards along the affected intercostal spaces a sensitive spot will be detected near the vertebral column.

Irritable breast or mastodynia is an affection of the anterior cutaneous branches of the upper intercostal nerves, and the supra-clavicular branches of the fourth cervical nerve are also liable to be implicated. It is one of the most obstinate and painful forms of neuralgia, and the pain is apt to radiate to the arm and neck. The attacks may last for several hours, and be separated from each other by only short intermissions

or remissions. In some of these cases the spinous processes of the last cervical and first dorsal vertebræ are very tender on pressure, and, as a general rule, the whole breast is more or less acutely sensitive. Even contact with the clothes is sometimes almost unbearable. Movement of the arm increases the pain, which is accompanied by a sensation of weight in the breast. The causes of mastodynia are very obscure; the affection is most common in young girls at the time of puberty, and up to twenty-five or thirty years of age; it is rare in women of middle age. When it occurs in these latter subjects it is sometimes due to hyperlactation, and under these circumstances the left breast is generally affected. The complaint is not unfrequently associated with disorders of menstruation, but it likewise occurs in the absence of any such complication. Local causes, such as injuries of various kinds, are sometimes assigned for the occurrence of the symptoms, but the relationship is for the most part doubtful. It often happens that careful examination of the gland will detect one or more small hard nodules, very sensitive to pressure, and varying in size from that of a pea to that of a hazel-nut. Nothing is positively known as to the nature of these swellings, and they have been supposed

to be neuromata or tubercula dolorosa of the nerves of the breast. Their size and tenderness are both increased at the commencement of menstruation. They are by no means always present in these cases of mastodynia; pain and tenderness of equal severity may exist in their absence.

The differential diagnosis in cases of mastodynia may present some difficulties; but careful observation will serve to decide the nature of the case. The pain resembles that of malignant disease, and the existence of hard nodules tends to corroborate the fears of the patient and her friends. In malignant disease, however, the growth always increases in size with more or less rapidity; it never remains circumscribed, and, of course, never disappears, as is often the case with the growths under consideration. Small and deeply-seated abscesses may be mistaken for these tumours of mastodynia, but their course soon reveals their true nature. The sensitiveness of the part in neuralgia of the breast is characteristic; it is more marked than in any other affection of the gland.

In the treatment of intercostal neuralgia the part should be carefully examined, in order that any existing local cause may not be neglected. Attention should

next be paid to constitutional conditions, *e.g.*, syphilis and gout, and to the presence of any hepatic, uterine, or other abdominal disorder. All these will require appropriate treatment. Whenever symptoms of anæmia or chlorosis are present, tonics of all kinds, and especially iron, are indicated. When amenorrhœa exists aloes is likely to be suitable, and may be combined with the iron. It seldom happens that general treatment of any kind is sufficient to cure intercostal neuralgia. Measures designed to relieve the pain are almost always indispensable. Of these the most efficacious is the hypodermic injection of morphine, though its results are for the most part only temporary. Other anodynes, *e.g.*, aconite, belladonna, and chloroform, may be applied locally as liniments. If these measures fail to relieve, electricity should be tried; and, first, the continuous current, the positive pole being applied close to the vertebræ and the negative to the lower border of the ribs in the affected spaces. The induced current may be applied in the form of the faradic brush. In very obstinate cases blisters are likely to be serviceable. Herpes zoster is rather a favourable complication than otherwise, for the pain generally subsides when the blisters left by the vesicles heal up. For mastodynia it is often necessary

to try one remedy after another until a suitable one is met with. As a general rule, the pain is relieved by warmth and by bandaging the breast. A stream of warm water should be allowed to play upon the painful spot for fifteen minutes twice a day, and after carefully drying the skin belladonna liniment should be applied, and afterwards cotton-wool and a bandage. Electricity may likewise be tried in the form of the faradic brush or the constant current. If the latter, the negative pole is placed on the vertebral column over any sensitive spot, and the other pole applied to the breast. In all cases the general health should be attended to, and the patient's mind diverted as far as possible from her ailment. A short course of the bromides is likely to be serviceable; it will tend to lessen the hyperæsthesia in the gland, as well as general irritability.

III. Sciatica.

Next to tic douloureux, sciatica is the most common form of neuralgia, and it has this peculiarity, that the pain is felt mainly in the trunk of the nerve, and either not at all or in a less degree in its branches of distribution. The frequency of the affection is due to the exposed and superficial position of the nerve; but it would appear that in many cases the mischief is seated

in the surrounding parts rather than in the nerve itself. The term is somewhat loosely used; it has, for instance, been pointed out by Mr. Hutchinson that inflammatory affections of the hip-joint are the real cause of the symptoms in some cases of supposed sciatica. The affection is important, not only because of the pain—often very severe—but also because of the incapacity for movement which results therefrom.

With regard to the *causation* of sciatica, the complaint is sometimes directly traceable to the influence of cold and moisture. Standing in cold water, sitting on damp grass, or on cold stones, or wet seats are common causes of an attack. Injuries to the hip or thigh, and continuous pressure upon the nerve, caused, *e.g.*, by sitting on a hard seat, are sometimes, though less often, followed by similar consequences. After difficult labours and the use of instruments for delivery, a troublesome attack of sciatica has been known to supervene, as a result of pressure upon the nerve in the pelvis. The growth of tumours, either within or external to the pelvis, may produce the same effect. Some cases are attributable to over-exertion of the lower limbs, as in walking or climbing and in working machines with the foot. Constitutional disorders, notably syphilis and

gout, predispose to sciatica; and in the former of these gummatous growths are sometimes found in connection with the nerve. The presence of hard fæcal masses in the colon and rectum, and dilatation and congestion of the veins of the pelvis, are common causes of sciatica. Many of these veins are destitute of valves, and are especially liable to periodical attacks of congestion in various disordered conditions of the abdominal organs, notably the liver. The connection between sciatica and abdominal affections has long been recognized, and the venous plethora is the connecting link. Constipation often precedes an attack, which is relieved when the former condition is removed. In some cases of sciatica the venous stasis extends to the affected limb, the veins of which from the foot upwards are enlarged and varicose.

As might be expected, sciatica is more common in winter than in summer, and the majority of the patients are of the male sex. The complaint is rare before puberty, and generally occurs in patients over thirty years of age. Conditions of anæmia do not seem to predispose to it, as is the case with facial and intercostal neuralgia. The complaint is sometimes met with in persons suffering from the effects of mercury and those

of lead, but the brachial nerves are more prone to be affected in these cases. Pain along the course of the sciatic nerves is not unfrequent in diseases of the vertebræ and of the spinal cord.

The prominent symptom of sciatica is the pain which extends over the greater portion of the course of the sciatic nerve. It is rarely confined to one portion, though it may be, and often is, more severe at the back of the thigh than in the leg or foot. There are generally some premonitory symptoms, such as numbness, tingling, or slight and transient pain along the course of the nerve. The pain often begins at the sides of the vertebral column, where it takes the form of lumbago; it thence gradually spreads downwards to the thigh, leg, and foot. In exceptional cases the pain begins below and spreads upwards. The pain is sometimes continuous, sometimes paroxysmal, with intervals of immunity. It is usually worse at night, and is variously described by patients as of a burning, piercing, screwing, or stinging character. The attacks often come on spontaneously, but are almost invariably excited by movements of the limb and pressure. The course of the nerve is sometimes exquisitely tender. In severe cases, owing to the pain which is caused,

movement of the limb is impossible; in slighter forms the patient walks with his knee bent. The pain is almost always worse on attempting to move the limb after it has been kept for some time in one position. Coughing and sneezing are apt to provoke a severe paroxysm. The attacks are not attended with pyrexia.

The symptoms are not always so acute as those above described. In some cases the pain is not such as to confine the patient to his bed, or to prevent him from following his occupation. A sensation of aching or soreness in the back of the thigh and a feeling of stiffness are the principal symptoms, and these vary in degree from time to time, last for an indefinite period, and never become very severe. In the acute form, on the other hand, the pain is often of an intense character, and, especially when occurring in a person unaccustomed to suffering, is apt to produce great mental distress.

The extension of the pain along the various branches of the nerve varies much in different cases. From the back of the thigh the pain may spread either to the internal or external popliteal branches. Sometimes the calf of the leg is the seat of acute pain; while in other cases the plantar branches of the posterior tibial nerve are especially affected. Moreover, the pain is apt to

shift its seat from time to time, without altogether leaving the spot in which it first appeared. The left leg is somewhat more frequently attacked than the right, but the difference in the liability is not very great. In a small proportion of cases both legs are affected.

With regard to the existence of *points douloureux* these are generally to be detected in cases of sciatica. The most important is situated near the posterior superior spine of the ilium; another is between the tuberosity of the ischium and the trochanter major. Others are to be found behind the head of the fibula and behind the malleoli. Pressure in the middle line of the popliteal space also frequently causes pain. In some cases there is increased sensitiveness on pressure diffused over the back of the limb, and with this some amount of diminution of tactile sensibility and of the temperature sense is apt to be associated. In some cases the sense of temperature is perceptibly heightened. Such a patient, standing with his back to the fire, finds the warmth unbearable on the affected side. The muscles of the limb and the vaso-motor and trophic nerves seldom remain unaffected in cases of sciatica. The flexor muscles of the thigh and the

muscles of the leg are stiff and tense, and motion is difficult, even when the pain is not of itself sufficient to prohibit it. This condition of the muscles can be observed when subjecting the limb to passive movements, and it is apt to remain for some time after the acute symptoms have subsided. The gait of the patient is often peculiar; he walks with the knee bent, and the pelvis on the affected side lower than on the other. In this position extension of the muscles is avoided, and the nerve and its main branches are not liable to be compressed. In chronic cases this position, unless steps be taken to remedy it, is likely to become permanent and to cause more or less lameness. Spasms of the muscles of the calf and fibrillary twitchings of the flexor muscles of the thigh are sometimes observed.

With regard to the vaso-motor and trophic symptoms, these vary in character in different cases and at different periods in the same patient. The temperature of the leg and foot on the affected side is sometimes increased, sometimes diminished; the colour may be either pale, or there may be patches of redness or diffused coloration; the secretion from the skin is either increased or diminished. The surface is sometimes dry and brittle; in other cases it is moist, and the foot

especially is covered with copious perspiration. It is curious that two such opposite conditions should occur in the same affection. In some cases after the complaint has existed for a few weeks decided atrophy of the muscles supplied by the sciatic nerve sets in. In these cases neuritis most probably exists. On the other hand, hypertrophy of the muscles has sometimes been noticed. Other evidences of disorder of the trophic nerves are sometimes supplied by the occurrence of various forms of eruption, *e.g.*, erythema, erysipelas, herpes, etc.

A remarkable symptom, probably indicative of disorder of vaso-motor nerves, is sometimes noticed in connection with sciatica; the urine is found to contain a small amount of sugar. The condition is usually transient, subsiding as the pain ceases to be troublesome. The complication has been observed in cases in which the sciatica was a symptom of some spinal affection; but it has also been noticed in simple cases, due probably to venous hyperæmia within the abdomen, and particularly in the portal circulation. I have recently attended three cases in which this symptom was present.

In cases of sciatica certain changes are sometimes

noticed in the electrical condition of the affected parts, especially when evidences of disordered nutrition are in any way prominent. The faradic contractility of the muscles is diminished; the cutaneous sensibility is at first increased, but afterwards lessened. The reaction to galvanism varies; in cases due to neuritis the excitability is at first increased and afterwards much diminished.

The course and duration of sciatica are liable to great variations. The pains generally disappear in the same order in which they came on, remaining in the lower parts of the limb for some time after they have ceased in the thigh. In some cases the last symptom is some amount of *anæsthesia dolorosa* of the toes. During the course of the complaint the pain is apt to radiate along other nerves; sometimes the other side is affected, sometimes an arm. Lumbago is likewise a frequent complication. The course of the complaint is of an indefinite character; it usually extends to several weeks, in spite of treatment; sometimes it lasts for several months, or even years. In cases due to cold, recovery is the rule; but when the cause is a pelvic tumour the sciatica is persistent. In all severe cases more or less weakness and wasting of the limb may be expected to

remain for some time after the pain has ceased. Relapses are very prone to occur, but instances are not unfrequent in which, after many weeks of very severe suffering, there is complete immunity from further attacks.

Diagnosis. This is for the most part easily made, but mistakes sometimes occur. In sciatica the pain follows the course of the nerve, and is not dependent on muscular action. The lightning-like pains of locomotor ataxy more or less resemble those of sciatica; but the absence of patellar reflex is characteristic of the former affection. Sciatica is most apt to be confounded with disease of the hip-joint. In the latter the pain produced in the part by movement, the shortening of the limb, and the position it generally assumes, are the points to be contrasted with the main features of sciatica. The history of the case will also aid the diagnosis, and the same remark applies to cases in which a paretic state of the limb has given rise to a suspicion of paralysis. In sacro-iliac disease, in which there is often severe pain in the thigh, the patients are always young, and a careful examination will detect the source of the mischief. Besides the affections already mentioned, it must be remembered that pain along the

course of the sciatic nerves is a frequent symptom of pelvic tumours, aneurisms, etc. Dr. Buzzard has pointed out that myalgia of the flexor muscles of the thigh, and muscular rheumatism in the same muscles, closely resemble sciatica. They differ from it, however, in the fact that the pain is situated especially at the points of attachment of the muscles, and is not spontaneous, but is felt only when the muscles are in action.

The *prognosis* is favourable in the majority of cases of sciatica. When the attack is directly traceable to an obvious cause, *e.g.*, exposure to cold and damp, prompt treatment generally yields the happiest results. Even chronic cases are almost always amenable to treatment, though relapses are prone to occur; and for some time after the pain has subsided there is often more or less discomfort in the limb and a feeling of weakness. The affected limb soon becomes tired, and weeks or even months may elapse before it recovers its normal condition. In cases dependent upon serious lesions in the pelvis, the prognosis is, of course, of a different character.

The *treatment* is more satisfactory than that of most other forms of neuralgia, and local remedies are often of signal service. A vast number of means

have been recommended, and the difficulty is to select the one most appropriate. The first step is to endeavour to ascertain the cause, and for this purpose the affected limb must be carefully examined in order to discover whether there are any local affections connected with the nerve or its branches. Should such exist the question of their removal by operation will have to be entertained. The general condition of the patient is the next point to be studied. If there be evidences of congestion of the pelvic veins, or of the portal system, purgatives are especially indicated, and of these the sulphates of sodium and magnesium are the most appropriate. Carlsbad salts form a very suitable combination, more particularly for gouty subjects in whom an attack of sciatica is likely to be due to hepatic congestion. In such cases two or three grains of blue pill should be given at bed-time for three or four nights, and a dose of the salts in the morning. The bowels should be thoroughly cleared out, but drastic purgatives are to be avoided. Salines will also be found suitable for non-gouty cases in whom constipation is a prominent symptom, but other purgatives, such as extract of aloes and castor oil, may also be used.

In rheumatic subjects, iodide of potassium or sodium

will probably be found the best remedy, doses of from five to ten grains three times a day being usually sufficient. It is well to add a little bicarbonate to the iodide, and the disagreeable effects which the latter sometimes produces may frequently be prevented by giving three or four minims of tincture of belladonna with each dose. Another way of administering the iodide is to give it in seltzer-water. Where there is great pain I have prescribed salicylate of sodium in doses of 20 grains every four or six hours with much benefit. Blisters are also particularly indicated in this class of cases, and the best method of using them is to apply the liquor epispasticus over circular spots about two inches in diameter down the course of the nerve. If there be marked tenderness at any one spot the blister should be made at some little distance from it. When the acute attack has subsided warm baths are almost always serviceable. In anæmic and chlorotic subjects tonics such as iron and quinine are invariably required in addition to local remedies. For cases in which there is a history of syphilis a course of the iodides will be found efficacious.

Much may be done by way of palliation in all cases of sciatica, and the hypodermic injection of morphine is probably the most potent remedy of this class that

we possess. It is advisable, and generally practicable, to make the injections close to the seat of the acutest pains, for the morphine has a *local* as well as a *general* anodyne action. If the morphine fail to give relief, or if it produce distressing head-symptoms, atropine may be tried, gr. $\frac{1}{50}$ for each injection. For some cases a combination of the two drugs acts satisfactorily. The atropine counteracts the unpleasant effects of the morphine upon the head and stomach.

Electricity is sometimes valuable for the relief of sciatica; but its action in this respect is very uncertain, and therefore it is impossible to foretell its effects in any given case. In recent attacks the continuous current sometimes produces marked beneficial effects.

Dr. Buzzard, in an excellent paper on Sciatica, which appeared in the *Practitioner* for February, 1877, states that the application is most hopeful in those cases of sciatica which are not dependent upon obvious causes of peripheral irritation, but that it may be useful in cases belonging to the latter class. Dr. Buzzard gives the following rules for the application of the constant current for the relief of sciatica. From 20 to 40 cells are required, but when used the strength of the current should be gradually increased; the sponge rheophores should be of large size and thoroughly saturated with

warm salt and water. Each sitting should occupy from 10 to 15 minutes, and during the application the rheophores should not be lifted from the skin; before they are removed the current should be gradually reduced to zero. Unless this precaution be taken, more or less shock will be caused when the current is interrupted.

There are three modes in which the constant current can be applied :—

1. The rheophore connected with the positive pole is applied to the upper part of the sacrum on the affected side, while the other rheophore may be either attached to the ankle or placed in a tub of warm salt and water in which the patient immerses his foot.

2. "Two sponge rheophores are applied firmly at a distance of three or four inches apart to the posterior and upper part of the thigh, and, that distance being preserved between them, they are made to slide slowly down, following the track of the nerve." A smaller number of cells must be employed than in the preceding method.

3. The rheophore connected with the negative pole is applied to the upper part of the sacrum, and the positive rheophore is moved over the course of the nerve, stopping for a minute or two over the most painful spots. Dr. Buzzard states that the second

method of application is theoretically the best, as being specially calculated to remove the irritability of the sciatic nerve near its origin. The sitting should be repeated daily; the use of electricity does not preclude the use of morphine hypodermically.

The induction current is far less serviceable as a general rule, but it may be tried if other remedies fail. It is most suitable for those cases in which the symptoms are those of muscular rheumatism. The electric brush should be drawn along the course of the nerve and its branches; slight diminution of the pain is usually all that can be expected. At a later period, however, after the pains have subsided and the limb remains weak and stiff, faradization of the muscles with moistened rheophores is often very efficacious. The use of this form of electricity may also be combined with the hypodermic injections of morphine.

Blisters have been already alluded to as especially suitable for rheumatic cases, but they are often advisable in the absence of this constitutional disorder. It is not by any means necessary to make a large raw surface; flying blisters are the most suitable, and they may be applied along the course of the nerve and its branches, or over any existing tender spot in the spinal column.

Acupuncture is probably but little practised at the present time, yet it would appear to possess a certain amount of efficacy. The rationale of its action can only be guessed at; it may be that it acts as a counter-irritant.

It is not to be wondered at that baths of all kinds should be warmly recommended as remedies for sciatica, and in chronic cases they are sometimes beneficial, inasmuch as they help to remove lingering pain and stiffness. Ordinary water, heated to the requisite temperature, is probably as useful as any of the natural hot springs. The constant temperature of the latter is, however, an advantage. When baths cannot be obtained, or are unsuitable for the patient, warm applications applied to the limb often give relief. The so-called Scotch douche is reported to have proved efficacious in several severe cases. In using it the temperature of the water is gradually increased to the maximum that the patient can bear, and a cold douche is then substituted for the hot one. This treatment can be applied twice a day. Hot sand-baths are a very old remedy, but, like douches, they are to be found only in special establishments; they would appear to be suitable for subacute and chronic cases. The same remark applies to massage,

from which great benefit may be expected when the limb has become weakened and reduced in size after a severe attack.

In a few cases of obstinate sciatica nerve-stretching has been practised with success. All other remedies should, of course, be tried before suggesting an operation of this character.

CHAPTER IX.

ARTICULAR NEUROSES—NEURALGIA OF THE JOINTS.

NATURE AND PATHOGENY OF NEURALGIA OF THE JOINTS—PREDISPOSING AND EXCITING CAUSES—SYMPTOMS—CUTANEOUS HYPERÆSTHESIA—POSITION OF THE LIMB—JOINTS USUALLY AFFECTED—COURSE AND PROGRESS OF NEURALGIA OF JOINTS—DIAGNOSIS—ANÆSTHESIA OFTEN NECESSARY—MENTAL CONDITION OF THE PATIENT—RESULTS OF APPLICATION OF BANDAGES, ETC.—EXAGGERATED PATELLAR REFLEX IN HYSTERICAL CONTRACTION OF THE KNEE-JOINTS—PAIN IN KNEE AN OCCASIONAL SYMPTOM OF HIP-JOINT DISEASE—TREATMENT, CONSTITUTIONAL AND LOCAL—MASSAGE, DOUCHES, BATHS, ETC.—ELECTRICITY—USE OF THE LIMB TO BE RECOMMENDED.

THIS affection was first described by Sir Benjamin Brodie in 1822, but some light has been thrown upon its nature by subsequent investigations. Neuralgia of the joints is a painful affection, which has its seat in the sensory nerves supplying the articular capsule, the fibrous ligaments, the skin, and the neighbouring tissues. The pain is not confined to a single nerve and its distribution, for a joint is supplied by branches of several nerves; the hip-joint, for example, is supplied by the sciatic, crural, and obturator nerves, while branches of the external and internal popliteal, tibial, crural, and

obturator ramify in and around the knee-joint. A rare form of neurosis of the joints is due to vaso-motor disorder. An experiment recently made explains, to some extent, the pathogeny of articular neuralgia. After a lateral section of the spinal cord, involving Flechsig's direct cerebellar paths of the lateral column, the joints as well as the skin of the injured side were observed to be hyperæsthetic, and it may therefore be that changes in the spinal cord, obviously of a slight and temporary nature, are the causes of neuralgia of the joints. This theory is supported by the fact that various symptoms of spinal disorder are frequent in hysterical women, who are the most common sufferers from these joint-affections.

Neuralgia of the joints is rare in male subjects; it is almost peculiar to women of a nervous temperament and belonging to the upper classes. Many of the patients are decidedly hysterical, and are the subjects of various disorders of the urinary and genital organs. Various conditions of anæmia and exhausting diseases, such as typhoid, are predisposing causes of these joint-affections. The majority of patients, however, attribute their suffering to injury or to over-exertion of the joint. In some cases the pain is due to irregular distribution of pressure

within the joint, such as may be caused by wearing shoes with high heels, and in other instances the neuralgia is the remains of some inflammatory affection, due, perhaps, to a trifling injury.

Symptoms. The knee or the hip-joint is almost always affected, and the principal symptom is the pain, invariably described as very severe; it may be limited to the joint, or may also extend from it in various directions. Keeping the limb at rest by no means always diminishes the pain; the patients sometimes assert that they are better when moving about. Exacerbations are common, and occur irregularly. Sometimes they are provoked by excitement, and sometimes by attempts to move the limb. As a rule they are most troublesome in the latter part of the day. It very rarely happens that the night's rest is disturbed by pain, and the complaint is thus distinguished from inflammatory affections. Pressure upon the joint and the surrounding parts usually excites great pain. The spots near the hip especially sensitive to pressure are just behind the great trochanter and below Poupart's ligament, while the inner side of the knee is the most sensitive part of that articulation. The attempt to take up a fold of skin between the fingers is also liable

to cause great pain. The most striking feature connected with the affection is the contrast presented between the subjective symptoms and the absence of any tangible or visible changes in the joint. Any swelling that may exist is generally due to local applications, fomentations, etc. In most cases the patients assert that the limb is weak; they less commonly complain of twitchings, and it is worthy of notice that the limb is usually kept in an extended position, whereas it is flexed when the joint is inflamed. There are sometimes evidences of vaso-motor disorder, such as redness and increase of temperature, and an eruption resembling urticaria has occasionally been noticed.

As already mentioned, in the large majority of cases the knee or the hip is the joint affected; but instances of the complaint in the hand, foot, shoulder, and elbow have been placed on record. In the vertebral column, too, articular neuralgia would seem to occur, and to simulate grave affections. As a general rule the pain occurs in one joint only; when two or more are implicated, and especially if they be symmetrically placed, the complaint is probably of a central origin.

With regard to its course and progress, neuralgia of a joint usually develops gradually. In some cases, how-

ever, the patients assert that the pain came on suddenly after shock, excitement, etc. The complaint generally runs a very tedious course; the attention, not only of the patient, but also of her friends, is apt to be concentrated upon the painful joint, with the result of magnifying the suffering. In such cases it will often be noticed that when the patient's attention is in any way diverted the joint-troubles are forgotten. The pain, indeed, has been known to disappear altogether after some sudden, violent emotion. On the other hand, it not unfrequently happens that the patient keeps her bed for months or years, receiving, it may be, temporary relief from remedies, but never exhibiting any real improvement. The tendency is for the limb to become weaker, and the joint more stiff.

Diagnosis. The diagnosis of nervous affections of joints is in not a few cases a very difficult task, especially in the early stages, and whenever there is any history of previous injury, however slight and unimportant. The examination should be very carefully made, and it is often useful to place the patient under the influence of an anæsthetic. If a joint which has for some time been rigidly fixed then becomes free, there can be little doubt then as to the real condition of

things ; but it is generally advisable to make several examinations, and it is often necessary to keep the patient under observation for some time before arriving at a positive conclusion. There are generally no physical changes, and no evidences of impaired health. The psychical condition of the patient will occasionally help the diagnosis, and if treatment be adopted it will generally be observed that remedies which would relieve a real affection of a joint will only increase the symptoms in a neurotic disorder. It has, for instance, been found that the application of bandages to a knee-joint affected with neuralgia, and their retention for several weeks, have served only to make matters worse. In cases of hysterical contraction of the knee-joint the state of the patellar reflex should always be examined ; it will generally be found to be exaggerated. In a case recently under my notice, that of a married woman, aged 47, who had been bedridden for a year with hysterical contraction of the knee-joint and other ailments, the knee jerked out immediately the patellar reflex was tested. A similar result was obtained in another case, the patient being a young woman, aged 26, who had been bedridden for four months. It must not be forgotten that in young subjects obstinate pain in the knee is

sometimes the first symptom of disease of the hip-joint, and that the same symptom is present in cases of genu valgum, which is not always bi-lateral.

Treatment. Having decided that the case is one of neuralgia of the joint, the general condition of the patient has first to be considered. If there be evidences of anæmia or debility tonic treatment of all kinds is indicated, and may by itself cure the complaint. Any disorder of the digestive or genital organs must be carefully treated, and above all things it is necessary to divert the patient's attention from the joint, and to caution the friends from talking seriously about it. The patient should be assured that she will get quite well if she will only carry out a few simple injunctions. The remedies to be prescribed are massage, carefully conducted, douches of tepid water, active and passive movements, frictions and baths, especially of salt water. These remedies, persevered in for several weeks, may prove sufficient, but if not there are others which may be tried, and among them electricity is likely to be the most serviceable. The constant current is the best, and it is especially useful whenever any points can be detected which are decidedly painful on pressure. The electrodes should correspond with the size of these spots,

against which they should be pressed, the strength of the current being gradually increased to the maximum that the patient can bear. Before withdrawing the electrodes the strength is gradually decreased. In cases in which the neuralgia of the joint is associated with tenderness over one or more vertebræ, it is sometimes useful to apply the electrodes to the latter. If the galvanic current fail to relieve, faradism may be tried, the moist electrodes being applied as before to the painful spots. The wire brush applied in this way is likely to prove serviceable in mild cases. Liniments, bandages, poultices, etc., are always to be avoided. The patient must be encouraged to use the limb and to walk about, however difficult the movement may appear.

CHAPTER X.

HEADACHE.

Pain in Head often Symptomatic—Associated with Cerebral Hyperæmia, Active and Passive—Causes and Consequences—Anæmic Headache—Symptoms—Headaches in Neurasthenia and Nervous Subjects Generally—Sympathetic Headache—Indigestion as a Cause of Headache—Rheumatic and Gouty Headache—Headache due to Intemperance—Headache in Hysterical Subjects—Pains in the Head due to Syphilis—Headache due to Disorders of the Refractive Apparatus of the Eye—Diagnosis of Headache—Treatment of the Hyperæmic and Anæmic Forms—Remedies for Neurasthenic and Rheumatic Cases—Empirical Treatment.

Pain in the head is a very common symptom of many disorders, but it likewise often occurs idiopathically, and constitutes the complaint for which the patient seeks relief. As a symptom, it is rarely absent in febrile disorders; in typhus it is often the first indication of an attack; it is prominent in inflammatory affections of the bones of the cranium and their coverings, as in periostitis, syphilitic or otherwise. Headache is a marked symptom of inflammation within the cranium and of tumours of the brain and its membranes. It is sometimes very troublesome in severe nasal catarrh,

implicating especially the frontal sinuses; and, lastly, it is not unfrequent in affections of the eye and ear. A special form of headache, migraine or hemicrania, will be separately described. In the present chapter it is proposed to consider those headaches which, not connected with acute local or general disorder, are due to a variety of causes not always very obvious, and comparatively insignificant when contrasted with the result they produce.

The pain is sometimes diffused over more or less of the head; it may, on the other hand, be principally felt in the forehead, occiput, vertex, or temples. Sometimes it is localized in a very small area, as in clavus hystericus. The character of the pain varies with the condition with which it is associated. Thus, when there is active hyperæmia, it is described as *throbbing*, and a similar sensation is experienced in anæmia when the vessels are dilated. In passive hyperæmia, the sensation is that of pressure; in rheumatic cases the pain is of a pricking or tearing character. In degree of severity the pain of headache varies greatly; it may be only so slight as to be scarcely regarded, or so severe as to be described as unbearable. In idiopathic cases the pain is wont to occur periodically; it is rarely con-

tinuous, except in cases of anæmia. Whenever it comes on at definite intervals, and at the same hour, it may generally be regarded as of a neuralgic character. For purposes of consideration headaches may be divided into classes, according as they are associated with vascular or nervous symptoms. The former may be either those of increased or of diminished blood-supply, and this first category may again be subdivided into those in which the hyperæmia is active and those in which it is passive.

In headache due to active hyperæmia of the cerebral vessels the condition is manifested by the state of face and eyes, which are red and hot. The temporal arteries are prominent and pulsate freely; the carotids are full and tense; the pain is increased on stooping and lowering the head, and relieved by the opposite postures; the patient complains of giddiness, noises in the ears, and black specks and flashes of light before the eyes. This condition is not unfrequently observed after indulgence in alcohol and as a result of excitement of various kinds. When oft repeated, the enlargement of the vessels is apt to become permanent, as a result of paralysis of the vaso-constrictor nerves. The headache then persists, becoming more severe under any form of excitement.

This kind of headache is not unfrequent as the result of excessive brain-work, and the symptoms associated with it may closely resemble those of chronic and severe cerebral congestion. If neglected, the consequences are apt to become very serious ; sleeplessness is always present, and its effect is to exaggerate all the symptoms. Vomiting, attacks resembling apoplexy and attended by transient loss of speech, are not uncommon, and the complaint at this stage proves very intractable.

Headache, associated with passive hyperæmia, is a common symptom of diseases in which the escape of blood from the veins of the skull is impeded. Hence it is frequently met with in diseases of the heart, and in cases in which cervical tumours, glandular or otherwise, press upon the veins of the neck.

Headache is very common in conditions of anæmia, and great care is necessary lest any mistake should be made in the diagnosis, and, consequently, in the treatment. In these patients, although the cheeks may be flushed, the conjunctivæ and gums are pale, a venous hum can be heard in the neck, and the headache is diminished when the patient is in the recumbent position. The sensation in the head is described as if the skull were forcibly compressed. There is likewise a

feeling of throbbing and beating within the cranium, and giddiness and humming in the ears are often very troublesome. Marked cases of this kind are often seen in women, as a result of prolonged lactation.

Headaches in which nervous symptoms predominate are also very common, and are seen especially in the subjects of neurasthenia. These form a large class at the present day, and include brain-workers of all kinds, men of business, speculators, and others whose nervous system is continually under a high degree of tension. The complaint is also common in women as a result of anxiety and mental and bodily strain. The prominent symptom is that of weight or pressure felt generally at the vertex, and with this other symptoms of neurasthenia, as described in the chapter devoted to that subject, are always associated. In some cases there is more or less hyperæmia, generally unilateral, of the cerebral vessels, and such patients often suffer from sleeplessness and various forms of indigestion. Mental disorder is a marked feature in these cases; listlessness and aversion to work of any kind alternate with fits of irritability or depression, which latter sometimes amounts to melancholia.

Some forms of headache may justly be regarded as

sympathetic in character, the most marked of these being that which not unfrequently accompanies acute attacks of indigestion. The connection between the headache and the state of the stomach is shown by the fact that the former is greatly relieved, or perhaps completely subsides, when vomiting takes place. Headaches of this class are often associated with excess of acid in the stomach, presumably due to fermentation. In these cases the exhibition of a full dose of sodium carbonate sometimes acts like a charm. Other forms of headache belonging to this category are those which occur in women suffering from uterine disorders.

Rheumatic and gouty subjects are prone to suffer from headache. In the former, attacks frequently come on after exposure to cold draughts; the pain is situated in the scalp, which is likewise tender on pressure. It is always relieved by warmth. In gouty subjects, the headache takes the form either of migraine, which is very common, or of sharp explosions of lightning-like pains over the parietal bones, occurring in quick succession, but unaccompanied by tenderness on pressure. Such attacks are sometimes to be traced to indulgence in wine and animal food; they are relieved by purgatives and alkalies. In other patients of this class it is found

that the articular attacks, at one time very frequent, either cease or become less marked, but are succeeded by headache, sleeplessness, vertigo, dizziness, and other symptoms of nervous disorder. The symptoms in these cases resemble those produced by the action of certain poisons which require a brief notice.

Headache due to indulgence in alcoholic liquors has been already mentioned, and in chronic cases results, in some degree at least, from the action of the poison upon the stomach and liver. A small dose of opium affects some persons in a similar manner; and to the same category belong those forms of severe headache which are associated with uræmia, chronic lead-poisoning, etc.

The headache which is so prominent a feature in many hysterical subjects has been described in the chapter on hysteria.

One form of headache, viz., that connected with syphilis, deserves a brief notice, if only because its nature is apt to be overlooked, and the treatment correspondingly misdirected. Pain in the head often accompanies an outbreak of secondary symptoms, and is wont to persist after the fever has subsided and the eruption is fully out. The seat of the pain is usually

over the vertex, but sometimes at the occiput and in the base of the skull. The pain is more or less continuous, but exacerbates at night; it is sometimes very violent, and associated with great mental excitement, or even delirium. It may be due to periosteal inflammation or intracranial mischief, which latter sometimes supervenes in the early stages of syphilis, *i.e.*, within the first or second year. When called upon to treat acute headache in young male adults, the possibility of syphilis should always be kept in mind. The presence of enlarged glands in the neck and groins will establish the diagnosis. Headache due to syphilis may occur many years after the primary disorder. I occasionally treat a case of this nature. The patient suffers at intervals from severe headache and neuralgic pains, which are always relieved by large doses of the iodides.

There is, lastly, one important form of headache which must not be passed over, though hitherto but little attention has been paid to it. In not a few cases headache of a more or less severe character is due to disorders of the refractive apparatus of the eye. As might be expected, this form resists all ordinary routine treatment; but yields at once when the proper measures

are adopted. The attention of the profession was particularly directed to this form of headache some years ago by Mr. Brudenell Carter, who met with a case in which a wrong diagnosis had caused much anxiety and a useless and expensive course of treatment. A young man studying at Oxford was attacked by severe head-symptoms, which were attributed to disease of the brain. A sea-voyage was ordered and taken, but caused no change in the symptoms. On examining the eyes with the ophthalmoscope, Mr. Carter found the patient to be myopic; glasses were ordered, and a few weeks afterwards all the head-symptoms had disappeared. Two years afterwards the condition was reported as quite satisfactory. Several cases of a like nature have been lately reported,* such conditions as simple and compound hypermetropic and myopic astigmatism being discovered on examination. Besides the attacks of headache, such patients often complain of giddiness, faintness, indigestion in various forms, languor, sleeplessness, and debility, all of which symptoms are

* See paper by Mr. T. H. Bickerton, on "Headache due to Errors of the Refractive Media of the Eye," *Lancet*, August 13, 1887. See also Dr. Stevens' work on "Functional Nervous Affections," p. 35.

relieved or cured by the use of suitable glasses. There can be no doubt as to the part which errors of refraction play in the causation of many cases of headache.

The account just given of the various forms of headache will sufficiently indicate the great variety of conditions under which the affection may arise. Neuralgia affecting the head and migraine are to be distinguished from headache in general; in the former the pain follows the course of certain nerves, branches of the fifth or the occipital; in migraine the pain is one of a series of symptoms. In all cases of headache every attempt should be made to ascertain the cause of the pain and the conditions with which it is associated. Attention should, therefore, be paid to the head itself, the eyes and nose, the organs of circulation and digestion, the state of the urine, etc. The history of the attack should likewise be inquired into; the seat of the pain, the frequency of its occurrence; the presence or absence of febrile symptoms and of concomitant disorder in other parts are the main points to be attended to. In all cases of severe headache, and especially in those for which it is difficult to assign an obvious cause, the ophthalmoscope should be used, and at the same time the urine should be carefully examined for albumen

and casts of the tubes. Severe and persistent headache is a frequent symptom of cerebral tumours, and is not uncommon in advanced renal disease. In the former, optic neuritis is almost invariably present in one or other of its stages; in Bright's disease, evidences of albuminuric retinitis, such as hæmorrhages, diffuse opacity and swelling of the retina, small whitish spots of degeneration, inflammation, and atrophy of the retina and nerve, are discoverable in a large proportion of cases.

Treatment. Every case of headache requires to be made a separate study in order that the treatment may be properly directed. In chronic cases with evidences of cerebral hyperæmia, the diet should be restricted; stimulants should be forbidden, and tea and coffee taken in great moderation. In very severe attacks, a few leeches behind the ears or to the temples will serve to relieve the pain; and in chronic and less severe cases a blister at the back of the neck, or even a mustard plaster, will be found efficacious. Cold applications to the head are always grateful to the patient; cold affusion may be practised, or an indiarubber bag filled with iced water may be placed upon the head. Saline purgatives are usually indicated, and sometimes it is necessary to

aid their effect by a preliminary dose of calomel or compound colocynth pill. Various mineral waters are suitable for these cases, and especially those of Carlsbad, Marienbad, Friederichshall, Hunyadi Janos, and Rubinat Condal. For gouty subjects in whom the headache is apt to be accompanied by symptoms of gastric catarrh, fermentation and acidity, the Carlsbad and Marienbad waters are especially suitable. The bromides may be required to relieve pain and to calm excitement, but their use should not be too long continued. Galvanism applied to the sympathetic nerve in the neck is sometimes useful. For this purpose the cathode should be applied to the inner border of the sterno-mastoid muscle, the anode being held in the hand; the circuit can be interrupted by alternately removing and replacing the anode. When the active symptoms have subsided, and in slight cases, tonics are generally suitable; the nitro-muriatic acid, nux vomica, and henbane, form an appropriate combination.

In opposite conditions of the system, viz., those connected with anæmia, tonics are indicated, and especially the various preparations of iron and quinine. Arsenic and strychnine are also sometimes suitable for these cases.

Headaches occurring in cases of neurasthenia are often very difficult to treat. Rest is one main element in the treatment, and change of air to a suitable locality will often do more good than medicines. Anæmia must be dealt with as above indicated. In some cases a combination of quinine with hydrobromic acid proves very serviceable. Bromide of potassium is useful to procure sleep, and morphine may be used hypodermically for the same purpose. Moderate exercise, plain nutritious diet, with a few glasses of good wine (Burgundy is one of the best), and tepid baths will do much to improve the general health. A course of strychnine is likely to be beneficial.

For rheumatic headache, alkalies and warm applications are indicated, and a few doses of iodide of potassium will often cause the pain to subside. This last-named drug is especially indicated in syphilitic cases, and if the pain does not yield a course of mercury is always desirable.

The treatment of headache due to sympathy with other organs is that of the original affection. That of headache connected with errors of refraction is simply the use of appropriate spectacles.

In cases in which, after thorough investigation, the

cause remains obscure, and the indications for treatment are therefore doubtful, such remedies as caffeine, guarana, the bromides, butyl-chloral, and gelsemium, may be tried. If periodicity be a feature of the attacks, and particularly if there be any history of exposure to malaria, quinine should be given in full doses. Anodynes applied locally will also help to relieve the pain. The most suitable for use are the liniments of opium, aconite, and belladonna, either separately or mixed, and to any of these a little chloroform liniment may be added with advantage.

CHAPTER XI.

HEMICRANIA.—MIGRAINE.—MEGRIM.

Frequency of Hemicrania—Its prominent features—Premonitory Symptoms—Symptoms of the Attack—Phenomena indicative of Vaso-motor Disturbance—Two Forms—Disorders of Vision—Periodicity of Migraine—Length of Paroxysms—Causes of Migraine—Sex, Age, Hereditary Tendency, Gouty Predisposition—Exciting Causes—Anxiety, Overexertion, Impressions on Certain Nerves of Special Sense, Derangement of Stomach, Relation of Gastric Symptoms to Migraine, Insomnia—Pathogeny of Migraine—The Spastic form—Pain due to Spasm of the Muscular Coat of the Vessels—Fluctuations in the Supply of Arterial Blood as Causes of Irritation—Dr. Liveing's Theory of the Irregular Accumulation and Discharge of Nerve Force—Migraine thought by some to be only a Variety of Trigeminal Neuralgia—Diagnosis—Prognosis—Treatment—A Course of Quinine—Aperients—The Iodides with the Alkaline Carbonates for Gouty Subjects—Strychnine, Arsenic, Oxide of Zinc, and Nitrate of Silver—Attention to Diet and Habits—Question with regard to Stimulants, Sleep, and Exercise—Change of Air and Scene—Precautionary Measures when a Paroxysm is Threatening—Rest, Darkness, and Warmth—Stimulants, Nux Vomica, Sodium Bicarbonate—Antipyrin—Treatment during the Attack—Darkness and Quiet, Cold to the Head, and Warmth to the Feet—Amyl Nitrite—Ergot—Cannabis Indica—Chloral—Morphine—Caffeine and Guarana—Galvanism.

This form of headache is very common, and causes more suffering and incapacity for work than could well be

imagined by those who have had no personal experience of the complaint. There are, moreover, many obscure points connected with its pathogeny, and it is often very intractable; for these and other reasons this affection is worthy of minute consideration.

Hemicrania is characterized by paroxysmal attacks of pain, on one or other side of the head, of apparently spontaneous origin, and very generally accompanied by vaso-motor disturbances, upon which the principal symptom seems to depend. The left side is more frequently affected than the right, but the pain is not restricted to either side in any given case, sometimes one side being affected, sometimes the other. Various modifications are observed in this respect; for instance, the attacks may come on in the left side for months or even years, and afterwards affect the right half of the head for a time and then become irregular. Even when this alternation has become established the pain is usually more severe on one side than on the other. In some instances in which the pain is truly unilateral there is some amount of uneasiness felt on the other side.

As a general rule attacks of migraine are preceded by certain prodromal symptoms, the nature and duration

of which vary in different cases and in different attacks. For a period varying from half-an-hour to perhaps three or four hours before the pain comes on the patient complains of discomfort or a feeling of pressure in the head, of fatigue and disinclination towards exertion, of depression of spirits, etc. In some cases there is incessant yawning, frequent sneezing, and a feeling of chilliness; nausea and vomiting are also sometimes present. Flashes of light before the eyes, black spots, indistinct vision or hemiopsia, and noises in the ears are other subjective phenomena which are often noticed. Sometimes the patient finds the pain present on waking, as in a case which I attended in consultation with Sir W. Jenner; sometimes the attacks occur in the evening, after a day of more or less uneasiness. The pain never comes on suddenly and without warning, as in attacks of true neuralgia; it is not uniformly diffused over the head, but is felt acutely in one spot, generally over the inner angle of the eye. It may, however, spread thence to the frontal region in general, and in some attacks the side of the head is more or less painful. The character of the pain is variously described by patients, and probably varies in different cases and in different attacks; it is therefore spoken of as heavy,

dull, boring, piercing, splitting, etc. Some patients complain of a feeling of tension, as if the head would burst. Certain of the prodromal symptoms remain and even become aggravated during the attacks; thus nausea and vomiting are often very distressing, and some of the ocular and auditory symptoms are prone to increase.

In a large proportion of cases of migraine the paroxysms are attended by circulatory phenomena indicative of vaso-motor disturbance, and these symptoms occur in two principal forms. In the first of these during the attack the painful side is pale and shrunken, the pupil dilated, the temporal artery hard and tense, and the ear is pale and cold. The pain is increased by coughing and stooping, and at each pulsation of the temporal artery. Compression of the carotid tends rather to increase the pain than otherwise. There is often an augmented flow of thick saliva. After an interval, which varies much in different cases, an opposite condition becomes established. The face becomes red and full, the ear is hot, the eye is injected, and the pupil often becomes contracted. Other symptoms which are liable to occur are palpitation of the heart with increased frequency of the pulse, sensation

of heat over the body, vomiting, and secretion of limpid urine. The vomiting and retching are apt to be peculiarly distressing in young subjects; as age advances these symptoms generally become less prominent. At the close of some attacks diarrhœa occasionally sets in. I am now attending a lady, aged 24, who always has diarrhœa after the attacks.

In the second form, when the attack is at its height, the face and ear on the affected side are hot, red, and swollen, the eye injected, the pupil contracted, and the lachrymal secretion profuse. Sometimes the upper lid feels stiff and difficult to raise; the temporal artery and sometimes the carotid are dilated and pulsate freely. The pain is diminished by pressure over the carotid. The pulse is less frequent than normal, and the radial artery feels small and contracted; but these are not constant phenomena. In some few cases ophthalmoscopic examination reveals dilatation of the central vessels of the retina, tortuosity of the veins, dilatation of the choroidal vessels, and a dusky appearance of the back of the eye. There is nothing characteristic about these appearances, for in some cases ophthalmoscopic examination has yielded negative results. As the attack passes off the above-mentioned symptoms

gradually subside. One curious feature in connection with these phenomena is that they sometimes occur in alternate attacks in the same patient. Moreover, certain symptoms of the one form are sometimes associated with those of the other type. In yet another class of cases of migraine the vaso-motor symptoms are either altogether absent, or so slight as to be scarcely observable, and whatever may be the type of the disorder, the changes in the size of the pupil are by no means constant.

The disorders of sight require a more detailed notice, inasmuch as they constitute a marked feature of a certain proportion of cases. They present two forms, viz., partial or complete loss, or indistinctness, of vision in a portion of the visual field, and certain spectral appearances. The extent to which vision is interfered with varies in different cases. If the obliteration be centric more or less of the page of a book will be unnoticed when the patient attempts to read. If it be eccentric, that is, not corresponding with the *macula lutea*, several words or letters will be found to disappear. Some patients describe a general dimness of vision, coming on in paroxysms, with intervals in which the sight is comparatively unaffected. The spectral appearances are less

frequently noticed; flashes of light are perhaps the most common. Some patients describe a kind of glimmering, as though surrounding objects were in a state of oscillation; others have noticed in addition luminous lines forming zigzags and circles, surrounding either the objects looked at or the darkened portions of the visual field. The disorders of vision, whatever form they may assume, rarely last for more than an hour unless the patient happens to be travelling by road or rail when the attack comes on. In that case the visual troubles are liable to become more severe, and they may continue until the journey is completed.

Periodicity is a characteristic of migraine, and is well-marked in not a few cases, the attacks recurring with extraordinary regularity at weekly, fortnightly, or other definite intervals. During such intervals the patients are completely free from pain, but many of them find that an attack is liable at any time to supervene as a result of such causes as over-fatigue, excitement, anxiety, exposure to cold, and indigestion. The paroxysms vary in length in different cases, but they generally subside within twenty-four hours. Some patients are fortunate enough to escape with only a few hours' suffering. If the attack commences at noon, or at any time after-

wards, it generally reaches its acme before bed-time; the patient then is apt to fall into a heavy sleep, from which he awakes, whether in the night or early morning, free from pain. There are, however, exceptions to this rule, for in a small proportion of sufferers the attacks last for several days, the pain becoming remittent, but not subsiding altogether. This form of migraine is naturally a very distressing one; while the attack lasts all kinds of exertion are utterly distasteful, if not impossible. Those who, under such circumstances, have to attend to the slightest duties are much to be pitied.

The causes of migraine are of a very varied character and will require to be discussed at some length. The effect of certain factors as predisposing causes is beyond a doubt; and among these the chief are sex, age, and hereditary influence. The female sex furnishes the largest contingent of sufferers, and in this respect, migraine is comparable with tic douloureux. The first appearance of the attacks often coincides with that of the menstrual process, and they are wont to cease after the menopause; their severity and frequency are increased by menstrual irregularities. With regard to age, the attacks generally appear before adult life is reached; it has indeed been stated that they rarely, if

ever, occur for the first time in persons over twenty-five years of age, but this statement is far from being correct. In the large majority of cases, migraine first shows itself at the period of puberty; but where there is decided hereditary predisposition the attacks may come on at a much earlier age. In these latter cases, the time of their appearance probably depends upon the manner in which the child is brought up. A too early or too close application to studies is beyond all doubt a potent factor in the early development of the complaint.

A decided hereditary tendency can often be shown to exist in cases of migraine, the occurrence of the complaint being traceable through several generations. It is moreover a fact of considerable interest that the complaint is apt to occur in children whose progenitors have suffered from other forms of nervous disorders, *e.g.*, epilepsy, hysteria, neuralgia, and various mental derangements. When the hereditary predisposition to nervous affections is very strongly marked in one or both parents, it is sometimes noticed that one child may suffer from migraine, while others are the subjects of epilepsy, hysteria, or neuralgia. A gouty family history is a predisposing cause of migraine. In my

work on Gout* I have drawn attention to the frequent coincidence of nervous affections with the presence of the gouty diathesis. In some families acute gout shows itself in the male members, while the females suffer from neuralgia in various forms, and especially from migraine. These nervous disorders likewise are wont to alternate with acute attacks of gout, and sometimes take the place of the latter. Dr. Liveing thinks that migraine, whatever form it may assume, is very frequently connected with the gouty diathesis, and that it is occasionally replaced by fits of regular gout.

With regard to other predisposing causes, there is little definitely known. The complaint exists among all classes of society, but on the whole it is probably most frequent among students and brain-workers in general. A chronic condition of anæmia also seems to be a predisposing cause.

Much more can be said with regard to exciting causes of the attacks. Excitement, anxiety, worry, over-exertion, whether mental or bodily, will often cause an attack; impressions on the nerves of special sense, whether caused by disagreeable odours, exposure of the

* "Gout and its Relations to Diseases of the Liver and Kidneys," 5th edit., p. 93.

eyes to strong light, protracted use of the eyes, a visit to a picture gallery, attendance at a concert, may have a similar effect. Many patients know exactly the kind of penalty they will have to pay for any mild kind of enjoyment which makes a decided impression on the nervous system. Derangement of the stomach is not unfrequently regarded as a cause of migraine, as it is a common accompaniment of the attacks. This view is doubtless correct with regard to a certain proportion of cases, but it more often happens that the gastric troubles result from the nervous disorder. In the experience of some patients the ingestion of food at a time when there are slight warnings of an attack is sufficient to provoke its onset, whereas if no food be taken the symptoms will usually disappear. This experience is similar to that which warns most sufferers to keep as quiet as possible and in a darkened room when an attack is supposed to be impending. The condition of some patients as regards sleep is closely associated with the occurrence of the attacks. In some persons subject to migraine a sleepless night is almost invariably followed by the well-known prodromal symptoms; in others no such effect is observable. Dr. Wilks has noticed the close relation between headache and sleepiness. Some of

his patients have stated that a short nap after dinner is followed by a wakeful and comfortable evening, but that without such rest they are drowsy and lethargic. If in this latter condition they seek their bed they sleep heavily and wake with a headache. Others have noticed that "if after a walk or exertion they have felt tired and sleepy, and, fearing the accustomed headache, have taken a cup of coffee or tea to counteract the sleepiness, they have escaped the attack." Dr. Wilks thinks that these facts indicate a close connection between sleeping and headache; in the latter, however, there are generally indications of cerebral hyperæmia, whereas there is every reason to suppose that an opposite condition prevails during sleep. The influence of menstrual disorders, both as predisposing and exciting causes, has been already noticed.

The pathogeny of migraine is confessedly very obscure, but it is obvious that the attacks are in some way connected with local or general disorder of the circulation. Whatever the condition of the affected parts may be, it is, to say the least, highly improbable that it corresponds with that which lies at the bottom of facial neuralgia, which differs from migraine in so many respects. The spastic form of the disorder, viz., that

in which the vessels of the affected half are more or less contracted, may be regarded as due to irritation of the cervical sympathetic, whilst the opposite condition, that of vascular dilatation, is caused by paralysis of the same nerve. This, however, is no real explanation, for although the phenomena may be due to anæmia and hyperæmia respectively, we are still in the dark as to the antecedent cause of the changes in the vaso-motor system. The seat of the pain is also a doubtful point, but it seems probable that the dura mater, the pia mater, and the sensory layers of the cortex are the parts affected. The fifth nerve supplies several branches to the dura mater; the pia mater is supplied from the vertebral and carotid plexus, and also from several of the cerebral nerves, especially the fifth pair. According to one theory, the pain is due to spasm of the muscular coat of the vessels; it is therefore regarded as similar in its origin to the pain attendant upon spasmodic contractions whether of the striped muscular fibres, *e.g.*, of the legs, or of the unstriped fibres of the bowels or uterus. This theory, however, does not account for the pain in the opposite class of cases, or those in which the vessels are dilated. According to another theory, the fluctuations in the supply of arterial blood as

observed in the two opposite conditions of anæmia and hyperæmia set up irritation of sensory nerves in any or all of the following parts—the skin, the pericranium, the cerebral membranes, and the sensory portions of the cortex. Such irritation is the cause of the pain, and that it should be produced by two such opposite conditions as anæmia and hyperæmia is no more extraordinary than the origination of epileptiform convulsions under equally diverse states of the vascular system. The other symptoms of migraine, *e.g.*, the cutaneous hyperæsthesia, the disorders of the nerves of special sense, the nausea and vomiting, and the copious secretions which often accompany some portion of the attack, may in like manner be referred to periodical fluctuations in the quantity of blood contained in the peripheral arteries, or in the cerebral centres of the nerves supplying the affected parts.

A theory of migraine, advanced by Dr. Liveing, must not be omitted. This author classes migraine with several other paroxysmal affections, *e.g.*, epilepsy, infantile convulsions, ague, and gout, and regards them as nerve-storms. He considers that "the fundamental cause of all neuroses is to be found not in any irritation of the visceral or cutaneous periphery, nor in any

disorder or irregularity of the circulation, but in a primary and often hereditary vice or morbid disposition of the nervous system itself; this consists in a tendency on the part of the nervous centres to the irregular accumulation and discharge of nerve-force. The immediate antecedent of an attack is a condition of unstable equilibrium and gradually accumulating tension in the parts of the nervous system more immediately concerned, while the paroxysm itself may be likened to a *storm* by which this condition is dispersed, and the equilibrium for a time restored." As supporting this theory, Dr. Liveing insists upon the paroxysmal and explosive character of the symptoms, the intermittent nature of the disorder, the tendency to recurrence with healthy intervals, the nature and variety of the exciting causes, and other considerations. The seat of the disorder is considered to be "the sensory tract, and the ganglia of the sensory nerves, from the optic thalamus above to the nucleus of the vagus below." The *storm* begins in the optic thalamus, and passes from above downwards, or from before backwards in the sensory tract.*

* See Dr. Liveing's work on "Megrim, Sick Headache, and some Allied Disorders," p. 336, *et. seq.*

Such are the principal theories as to the nature of migraine. The view supported by the late Dr. Anstie, and by some at the present day, that the disorder is merely a variety of trigeminal neuralgia must, I think, be regarded as untenable.

The diagnosis of migraine can seldom present any difficulty, in spite of the variations of the symptoms in different cases. The pain differs from that of true neuralgia, for it does not come on suddenly, or take the form of darts or shocks separated by intervals of freedom. Moreover, it does not follow the course of a nerve; the supra-orbital region and the posterior part of the roof of the orbit are the commonest seats of pain. Tender points are not discoverable. The heat and throbbing of the affected side are also characteristic symptoms, while the vomiting and the evidences of constitutional disorder are never observed in connection with tic douloureux. The frequent termination of the attack in a heavy sleep is another distinguishing feature of migraine. The so-called *clavus hystericus* probably resembles the pain experienced in many cases of migraine, but the two conditions are not likely to be confounded. Migraine, however, may, of course, occur in hysterical subjects.

The prognosis is favourable as regards any danger to life, and in some cases the attacks appear to exert a beneficial effect, inasmuch as the dread of their occurrence tends to restrain patients from various excesses to which so unpleasant a penalty is attached. In a large proportion of cases patients find themselves less liable to attacks as they advance in life, and the symptoms become less marked. Much depends upon the circumstances and habits of life of the patient, inasmuch as under favourable surroundings, and with the exercise of a little common sense, measures can be adopted to ward off the attacks, or at least to render them more tolerable.

Treatment. Migraine is often a very intractable affection, owing in a great measure to the difficulty or impossibility of altering the conditions with which it is associated. Much may be done for the relief of patients who are both able and willing to carry out a definite line of regimen and treatment, but there are not many sufferers from migraine who can be included in such a category. Patients come to look upon it as a necessary evil, and comparatively few of them seek and act upon medical advice, except as regards some medicine for the relief of the pain. There are a few drugs which, taken

when a paroxysm is threatening, diminish its intensity, but their action is variable and not to be depended upon in all cases. In order to afford any permanent relief the state of the patient's general health must receive minute attention, and any existing cachexia must be dealt with as far as possible. In the majority of cases tonic treatment is indicated, and a course of quinine and iron sometimes yields very beneficial results, especially where there are evidences of anæmia. The quinine should be given about an hour before meals, and the iron immediately after them. If constipation be present, or result from the iron, a little extract of aloes should be given with the quinine. Under the use of these remedies I have known the attacks to cease for several months in a young man who had for many years been subject to almost weekly recurrences. Strychnine, arsenic, oxide of zinc, and nitrate of silver, given for a considerable time, have all been found more or less efficacious in diminishing the frequency of the attacks. In women, any existing menstrual irregularities should receive careful attention. In cases of migraine with a gouty family history, I have witnessed much relief from a combination of the iodides with alkaline carbonates and nux vomica.

As a matter of course, in all cases of migraine the diet and general habits of the patient are points of much importance. The food should be nourishing, easily digestible, moderate in quantity, taken leisurely and at regular intervals. The evening meal should always be a light one. Tea and coffee may be allowed, but always in moderation, and with regard to alcoholic drinks, excess must, of course, be prohibited, but small quantities of those preferred by the patient may be allowed if taken with meals. Sleep is another important consideration, and patients should be advised to make every effort to secure a proper amount. Exercise must not be neglected; its form and duration must be regulated by the patient's circumstances, always remembering that over-exertion is likely to be as mischievous as the opposite condition. The functions of the skin must likewise be attended to. A prolonged change of air and scene appears in some cases to be remarkably beneficial. A friend of mine who had suffered severely in England for many years was completely free from attacks during a six years' sojourn in India. Some patients have found relief while staying at various watering-places, but the effect seems to be of a transitory character.

When the sensations of the patient warn him that an attack is imminent, there are a few measures which, if adopted, may either prevent a paroxysm or lessen its severity. Chief among these is rest, either in the sitting or the horizontal position, in a darkened room, and absolute quiet. If, as often happens, the patient is chilly and his feet decidedly cold, warmth, applied either by means of a hot bottle or by sitting near a fire, will be found, not only grateful, but of much assistance in warding off the attack. Some patients find that a small quantity of stimulant helps to shorten this stage. The most useful drug is nux vomica; the best way to take it is to mix 10 or 15 minims of the tincture with an ounce of water, and to sip the mixture slowly. In some persons the effect of this remedy, especially when combined with the measures just adverted to, is very satisfactory. A full dose of sodium bicarbonate acts well in some cases, presumably in those in which the presence of much free acid in the stomach is the exciting cause of the attack. If any of these measures afford even slight relief, the maintenance of the recumbent position will often induce sleep, from which the patient awakes almost or altogether free from discomfort.

A remedy named antipyrin has lately been recommended for the relief of migraine. A single dose of from 10 to 15 grains will sometimes cut short an impending attack. I have witnessed this result in several cases. Should the first dose fail to relieve, a second and even a third dose may be given at intervals of twenty minutes. Given in smaller doses for several days after an attack it is said to prevent recurrences. It must not be forgotten that even a few grains of antipyrin sometimes cause sickness and other unpleasant symptoms (see *Lancet*, Feb. 25, 1888).

When the attack is at its height, anything that is likely to relieve the pain is readily welcomed by the patient. In not a few cases, however, experience has taught him that little or nothing can be done in this direction. The horizontal posture, a dark room, and perfect quiet appear to be the most effectual palliatives, and to these may be added the application of cold when the throbbing and the hot stage are present. An ice-bag placed on the forehead lessens the intensity of the pain. If, as often happens, the feet are cold, a hot water bottle will also be useful. But few patients would care to place their feet in warm water owing to the change of position that would be requisite. Some patients

find that heat or a mustard plaster applied to the back of the neck affords relief; and compression of the carotid on the affected side is sometimes resorted to for the same purpose. Various drugs are used with more or less advantage in different cases. When there is evidence of vascular spasm, inhalations of amyl nitrite are likely to be serviceable. From two to four drops may be inhaled from a handkerchief, and where the remedy has a good effect much relief is rapidly obtained. In the opposite condition of the vessels, ergot in some form has been found useful. It may be administered either in pills, in doses of three or four grains, or else injected hypodermically (eight to ten minims of the Pharmacopœia injection). Cannabis indica appears to benefit some patients; from ten to fifteen minims of the tincture may be given every two hours until relief is obtained. Bromide of potassium and chloral hydrate will assist other patients. The chloral is best given in a full dose (of 25 or 30 grains), and if it produce sleep the patient will generally awake therefrom refreshed and free from pain. Butyl-chloral hydrate is recommended by some authorities, the dose being five or six grains every three or four hours. The hpyodermic injection of morphine is another remedy of this class, but it is less

efficacious than chloral, and is, moreover, quite unsuitable for cases in which the attack has been excited by gastric or hepatic derangement.

There are two drugs, viz., caffeine and guarana, which appear to have a really marvellous effect in some cases. Unfortunately their action is very uncertain upon different patients: some persons find them utterly useless. They are, however, always worthy of a trial. About 20 grains of guarana should be given when the attack is coming on, and followed, if necessary, by a second dose an hour afterwards. Under similar circumstances citrate of caffeine may be tried in doses of from eight to ten grains.

As a matter of course galvanism has been tried, both as a prophylactic and as a palliative during attacks: in the latter capacity it sometimes gives relief. A weak current must be used, one pole being placed on each mastoid process. If it be wished to galvanize the sympathetic nerve, one pole is placed behind and below the angle of the jaw, while the other pole is held in the hand. When the symptoms are referable to vascular dilatation, the negative pole should be applied to the neck, while the positive is held in the hand; and when the opposite condition exists the position of the poles should be reversed.

CHAPTER XII.

VERTIGO—GIDDINESS.

VERTIGO AS A SYMPTOM OF ORGANIC DISEASES OF THE NERVOUS SYSTEM—IN DISEASES OF THE STOMACH AND LIVER—IN AFFECTIONS OF THE EYES AND EARS—IN DEBILITY AND ANÆMIA, AND FUNCTIONAL DISORDERS OF THE NERVOUS SYSTEM—TOXIC FORMS AS IN GOUT—DEFINITION AND KINDS OF VERTIGO—GASTRIC VERTIGO, SYMPTOMS AND TREATMENT—OCULAR VERTIGO—AURAL VERTIGO—VERTIGO OF ANÆMIA, NEURASTHENIA, HYSTERIA, EPILEPSY, AND HEMICRANIA—VERTIGO IN GOUTY SUBJECTS.

VERTIGO is a common and often a prominent symptom of many organic diseases of the central nervous system, *e.g.*, of tumours of the cerebrum, cerebellum, crura cerebri, and pons Varolii. It also occurs in connection with disorders of the stomach and liver; as a result of certain affections of the eyes and ears; in association with post-nasal catarrh; in states of debility and anæmia; and as an effect of various functional disorders of the nervous system. There are also toxic forms of vertigo, examples of which are seen in some cases of lithæmia, and likewise as a result of alcohol, tobacco, and various other drugs. In a few rare cases in which

giddiness is a prominent symptom, no other abnormal condition can be detected. At the present time I have a patient under my care, a gentleman aged 35, in whom vertigo is the only symptom, while its cause remains obscure. The term vertigo implies a sense of defective equilibration, accompanied by a feeling of false impressions as to the relations and motions of surrounding objects, or of the movements of the body, or of the brain itself.

In the most common type of vertigo, surrounding objects appear to be in motion; sometimes they seem to be revolving round the sufferer, sometimes to be coming towards him, or to be changing their positions and to stand at abnormal angles to each other. In another form the surrounding objects are at rest, while the patient himself appears to be in motion. In a third form the symptom is sometimes described as a "swimming of the head;" the contents of the cranium seem to be revolving. Vertigo, especially in its graver forms, seldom exists alone; it is often accompanied by a feeling of nausea or even by vomiting, by noises in the ears, confusion of thought, and sometimes even by slight loss of consciousness. The various conditions with which vertigo is associated will

be first pointed out, and afterwards the pathology of the symptom will be discussed.

A common form of vertigo is associated with disorder of the stomach and liver. Men of middle age, who take an insufficient amount of exercise and eat hurriedly, are the most common sufferers. In some of these cases, exercise after a meal will bring on an attack. There are other persons, in whom, owing to a curious idiosyncrasy, an attack of nausea and vertigo is the invariable result of eating certain articles of food, *e.g.*, shell-fish and eggs. I have met with several examples of this character. When such articles are taken, they cause intense irritation of the stomach, with nausea, sickness, and vertigo, all of which symptoms pass off after the offending matters are ejected. In ordinary cases the vertigo comes on after a hearty meal. The stomach becomes distended, there is pain, heat, or uneasiness in the head, buzzing or other noises in the ears, eructations, perhaps of an acid character, palpitation, and vertigo. This last condition varies in degree, and is not unfrequently so severe as to create alarm. All the surrounding objects seem to be in motion; the patient, on attempting to walk, reels as though he were intoxicated; sometimes there is double vision, flashes of

light before the eyes, confusion of ideas, and great uneasiness. In some cases, but not in all, the giddiness passes off, or is lessened when the patient lies down. These symptoms may last for several hours; but they almost invariably cease after free vomiting. The ejected matters are often intensely acid; but sometimes bitter and yellowish. In less marked cases there is only nausea and retching as gastric symptoms, and these, with the vertigo, slowly subside. The attacks, whatever form they may assume, are very apt to recur, and in some patients a condition of giddiness becomes established, and lasts almost indefinitely, the sensation being aggravated by movements, by mental efforts, and by impressions on the nerves of special sense. In none of these cases is there any loss of consciousness, and if sensory hallucinations are present, they are not made worse when the head is lowered, as is the case when they are dependent on cerebral hyperæmia.

The treatment of gastric vertigo consists first in attention to the diet. The food should be of a simple and digestible character, taken at proper intervals, and without undue haste. Excesses of all kinds are, of course, to be avoided; beer, pastry, and other substances liable to engender flatulence should be forbidden. In

an acute attack, coming on soon after a meal, if there be nausea and retching, an emetic, such as mustard, sulphate of zinc, or ipecacuanha, should be given and followed by a draught of lukewarm water. If the bowels are confined a purgative draught of rhubarb, magnesia, and soda should be given a few hours after the emetic has acted. A course of vegetable bitters with alkalies will help to ward off attacks for the future. Trousseau recommends a cup of infusion of quassia every morning, and a little soda, chalk, and magnesia at bedtime and after each of the two principal meals. Nux vomica is also likely to be serviceable; ♏v-x may be given before meals. When the liver appears to be at fault, purgatives are usually indicated, and the Carlsbad salts and the Rubinat Condal water are suitable for such cases. In the more chronic forms, in addition to purgatives, a course of dilute nitro-muriatic acid with nux vomica and henbane will probably afford relief. Attention to the diet is all-important.

Vertigo from ocular causes generally depends upon paralysis of the external rectus muscle of one eye. Diplopia is caused thereby, and is associated with confusion of vision, and these symptoms with the giddiness may become so severe that the patient fears to walk

alone in the streets. Loss of power of the internal recti muscles is another cause of vertigo, and this condition is not unfrequent in persons whose daily occupation involves the continuous use of the eyes at reading distance. In maintaining the necessary convergence of the visual lines the internal recti become strained and gradually insufficient; prolonged use of the eyes causes aching pain and confusion of vision, with headache and a feeling of giddiness. All these symptoms become aggravated if the patient's health fail from any cause, or if any special strain be put upon the eyes. On the other hand, after rest, change of air, and a general tonic treatment the vertigo and the other symptoms are always less troublesome. Astigmatism and asthenopia from defective accommodation are less frequent causes of vertigo. In connection with ocular defects it is worthy of notice that even when slight they may induce and greatly exaggerate giddiness, due primarily to gastric or aural causes. In persons liable to these latter forms of vertigo the use even of normal eyes is liable to cause or increase the giddiness.

The treatment of vertigo due to ocular causes consists in remedying the defect in the eyes, either by suitable glasses or by operation.

Aural vertigo, to which much attention has been paid since its pathology was explained by Menière in 1860, is to be regarded as the effect of irritation of the nerves of the semicircular canals. The vertigo is associated with auditory sensations of a severe character. The acute attacks are generally preceded by pain in one ear, deafness, and more or less discharge, and occasionally by sensations of chilliness; but in some cases they come on suddenly and without any warning. The patient feels giddy and sick, and is conscious of a loud, buzzing, whistling, or cracking noise in one ear; the face becomes covered with a cold perspiration, and in rare cases sensation and power of motion are almost completely abolished. In an ordinary attack consciousness is not impaired and movement is possible, though not in a straight line. This condition was very marked in a case I saw recently in consultation with Dr. Woakes. Neighbouring objects appear to oscillate or to revolve round the patient; he reels or totters as though the ground were moving under his feet, and sometimes he is conscious of an irresistible tendency to keep turning in the same direction. The impulse is from right to left when the right ear is affected, and *vice versâ*. These symptoms may last for a few seconds only, or may continue for

several hours, and they sometimes pass off after free vomiting. The patient may then feel quite well, or may still complain of uneasiness about the head, especially on movement. Diminution or loss of hearing is commonly noticed after the first attack, when the latter has occurred without any premonitory symptoms. In some patients the giddiness and noises in the ears are almost habitual, becoming worse at intervals. In ordinary cases the giddiness and impairment of hearing are the only remaining troubles, and the former may soon pass off; but in more severe and complicated cases there are clonic spasms of the muscles of the face, involuntary movements of the limbs, causing the patient to run forwards or fall in various directions. I have a patient suffering from aural disease, in whom the noises continue for months and then stop suddenly, and cease altogether for several weeks, again to recur. Once established, the attacks of aural vertigo are apt to recur at uncertain intervals, and their incidence has no relation to the state of the digestion. If the deafness becomes complete, cessation of the attacks is the general rule. Aural vertigo is liable to be mistaken for giddiness, the result of cerebral congestion. In this latter condition

there are frequently intervals of decided loss of consciousness, from which recovery is gradual and tedious, so that mental confusion and embarrassment may last for some time. Deafness is, however, absent, and the prodromal symptoms are more often visual than auditory illusions. Loss of consciousness is characteristic of epileptic vertigo; on recovery the epileptic patient has no knowledge of what has gone before, and there is no impairment of hearing.

Recent experiments have served to explain the pathology of auditory vertigo. Section or injury of the semicircular canals of the labyrinth produces a feeling of giddiness and consequent disturbances of equilibrium. A normal condition of the labyrinth is necessary for the maintenance of the balancing power. According to Dr. Ferrier, this portion of the ear seems to regulate the state of the equilibrium of the individual and to preside over co-ordination. Dr. Crum Brown suggests that the sense of rotation has a special peripheral organ, a brain-centre, and a connecting sensory nerve. All experimenters agree that the labyrinth is a special organ of this character; the irritation is conveyed by the auditory nerve to the centre, with the result of producing anæmia of certain parts of the

brain. The vertigo, reeling, and other symptoms are held to depend upon the last-mentioned condition. Irritation of the external and middle ear will sometimes produce vertigo. Thus the injection of cold water into the meatus and the presence of foreign bodies are occasional causes of the condition, while in the middle ear inflammatory processes and obstruction of the Eustachian tube may lead to a similar result.

In the treatment of aural vertigo, the ear should be examined in the hope that a removable cause may be discovered. Hardened wax and foreign bodies should, of course, be removed, and obstruction in the Eustachian tube must be dealt with by inflating the tympanum, astringent applications to the pharynx, and, if necessary, by passing the Eustachian catheter. Labyrinthine vertigo is much less amenable to treatment. The most useful remedy during the intervals is quinine in large doses, *e.g.*, gr. x-xv daily, combined with dilute hydrobromic acid, and continued for three or four weeks. The bromides, in full doses, are sometimes useful in severe attacks, and the addition of morphine may also be tried. For chronic cases, counter-irritation over the mastoid process is likely to prove serviceable. Attention should be paid to any gastric derangement, for in the subjects

of aural vertigo, disorder of the stomach is liable to provoke an attack. It must not be forgotten that when the deafness becomes complete and permanent, the vertiginous attacks generally cease.

Dr. Woakes* has pointed out that the condition of the Eustachian tubes in post-nasal catarrh, of which indigestion is a frequent concomitant, exerts a marked influence on the induction of the so-called stomach vertigo. The result of the obstruction of the tubes is retraction of the drum-membrane, "in consequence of the external atmospheric pressure not being counterbalanced by the column of air behind it, which should be constantly renewed by the automatic action of the Eustachian tubes upon the respired air. This function being in abeyance the air is excluded from the tympanic cavity and hence the greater or less degree of collapse of the drum-heads. With this the ossicles are also pressed inwards, and through the medium of the stapes exert a slightly increased degree of tension upon the intra-labyrinthine fluid, which constitutes a predisposing cause of vertigo. Now the subjects of chronic

* "On Post-Nasal Catarrh and Diseases of the Nose causing Deafness," p. 52.

catarrh are particularly prone to attacks of vertigo, which attacks are frequently initiated in the *primæ viæ*."

In various conditions of debility, as anæmia and neurasthenia, more or less severe vertigo is a somewhat common symptom. It always attends copious losses of blood, and is felt by the patient before actual syncope comes on. In ordinary anæmia and in chlorosis, patients often complain of giddiness especially on exertion. There is seldom any difficulty in recognizing these conditions, and the main question in diagnosis relates to the cause. This, of course, must be discovered and dealt with, and the giddiness and the other cerebral symptoms will then subside. In neurasthenic subjects, vertigo is seldom very severe, though it may continue for some time and cause great distress to the patient. It is always aggravated by the gastric and hepatic disorders and the sleeplessness, all of which are common complaints in these subjects. As a symptom, vertigo is apt to be most prominent in those cases of neurasthenia which are mainly due to sexual excesses. It is worse when the patient assumes the erect position, and while he is walking there is a distressing sense of unsteadiness. There is no deafness, and noises in the ears are rarely complained of; the vertigo is aggravated by

mental efforts of various kinds, and by prolonged use of the eyes. The treatment is, of course, that of the condition of which the vertigo is only a symptom. Avoidance of the cause is indispensable to a cure.

Among functional nervous disorders, besides those already mentioned, hysteria, epilepsy, and hemicrania count vertigo among their symptoms. Dr. Weir Mitchell states that he has "seen hysterical girls with deafness, tinnitus and a great development of equilibrial disturbance, in whom the disease passed away without leaving a trace behind it." He adds that vertigo in such cases does not exclude the presence of true aural, optic, or gastric dizziness, which is then apt to become the starting-point of a long train of hysterical disorders. In epileptic cases the attack may be ushered in or replaced by a feeling of giddiness. Epileptic vertigo is always accompanied by unconsciousness, and often by various motor phenomena and some of the other ordinary symptoms of the typical epileptic paroxysm. The vertiginous feelings in an attack of migraine are seldom severe, unless the patient happen to be travelling during the attack. The giddiness may precede or accompany the pain in the head, and it is often marked when the gastric symptoms are prominent, and subsides

after free vomiting. There is neither deafness nor noise in the ear; but various ocular symptoms of migraine are generally associated with the giddiness. The treatment of these forms of vertigo is, of course, that of the conditions with which they are associated.

Vertigo is somewhat frequent in gouty subjects, and in some of these cases it forms one of a group of symptoms which alternate with or occasionally replace the articular inflammation. Under such circumstances it is apt to be accompanied by headache, disturbed sleep, flatulence, and other signs of gastric disorder. It is probably due to the presence of lithic acid and other imperfectly oxidized substances in the blood, and not unfrequently to the presence of undigested and irritating articles of food in the stomach and bowels. The treatment is that of gouty dyspepsia; the diet must be carefully regulated; excess of animal food and indigestible articles must be strictly forbidden; stimulants, if allowed at all, should be prescribed in definite and small quantities, to be taken only with meals; exercise and attention to the state of the skin should be carefully insisted on. By way of medicines, purgatives are generally indicated, and these may be taken in the form of such mineral waters as Friedrichshall, Æsculap,

Hunyadi Janos, or the Rubinat-Condal. When there are marked symptoms of gastric catarrh, such as fermentation and acid eructations, Carlsbad water is preferable. Should the function of the liver appear to be imperfectly performed, small doses of calomel or blue pill, either alone or in combination with colocynth or rhubarb, may be given from time to time. Various other hepatic stimulants and alteratives, as podophyllin, euonymin, iridin, and leptandrin, are available for use in chronic cases. When the urine contains much free acid, a course of alkalies with bitter tonics is likely to be serviceable. Vertigo in cases of gastric disorder is explained by the close relation which exists between the nuclei of origin of the pneumogastric and auditory nerves; the irritation is propagated from the former to the latter. In lithæmia the giddiness is presumably due to the irritating effect of the lithic acid upon the cerebral vessels, and the consequent disturbance of the circulation.

CHAPTER XIII.

WRITER'S CRAMP AND ALLIED DISORDERS.

WRITER'S CRAMP, PECULIARITIES OF—PERSONS MOST PRONE TO SUFFER — PATHOLOGY — SYMPTOMS, THREE FORMS: SPASTIC, TREMULOUS, AND PARALYTIC—MIXED FORMS—ALLIED DISORDERS —DIAGNOSIS—TREATMENT — REST — WOLFF'S METHOD — GALVANISM—ATTENTION TO GENERAL HEALTH—LOCAL MEASURES—COUNTER-IRRITATION—MECHANICAL APPLIANCES.

THE condition termed writer's cramp is the most common example of a class of peculiar disorders of motion. These affections present one feature which is common to them all, namely, that certain actions, previously accomplished with perfect ease, are rendered difficult or even impossible in consequence of cramp or other disordered form of muscular action, whereas other kinds of movement are performed by the same muscles without difficulty or discomfort. As a matter of course, the upper extremity, and particularly the hands and fingers, are most liable to be thus affected, inasmuch as these parts have more work thrown on them. The cases in which the lower extremities are affected are comparatively few in number.

Writer's cramp occurs almost exclusively in persons whose avocations require them to write for many hours daily. The majority of the sufferers are those who are compelled to write a good legible hand and overtax their muscles. It is said that bad writers and authors for the most part escape; copyists have to bear the burden. Weakly subjects with a predisposition to nervous affections are most liable to be attacked, and when the symptoms have appeared they are apt to be aggravated by excesses of all kinds, and in fact by anything which tends to lower the tone of the nervous system.

In a few cases the symptoms have been noticed to appear after an injury to the hand; their development is, doubtless, often promoted by the use of hard steel pens, a thin and rigid penholder, and by the adoption of a cramped and confined position when writing. The fear and anxiety lest the disorder should prevent the sufferer from gaining a living will also tend to accelerate the progress of the symptoms.

Nothing definite can be stated with regard to the pathology of this affection. The symptoms indicate disordered co-ordination, and, as Dr. Poore has pointed out, such disorder would be produced by "the failure of one muscle, however small, which had been taught by

years of laborious education to act in harmony with many others for the accomplishing of a complicated and delicate act." It has been thought by some that degenerative changes take place in the spinal cord, and this opinion is supported by the fact that faradisation of the hands has no effect upon the symptoms. Moreover, if the left hand is used to supply the place of the right it is soon apt to become affected in a similar manner. It may be that slight inflammatory changes are set up in the peripheral nerves, and that the process gradually advances towards the nerve-centres.

Symptoms. These are of a typical character, inasmuch as they occur only when an attempt is made to use the pen. They begin gradually and insidiously; there is at first a sense of discomfort in the hand and arm generally, and the guidance of the pen seems to be difficult. As time goes on the symptoms become more marked, and after a few letters or words are written the hand becomes stiff, or painful, or both at the same time. In the most common form of the affection the thumb and index finger are thrown into a state of tonic spasm soon after the patient attempts to write, and it is obvious that certain muscles, or groups of muscles, are spasmodically contracted. In some cases the thumb is

drawn across the palm, and thus pressed against the pen; in others the index finger is firmly extended; while in a third class extension of the thumb is added to that of the forefinger, so that it is impossible to hold the pen in the ordinary manner. In very severe cases the hand is drawn to the ulnar side owing to spasm of the flexor and extensor carpi ulnaris. It less frequently happens that the pronators and supinators are affected; in very rare cases the muscles of the shoulder are spasmodically contracted. When the hand is affected, as above described, writing becomes very difficult, and the letters are apt to be unequal and distorted, and separated from each other by irregular strokes.

In a second form of the disorder, immediately the patient attempts to write, the hand, and perhaps the entire arm, begin to tremble, the movements become worse as the patient endeavours to overcome them, and legible writing is, of course, impossible. In the third, or paralytic form, the hand and arm feel weak and painful after a few words or lines have been written; if writing be persevered in, the hand at last is felt to have lost its strength, and it rests for some time on the paper in order to recover itself. As a general rule other movements can be performed without difficulty by the

affected hand, and no discomfort is felt except when writing; but as time goes on the muscles at the back of the forearm are liable to continue painful, especially when called into action for any purpose. The pain may also extend to the nerves on the inner side of the arm and to the shoulder.

These three forms of writer's cramp may be combined in various ways; tremulous movements are often superadded to the spasm. Various manœuvres are adopted by patients in order to overcome their difficulties; they often try holding the pen in a different way, and for a time they may find relief, but at last the different muscles called into play become similarly affected. Writing from the wrist alone, or even from the shoulder, is often, for a time at least, efficacious, and patients always find that they can write more comfortably with a pencil than with a pen. A feeling of tiredness is common to all the patients, but it is especially marked in those who suffer from the spastic form of the disorder. They are apt to make enormous efforts in order to overcome their difficulties. The pain already described may extend from the shoulder to the spine, and the lower cervical and upper dorsal vertebræ are not unfrequently tender on pressure. An eruption of

eczema, with severe tingling at the back of the forearm, has been noticed in some cases. The electrical excitability of the affected muscles is generally normal, but it may be somewhat increased.

When the pain and stiffness have become marked, the handwriting is, of course, considerably altered; the letters are stiff, angular, and ill-formed. The complaint is a very obstinate one; a complete cure can be expected only in slight cases. The chronic and severe forms may, however, be considerably relieved by treatment. Some patients learn to use the left hand, but this, as before stated, is apt to become similarly affected. I have a patient who has learnt to write with his left hand, and by using the hands alternately has prevented a recurrence of the attack.

With reference to disorders allied to writer's cramp it is only necessary to mention their names. The most common instances are as follows: Piano- and violin-players' cramp, telegraphists' cramp, and tailors' cramp. In the lower extremities analogous symptoms are occasionally witnessed in ballet-dancers and in girls working treadle sewing-machines.

The diagnosis of writer's cramp is almost always easily made. It is only necessary to remember that

difficulties in writing are sometimes the first symptom of chorea.

Treatment. Rest of the affected part is all-important, and for mild cases may be all that is necessary. It must, however, be continued for weeks or even months, and when the patient recommences writing he should do very little at a time, adopt a comfortable position, wear a glove on his hand, use a large soft cork pen-holder and an easy pen. In severe cases something more than rest is required, and systematic massage would appear to have yielded very favourable results in the hands of specialists.

The method employed, with a considerable amount of success, by J. Wolff, is as follows:—(1) Twice or three times daily, the patient is directed to move his fingers, hands, forearms, and arms in all possible directions, the muscles "being made to contract from six to twelve times with considerable force and with a pause after each movement, the whole exercise not exceeding thirty minutes." (2) The movements are made as before, but "each one is arrested by another person in a steady and regular manner; this may be repeated as often as the active exercise. Massage is practised daily for about twenty minutes, beginning at

the periphery; percussion of the muscles is considered an essential part of the massage. Combined with these are peculiar lessons in pen-prehension and writing."* Dr. Lewis cites the experience of Theodor Stein, according to whom, out of 277 cases thus treated, 157 were cured, 22 improved, while 98 remained unimproved. The total number comprised cases of writers', pianists', telegraphers', and knitters' cramp.

In a considerable number of patients, much improvement has also been effected by the use of galvanism, the application of which, however, must be adapted to each particular case. As a general rule weak currents alone are necessary, and violent contractions of the muscles and long sittings are to be avoided. In one method the anode is applied to the spinous processes of the lower cervical and upper dorsal vertebræ, while the cathode is placed over the affected muscles or their nerves. The poles are not to be moved about, but should be kept in position for about ten minutes, and the treatment may be repeated either daily or every other day. In another method, the anode is placed as before, over the lower cervical or upper dorsal vertebræ,

* "Neural Disorders of Writers and Artisans," by Dr. M. J. Lewis, in Vol. V. of "Pepper's System of Practical Medicine."

and the cathode in the depression between the angle of the lower jaw and the sterno-cleido-mastoid muscle. A mild current should be used, it should not be suddenly broken, and the sitting should not exceed five minutes. When, as not unfrequently happens, one or more spinous processes are tender to the touch, the application of the anode will generally relieve this symptom and produce a corresponding improvement in the state of the arm. The faradic current is not to be recommended in these cases of writer's cramp except, perhaps, in the paretic forms, and after the spastic symptoms have entirely disappeared. In these cases the nutrition of the muscles may be promoted by the cautious use of the induced current. One electrode should be placed over the affected muscles, and the other on the patient's chest; a weak current just enough to cause contraction of the muscles is all that is required, and the application should not be continued for more than five minutes.

In all cases of writer's cramp the state of the general health should be inquired into and improved as far as possible. Anæmia should be combated by iron, quinine, and the hypophosphites; if nervous irritability, anxiety, and sleeplessness are prominent symptoms, a short course

of the bromides, in combination with the tonic remedies, is likely to be serviceable. Pain in the arm should be relieved by belladonna and chloroform liniment. Some authorities recommend the hypodermic injection of atropine (gr. $\frac{1}{60}$) for cases in which tonic contraction is a marked feature. When pain extends up the inner side of the arm it is probably due to neuritis, and should be treated by the application of flying blisters to the neighbourhood of the painful spots. In very severe cases it may be better to apply the Paquelin cautery to the skin. The instrument must be at a *white* heat, and very quickly and firmly drawn along the course of the affected nerves. If properly applied, vesication will not be produced; only the superficial layer of skin becomes dry and brown. The length of the cauterized surface need not exceed a couple of inches, and the application should be repeated from time to time on fresh portions of skin.

Various mechanical appliances have been devised for enabling the subjects of writer's cramp to continue their avocation to some extent. Such appliances act by making another set of muscles perform the work. They are of questionable efficacy inasmuch as the symptoms are apt to become developed in the muscles whose vicarious action is solicited.

CHAPTER XIV.

FACIAL PARALYSIS.

Forms of Functional Paralysis—Rheumatic Paralysis—Paralysis of the Facial Nerve, due to Cold and other Influences—Symptoms, Subjective and Objective—Loss of the Sense of Taste—Auditory Symptoms—Electrical Reactions of the Paralyzed Parts—Diagnosis of Facial Paralysis—Determination of the Site of the Lesion—Prognosis—Treatment.

The term *functional* is applied to those forms of paralysis, the cause of which is either obscure or altogether unknown. Thus under this heading may be grouped the paralyses met with in chronic poisoning by lead and mercury; those which are observed as sequelæ of febrile affections, such as diphtheria, dysentery, and intermittent fever; the paralyses of reflex origin, and those which occur in hysterical cases. With the exception of the last, all these forms are comparatively rare, but another form more often met with, and vaguely termed *rheumatic*, may be included in the category of functional paralyses, inasmuch as the anatomical condition of the affected nerve is unknown. The most common example of rheumatic paralysis is that which

involves the facial nerve, which, from its superficial and exposed position, is especially liable to be influenced by changes of temperature. The paralysis referred to is almost always unilateral; facial diplegia is a symptom of bulbar paralysis, and is rarely, if ever, seen as a consequence of cold.

In the majority of cases exposure to cold, especially in the form of a cold wind, is the exciting cause of facial paralysis. Persons in good health are liable to be thus attacked after sitting at an open window, for example, of a railway carriage. A decided current of air is not absolutely necessary, inasmuch as remaining in a damp place, as in a new house with imperfectly dried walls, has been known to produce it. It is also stated that violent emotions, as terror, grief, or anger, have been the only assignable causes in some cases. Nothing is definitely known as to the nature of the anatomical change which takes place. It may be supposed that there is slight inflammatory swelling, followed by exudation in the sheath of the nerve. When this process takes place within the aqueduct of Fallopius the results will be more marked than when the peripheral part of the nerve is affected. According to another theory the cold affects the sensory nerves of the skin,

and the paralysis is due to reflex inhibitory influence. When the loss of power follows violent emotional excitement, the nuclei at the origin of the facial nerve must be paralyzed by an influence transmitted to them from the higher cerebral centres.

It is necessary to say a few words on the other causes of facial paralysis. The severest forms are observed in cases of caries of the temporal bone in which the nerve may be completely destroyed. Simple catarrh of the tympanum may, however, cause facial paralysis. Owing to the near proximity of the two structures, inflammation may easily extend from the one to the other. Wounds are a not unfrequent cause of facial paralysis, and inflammatory swellings in the neighbourhood of the parotid gland, and glandular and other tumours near the stylomastoid foramen may produce the same result. Another category includes those causes which are intracranial, and of these the most common are tumours and periosteal growths, especially those of a syphilitic nature at the base of the skull. Intracerebral lesions, affecting the facial nuclei in the medulla oblongata, or the motor centres in the cerebral cortex, are other causes of facial paralysis.

Patients are generally made aware of the occurrence

of facial paralysis by finding that fluids taken into the mouth have a tendency to escape on one side, and that solid morsels, after mastication, remain between the gums and the cheek. Pain on the affected side, due to implication of the fifth nerve, is rarely experienced, but there is often a feeling of stiffness. When the paralysis has come on slowly, *e.g.*, several days after exposure to cold, the patients are sometimes conscious of some loss of taste, as well as of deafness and noises in the ear of the affected side as premonitory symptoms.

When the paralysis is complete, that is, when all the branches of the nerves are involved, the objective symptoms are very distinct. The surface of the face is drawn towards the sound side; on the paralyzed side the folds and wrinkles are obliterated and the face therefore presents a smooth appearance, the angle of the mouth is lower than normal, the nostril does not rise in inspiration, but sinks owing to the pressure of the atmosphere. The objective symptoms become much more marked when the patient attempts to use the muscles of the face, as in laughing, crying, making grimaces, etc. On the paralyzed side no wrinkles are then seen on the forehead; the closure of the eye is incomplete; the eyeball is rolled upwards, so that only

the sclerotic is seen; the angle of the mouth cannot be drawn toward the ear; the lips cannot be moved in any direction, and when the patient endeavours to whistle the difference becomes very obvious. When he laughs or cries the mouth is opened only on the sound side. Moreover, the eyelids do not blink, the eye remains open and conjunctivitis is apt to be set up, the tears do not find their way into the lachrymal canal, but course downwards over the cheek. The patient finds it difficult to pronounce the labial consonants, and in speaking the affected side of the face remains flat. The paralysis is sometimes found to affect one side of the soft palate and uvula.

Partial loss of taste is frequently met with in these cases of facial paralysis. The lingual nerve is the nerve of taste for the anterior part of the tongue, and it owes this endowment to the chorda tympani nerve. This nerve leaves the facial within the aqueduct of Fallopius, passes across the membrana tympani to emerge at the Glaserian fissure, and finally unites with the lingual nerve. If the facial be affected before giving off this branch, the fibres of the chorda tympani will become involved and, as a result, there will be loss or diminution of the sense of taste on the anterior two-thirds of

the tongue. This loss, if not noticed by the patient, may be detected by placing a few grains of salt, or a drop or two of vinegar, or of some bitter tincture on the surface of the tongue. Dryness of the mouth on the affected side is observed in some cases, and this is due to implication of those fibres of the chorda tympani which supply the parotid gland. Auditory troubles are more common; they may be due to disease of the tympanum, and in that case would take the form of deafness; or they may appear as excessive acuteness of hearing, a condition presumably due to paralysis of the stapedius muscle which is supplied by a branch of the facial. When the action of this muscle is in abeyance, the stapes becomes somewhat loose, so that all impulses from the tympanum act upon it more vigorously, and, as a result, more considerable vibrations take place in the fluid of the internal ear.

In these cases of facial paralysis there is no loss of sensation on the affected side. When the complaint is of peripheral origin reflex movements are not excited on touching the conjunctivà or on irritating the skin of the face. Signs of trophic disorder are rare, but they are sometimes noticed in severe and chronic cases, when they take the form of atrophy of the affected cheek.

The electrical condition of the muscles is of great importance with regard to diagnosis and prognosis. The electrical excitability is diminished in cases in which the facial paralysis is a symptom of lesion of the medulla oblongata; but it is not affected in the paralysis which is associated with ordinary hemiplegia. Cases of rheumatic facial paralysis may be divided into three classes according to the electrical reactions which are presented.

1. In the slight forms the electrical irritability is normal, or only very little increased; the prognosis is favourable, the paralysis usually subsiding within a week or ten days.

2. In more severe cases the muscles at first show increased irritability to both faradism and galvanism; gradually, however, the effect of the former becomes less and less, while that of galvanism is preserved and may be even still more exaggerated. The irritability of the nerve to both forms is diminished, but not entirely lost. Severe degenerative changes have not as yet set in; the prognosis is not unfavourable; the paralysis may subside in four or five weeks.

3. In very severe forms the reaction of degeneration is pronounced. The symptoms then are: diminution

or complete loss of the faradic and galvanic excitability of the nerve; loss of the faradic excitability of the muscles; quantitative increase and qualitative changes of the galvanic and increase of the mechanical irritability of the muscles. The prognosis is unfavourable; but after several months the paralysis may subside, leaving behind it some amount of stiffness and contraction of the muscles.

The diagnosis of facial paralysis is for the most part easily made. In severe cases the condition is detected at once; the want of symmetry in the face is quite evident. In slight cases the change is rendered perceptible when the patient attempts to use the muscles of expression, and when he purses up his lips as if to whistle. It is a point of great importance to determine whether the symptoms are due to a peripheral or to a central cause; in the former case all the branches of the nerve are equally involved. The paralysis affects the branches distributed to the forehead and eyelids, whereas these parts remain free in cerebral cases. The reaction of degeneration and the absence of reflexes are additional indications of a peripheral origin. In cerebral cases the electrical excitability and the reflexes are preserved, while other symptoms due to the paralysis of other cerebral nerves are always present.

A consideration of the course and anatomy of the facial nerve enables us to discover the site of the lesion in peripheral cases. Thus, when the nerve is affected outside the aqueduct of Fallopius, paralysis of the muscles of the face is the only result; the muscles of the external ear will be paralyzed when the lesion extends into the aqueduct, but not as far as the origin of the chorda tympani. When the lesion is between the chorda tympani and the nerve which supplies the stapedius muscle, in addition to paralysis of the facial muscles, there will be some loss of taste and perhaps diminution of the salivary secretion. If the lesion is between the nerve to the stapedius and the geniculate ganglion there will be abnormal acuteness of hearing, to which will be added paralysis of the velum palati if the neighbourhood of the ganglion be involved. Lastly, if the lesion be situated above the geniculate ganglion there will be the disorders just mentioned, but no diminution of taste. The hearing may be interfered with, as the lesion will probably affect the auditory nerve.

In most cases of rheumatic facial paralysis the prognosis is good, but the symptoms may last for a considerable time: I have seen several cases of this kind. Troublesome sequelæ are sometimes ob-

served; some of the facial muscles become contracted and rigid; the zygomatici are especially liable to be thus affected, and this rigidity is sometimes associated with spasmodic contractions of the orbicularis palpebrarum, and of various muscles about the mouth. In non-rheumatic cases the prognosis depends on the nature of the lesion; in cerebral hemiplegia the facial symptoms are usually the first to disappear, but in syphilitic cases they are apt to be very obstinate. The muscles of the forehead and about the eye usually recover before those of the mouth. Some amount of disfigurement, observable when the patient laughs, sometimes persists after the disappearance of other symptoms.

For the proper treatment of facial paralysis every attempt should be made to discover the cause. If due to cold, hot fomentations should be assiduously applied to the side of the head and face; purgatives are generally useful, and some iodide of potassium with alkalies may be given for a few days. The patient, of course, must be kept warm and quiet. In cases in which there is a history of syphilis the iodides in full doses are especially indicated, and mercury should be given if these fail to cause improvement. By way of

expediting the cure the muscles should be carefully faradized; it sometimes happens that an improvement is manifested after one such application. In severe cases, and whenever the muscles will not respond to faradism, the galvanic current should be used; the positive pole being placed in the auricular fossa, while the negative pole is applied over the individual muscles. The strength of the current must be carefully graduated, and should never be more than sufficient to produce distinct contraction. It is sometimes advantageous to make alternate applications of galvanism and faradism. In severe cases the treatment may have to be continued for several months, and when no improvement becomes visible it is best to discontinue the applications for three or four weeks, and then to renew them. During this interval the patient should be instructed to rub and knead the muscles. When contraction has taken place electricity should not be applied to those muscles, but rubbing and kneading alone should be practised. For obstinate cases of paralysis, in which electricity has been applied without avail, the subcutaneous injection of strychnine may be carefully tried. From gr. $\frac{1}{50}$-$\frac{1}{20}$ of the nitrate of strychnine may be thus employed.

CHAPTER XV.

HYPOCHONDRIASIS.

HYPOCHONDRIASIS, DEFINITION AND FORMS—CAUSES—HEREDITARY PREDISPOSITION—HABITS OF LIFE—GOUT—ABDOMINAL AND SEXUAL DISORDERS—SUBSIDIARY CAUSES—SYMPTOMS—INFLUENCE OF ATTENTION—MENTAL DISORDER—ILLUSIONS—DISORDERS OF SENSATION—DISORDERS OF MOTION—IMPOTENCE—VASO-MOTOR DISTURBANCES—COURSE AND PROGNOSIS—DIAGNOSIS—TREATMENT—EXISTING AILMENTS TO BE ATTENDED TO—GOUTY CASES—REST AND RECREATION—CHANGE OF AIR AND SCENE, AND SUITABLE OCCUPATION.

HYPOCHONDRIASIS necessarily occupies an indefinite place in the category of nervous disorders. In some cases the symptoms are so distinct, severe, and permanent as to place the existence of mental unsoundness beyond all doubt; in others the patients could not with fairness be described as insane. In other words, the hypochondriacal state is sometimes on the one, sometimes on the other side of the line which separates the neuroses from the mental disorders properly so-called. It may be defined as a form of mental depression in which the attention of the patient is principally or constantly directed to the state of his body or mind. The

organ or part which is the seat of painful sensations may be really diseased, and under such circumstances the condition is sometimes termed "hypochondria cum materia," while the words "hypochondria sine materia" are used to describe cases in which no disease can be recognized.

Hypochondriasis is most common in men of middle age; hereditary predisposition to nervous disorder is often traceable; and effeminate habits and easy circumstances favour the development of the complaint. An out-door life tends to ward off hypochondriasis; studious, sedentary habits, combined as they often are with insufficient exercise, have a directly opposite effect. An outbreak of the symptoms may be produced by mental agitation or mental fatigue, by witnessing disease in others, and by indulging in a habit only too common in these days, viz., that of reading medical works adapted to the popular understanding. Among pathological conditions often associated with hypochondriasis, functional disorder of the abdominal organs occupies the first place. Congestion of the liver and hæmorrhoids are sometimes associated with hypochondriasis; I have recently seen a marked case of this character in consultation with Mr. Alfred Cooper. The patient had

suffered from piles for years, and was the victim of profound hypochondriasis. His mental condition rapidly improved after Mr. Cooper had successfully operated upon the hæmorrhoids. A gouty habit of body predisposes to hypochondriasis, which, in some cases, is cut short when an acute attack of gout supervenes. Next in frequency come various affections of the sexual organs, often more imaginary than real, always exaggerated by the amount of attention devoted to them, and in not a few cases by the study of obscene literature. Not a few male hypochondriacs believe themselves to be suffering from spermatorrhœa. As subsidiary causes of hypochondriasis must be mentioned severe diseases and their sequelæ, the immoderate use of tea, coffee, and tobacco, especially the last-named. Hypochondriasis may be associated with any organic lesion, and the latter may be discoverable only on post-mortem examination. Nothing is known of the seat and nature of the mental disorder.

In the majority of cases of hypochondriasis, the symptoms become gradually developed. Given a tendency to mental depression, the slightest disorder of any part of the body, or the most trifling indication thereof, is regarded as a matter of the highest import-

ance, and the gloomiest apprehensions are excited. The attention becomes closely fixed upon the sensations which emanate from the affected part, with the result of aggravating any existing lesion, and even of inducing real disorder in organs previously sound. The influence of attention upon the action of the heart is often manifested in these cases; when the consciousness is directed to it, its contractions are quickened or otherwise disturbed. When pain is complained of and the attention is centred on the part, the conductivity of the nerve fibres is augmented, so that very slight irritation gives rise to marked sensations. A vicious circle becomes thus established; weak peripheral irritation produces a severe effect on nerve-centres which are abnormally sensitive; the impressions are thence transmitted to other peripheral nerves with increase of the excitement and irritability, and corresponding aggravation of the mental state of the patient.

The symptoms of the mental disorder are lowness of spirits, uneasiness, profound anxiety, and marked irritability. In severe cases the patient's own feelings occupy his attention to the exclusion of everything else; he becomes egotistical to the last degree. The intelligence may seem to be impaired, for the hypo-

chondriac engrossed in his own thoughts is incapable of that degree of mental effort which would enable him to understand the thoughts and feelings of others. This condition is often permanent, and no further change takes place, but if the patient is not satisfied with the natural explanation of his troubles and attributes them to impossible or supernatural influences, the condition is one of true monomania.

In some cases the illusions are connected with perception. The patient hears imaginary noises, or has visions, and sees persons or things which are non-existent. For some time he may recognize the true nature of his perceptions, and may laugh at them as absurd; if, on the other hand, he believes them to be real, and acts on such belief, he is obviously of unsound mind. In rare cases the patient fears to touch certain objects or persons under the idea that some maleficent influence proceeds from them. Some hypochondriacs are very inquisitive, and are constantly investigating the causes of things. They do not propose real problems, but ask useless questions, *e.g.*, why any given article has such and such a name, or why its shape is not other than it is, etc.

Disorders of sensation are always present in hypo-

chondriacal subjects, and constitute indeed the groundwork of their complaints. Any internal organ may be the seat of peculiar sensations, increasing in severity until they amount to severe pain. The most common seats of suffering are the chest and abdomen, especially under the false ribs, the locality from which the name of the affection is derived. Uneasiness or pain in the epigastrium, pains in the head, especially about the occiput, and perverted sensations in various parts of the body are always present in different degrees. Anæsthesia is less common, and when present is usually confined to limited areæ. Disorders of motion are far less common, but in some cases there are obvious fibrillary twitchings of various muscles, and these may extend and cause cramp. In rare cases the pharyngeal muscles and some of the muscles of respiration are prone to spasmodic contraction, probably under the influence of some dominant idea.

Some hypochondriacs suffer from the group of symptoms termed "agoraphobia," but these, of course, are in no way peculiar to them. In the commonest form of this condition the patient finds it impossible to cross an open space, for when he attempts to do so he is stopped by a sensation of sinking and weakness, which is

accompanied by a feeling of pressure in the chest, palpitation of the heart, and pallor of the countenance. The feeling of powerlessness subsides if the slightest help is rendered, or even if the patient imagines that assistance is forthcoming. The symptoms are, however, liable to be very troublesome, and are often permanent in these cases.

Male hypochondriacs are often impotent, the loss of power depending on mental causes, and increased by ineffectual attempts at coition. Any form of true paralysis of the voluntary muscles is very rare; but, on the other hand, defective action of the muscular coat of the intestines, as shown by constipation, is one of the commonest symptoms. The feet and hands are often cold, and the secretions of the liver, stomach, and bowels are always more or less disordered, as results, it may be presumed, of vaso-motor disturbance.

When a condition of hypochondriasis suddenly supervenes, it is generally traceable to some specific cause, and most of these cases admit of a favourable prognosis. As a general rule, however, the complaint is gradually and slowly developed, and pursues a chronic course, seldom exhibiting any permanent improvement. The symptoms may, however, remit

from time to time, the patient during these intervals appearing almost or quite free from his troubles. A fatal termination is of rare occurrence as an immediate consequence of hypochondriasis, but the power of resisting injurious influences is much diminished, and the patient is especially liable to be attacked by various diseases, and notably by those of an infectious character. Suicide is seldom attempted by hypochondriacs unless a condition of melancholia has supervened. The prognosis is unfavourable in cases with hereditary predisposition to nervous disorders, and when the symptoms appear in early life. Hypochondriacal insanity is quite incurable. Hypochondriacal symptoms, even of a grave character, have been observed to cease on the supervention of an acute attack of illness.

The diagnosis of hypochondriasis is for the most part easily made. The patient should be very carefully examined in order to ascertain whether there are any material grounds for his beliefs and statements. Hypochondriasis in some respects resembles melancholia, but there are marked differences between typical examples of the two conditions. The hypochondriac is always dwelling upon his symptoms, and constantly talks about his health. He is quite willing to use remedies,

and goes from one medical adviser to another, and listens with eagerness to any new suggestion. He has no wish to cut short his troubles by suicide, even when he imagines they must have a fatal termination. In melancholia the patient is often taciturn, and seldom communicative on the subject of his troubles. He is always despondent, and rarely discusses any methods which might relieve his symptoms, for he considers them to be incurable. Melancholic patients often evince a strong tendency to suicide.

The satisfactory treatment of a case of hypochondriasis requires a considerable amount of tact and patience on the part of the physician. He must spare no endeavour to gain the patient's confidence; he must not deny the subjective reality of the suffering while he explains the want or insufficiency of any objective basis. The patient must, of course, be carefully examined, and it is well to let the first examination be thorough and complete, so as to be able to say that nothing has been overlooked. Any obvious source of trouble must be carefully dealt with; any symptoms of indigestion will require appropriate treatment. Constipation often exists in these cases, and invariably aggravates the general condition. It should be dealt with

by attention to diet and exercise, and if purgatives are required aloes will generally be found the most suitable. A combination of extract of aloes, quinine, and extract of belladonna is well adapted for these cases; moderate and regular action of the bowels is all that is necessary. In cases with a history of gout, a course of alkalies with bitter tonics, combined with purgatives, is likely to be serviceable. Exercise, a moderate diet, and attention to the state of the skin are especially necessary for these cases. A course of iron will be useful where there are evidences of anæmia.

When all possible causes of the disorder have been attended to, treatment of a more general character should be adopted, and it should be prescribed immediately in those cases in which there are no objective indications. When the condition is due to overwork, or appears to be associated with the opposite condition, viz., lack of suitable employment, the treatment is obvious. Patients belonging to the former class require rest and recreation, while the lazy and indolent should be encouraged to follow a better way of life. In either case change of scene, as obtained in foreign travel, and exercise are the means most likely to be successful. The recreation must be adapted to the individual; if the

muscular strength be good and the thoracic organs sound, a sojourn for some time in a mountainous district, where the limbs can be exercised in pure air, and where all the surroundings are conducive to health and vigour, will yield good results in many cases of hypochondriasis. Dyspeptic symptoms will speedily vanish, and the mind will throw off the cloud which had oppressed it. Any outdoor recreation which interests the patient will help him to get rid of his nervous troubles. The same advice should be given to the idle and indolent hypochondriac ; employment of some kind should be found for him, and if he can be induced to take an active interest in some work of charity he may be regarded as having taken a very important step towards recovery. As soon as he begins to feel for others and to interest himself in them his own troubles will begin to disappear. In advanced cases of hypochondriasis, with more or less decided delusions, it is advisable to place the patient in a well-managed institution.

SECTION II.

FUNCTIONAL DISORDERS OF THE ORGANS OF CIRCULATION.

INTRODUCTORY CHAPTER.

PECULIAR FEATURES OF FUNCTIONAL DISORDERS OF THE HEART—DIFFERENCE BETWEEN FUNCTIONAL AND ORGANIC AFFECTIONS—SYMPTOMS OF FUNCTIONAL DISORDERS, EITHER THE MOVEMENTS OR THE SENSATIONS OF THE ORGAN AFFECTED—DISTURBANCES OF RHYTHM—CAUSES OF FUNCTIONAL DISORDER OF THE HEART—PREDISPOSING CAUSES—DR. SHAPTER'S CLASSIFICATION—SYMPTOMS OFTEN ACCOMPANYING PALPITATION—DIMINISHED IMPULSE ASSOCIATED WITH DEPRESSION AND ANXIETY—NECESSITY OF EXAMINATION INTO HABITS AND CIRCUMSTANCES—INORGANIC MURMURS—CASES OF CARDIAC EXHAUSTION—DR. HARTSHORNE'S EXPERIENCE—THE IRRITABLE HEART—STUDY OF THE CARDIAC NERVOUS APPARATUS—THE INTRA-CARDIAC GANGLIA—THE PNEUMOGASTRIC NERVES—CARDIAC SENSORY FIBRES—THE SYMPATHETIC NERVE—THE DEPRESSOR FIBRES OF THE VAGUS—SUMMARY OF THE CIRCUMSTANCES AFFECTING THE FREQUENCY OF THE HEART'S ACTION.

FUNCTIONAL disorders of the heart are of frequent occurrence, and, owing to the importance of the organ, they are often the source of much inconvenience, distress, and even danger. The symptoms to which they give rise are identical with some of those which are the

result of organic affections, and they are apt to cause much anxiety and apprehension on the part of the patient, lest he may be suffering from incurable disease. There is another peculiarity about the symptoms, viz., that those of functional disorder may supervene from time to time in cases in which organic disease exists, without any necessary mutual dependence. A correct diagnosis is, therefore, of great importance, both for the satisfaction of the patient and for determining the treatment to be pursued. The duty of the physician is to ascertain the circumstances that are incompatible with the idea of mere functional disorder, and, secondly, those which are quite compatible with it. The following are the principal features of a general character, which serve to distinguish the two classes of disorders.

1. In purely functional cardiac disorders, the symptoms, whether serious or the reverse, are never constant for any length of time. In organic cases this constancy is the rule, though the severity of the symptoms necessarily varies very considerably from time to time. When, therefore, the signs of cardiac disorder are always discoverable, the idea of a functional origin must be excluded.

2. When symptoms become developed in other organs as a secondary result of the cardiac disorders, we may be sure that organic derangement is present. Among other symptoms of such import are œdema, ascites, venous congestion, pulmonary hæmorrhage, and albuminuria. As a matter of course, increased dulness on percussion, and murmurs of certain kinds, especially when persistent and not occurring in anæmic subjects, are indicative of structural changes. Murmurs due to functional causes will be afterwards referred to.

3. The effect of exercise sometimes serves to distinguish functional from organic disorders. As a general rule, the symptoms of the latter are aggravated by movement, especially if violent; in functional disorders in general this effect is by no means constant, and is sometimes altogether absent. In anæmic cases, however, movement is very apt to induce and to aggravate palpitation, while rest and quiet have a contrary effect. The discovery of the exciting cause may aid in explaining the nature of the disease, and if the symptoms cease when the cause is removed, the inference is unavoidable that they are of a functional nature. Thus the immoderate use of alcohol, tea, and tobacco is a potent cause of palpitation, which often ceases when the habits are dis-

continued. Under such circumstances there could be little doubt as to the nature of the symptom.

The symptoms of functional disorders of the heart appear as alterations either in the movements or the sensations of the organ. Derangement of movement takes two principal forms. In the first of these the heart is excited or irritated, and beats more strongly and frequently than natural; this condition is included under the term palpitation. In the second form, of which syncope or faintness is the type, the heart either beats feebly or almost ceases to act.

Of cardiac disorders of sensation, angina pectoris, or neuralgia of the heart, includes all the symptoms of functional affection in which pain is a prominent feature, and this latter may be associated with decreased or increased action of the organ. In most of these functional disorders motor and sensory disturbances are variously combined. Disturbances of rhythm in the forms of intermissions and irregularity are not unfrequent symptoms of functional disorders. Intermission is mostly of functional origin; irregularity is sometimes observed in dyspepsia, but is more often associated with organic mitral disease. With regard to their causation in general, it may be stated that functional dis-

turbances of the heart's action may be caused by anything which interferes with the normal development or character of its muscular walls or the healthy condition of the blood passing through it, or by interference, direct or indirect, with the functional activity of its nervous supply. The muscular contraction and expansion of the heart, together with the regularity of its beat or rhythm, depend upon the agency of the cardiac ganglia, the sympathetic and pneumogastric nerves, and these, together with the muscular walls, require for their normal action an adequate supply of healthy blood. The action of the heart may be indirectly disturbed by reflex action through the nervous system, as in dyspepsia, intestinal irritation, and mental emotion, and may be directly affected through the passage of blood either too rich or too poor in fibrine and red corpuscles. All such conditions may cause palpitation or irregular action, accompanied, or not, by a bruit. Errors in diet, excessive smoking, over-exertion, and mental shock are amongst the most frequent exciting causes of functional disturbances of the heart.

Dr. Shapter classifies the predisposing causes as follows:—"(1). Those conditions acting through or upon the nervous system, such as the general exhaus-

tion of the nervous system, all forms of reflex irritation, venereal excesses, vain longings, purposeless occupations and amusements, protracted mental exercise, abstinence from adequate repose, etc. (2). Those conditions acting upon the general blood supply of the body, and consequently affecting the special blood supply of the heart, such as the turgid and plethoric states of gross feeders, depraved states caused by bad and deficient diet, and all forms of blood disorders, as anæmia, gout, scurvy, etc. To these may be added the special temperament and personal peculiarities of the individual." *

When palpitation and disturbance are caused by over-action and increased impulse of the heart in nervous or plethoric subjects, other symptoms are often superadded, such as giddiness, rushing of blood to the head, violent pulsation of the carotids, a feeling of choking and faintness, with clammy hands and cold perspiration, and there is frequently irregularity of the heart's action, with, in neurotic patients, an occasional reduplication of the second sound, which seems peculiar to these cases. These effects are usually the result of venereal excesses, errors in diet, or too little out-door exercise,

* "Functional Disorders of the Heart."—"Quain's Dict. of Medicine."

and when associated with an irregular action of the heart it is very difficult to make the patient take comfort and believe that he is not the victim of organic disease, especially should the system be further depressed by præcordial pain.

When the heart's action is affected, and there is diminished impulse with no sign of organic change, the symptoms are evidenced by much depression and mental anxiety. Faintness is often experienced, and there may be flatulence or other symptoms of dyspepsia. In a case recently under my care, the patient, a gentleman aged 42, of sedentary habits, had suffered for some months from irregular action of the heart, together with occasional attacks of palpitation. During these paroxysms there was much præcordial pain and a sense of impending death; his hands, feet, and body generally became cold and clammy, and the forehead was bedewed with cold perspiration. These paroxysms would last from five minutes to two hours, and occurred at intervals of 10 to 20 days, and always were induced by smoking or sexual intercourse. Some months ago I had a similar case under my care. The subject was a boy, aged 14, who had at an early age contracted the habit of masturbation. The symptoms in this case, though

much less urgent, were none the less marked. The practical lesson to be drawn from these and similar cases is the absolute necessity of getting a candid and complete history of the habits of life and surroundings of the patient before prescribing any special form of treatment.

Functional disturbances of the heart are frequently associated, as before mentioned, with inorganic bruits or murmurs. They are basic and always systolic, the sounds being generally conducted in the course of the great vessels; they are rarely heard at the apex. Murmurs of this character occur especially in chlorosis and anæmia, and are accompanied usually by palpitation, which may persist after the bruit has ceased to be evident. In 50 cases of both sexes which I have noted, 12 had continued palpitation for some months after the bruit had ceased; nine of these cases were young girls or women of more or less hysterical character, but the remaining three were in men leading sedentary and anxious lives, not given to dietetic or venereal license. I see many cases of both sexes, and of every variety of age, who present these murmurs, all of which are wont to disappear more or less readily under treatment, leaving no morbid results whatever.

Cardiac exhaustion often occurs as a result of worry, overwork, late hours, or deficient nourishment, and is characterized by a weakened impulse with a rapid pulse. In these cases the slightest exertion causes increased rapidity and breathlessness, but without any evidence of valvular disease. Dr. Hartshorne says:* "In U.S. General Hospitals during the Civil War, under my own observation, as well as that of other practitioners, quite a number of cases of soldiers were presented who were rendered unfit for duty by heart symptoms, and yet without signs of valvular or other organic disease. Careful investigation of these satisfied me that the condition was one of *muscular exhaustion* of the heart." The same author says, "*Heart starvation* is probably (in people who are underfed, overworked, or suffering from *worry*) often overlooked or *mistaken for fatty degeneration of the heart.*"

My experience entirely coincides with the opinion expressed by Dr. Hartshorne; I have seen many cases of the *irritable heart* justly so named by Da Costa. I may mention one instance. I was consulted by a medical man who had had much physical exertion in a

* "Essentials of Medicine," 5th Ed., p. 253.

parochial practice in a hilly district and had many home worries; the evidence was conclusive in my opinion that his cardiac derangement was due to muscular exhaustion. Time, rest in a bracing air, with a nutritious dietary, is in such cases all that is required for apparently complete restoration to health.

Fothergill says that palpitation is the evidence of muscular inability. Neuroses of the heart is the term Niemeyer applies "to these forms of perversion of its action or abnormity of its sensations which, without depending upon any structural change, arise either without perceptible cause or else upon occasions which in most persons would not give rise to any functional disturbance."

In order to understand some portion of the mechanism of cardiac neuroses, it is necessary to inquire into the sources whence the heart derives its nerves. A very simple experiment proves that the rhythmical movements depend upon the presence of ganglia situated within the heart itself, for when the organ is removed from the body, or when all the nerves passing to it are divided, regular contractions go on for some time. This phenomenon is best seen in the heart of a fish or turtle; contractions go on for hours after removal, and

even when they appear to have ceased they may be excited by touching the surface with the point of a needle. Moreover, the fact that a regularly-pulsating heart has been found in anencephalic monsters proves that this organ is not exclusively or essentially dependent upon the central nervous system for the continuance of its rhythmical movements. In addition, however, to the rhythmical movements of the heart, it is a matter of common observation that its action is influenced by impressions which reach it from without, *e.g.*, from the brain, abdominal viscera, and limbs, and these impressions are conveyed to it by the pneumogastric and sympathetic nerves.

The heart contains many automatic centres which are connected with each other by nervous fibres. The dominating centre, according to Landois, lies in the auricles, and hence the regular progressive movement usually starts from them. The same author states that the auricular centres seem to be more excitable than those of the ventricle; that all stimuli of moderate strength applied directly to the heart increase the frequency of the rhythmical heart-beats, whereas stronger stimuli cause a diminution, and possibly paralysis. Another important point is that the heart

may be excited from its internal surface, and that very weak stimuli suffice to produce this effect. A supply of blood or other similar fluid holding nutritive materials in solution is necessary for the contractions. It would appear that the presence of ganglia is not absolutely necessary for rhythmical pulsation, inasmuch as the latter takes place in parts of the heart devoid of these structures, and direct stimulation of the muscular fibres may cause the movements. The ganglia are, however, much more excitable than the heart itself, and we must assume that they preside over the rhythmical movements. It must be mentioned that, according to some observers, the heart contains certain ganglia which exercise an inhibitory or restraining influence.

The influence of the pneumogastric nerve has been much disputed, but the main questions relating to its action may be regarded as settled. Experiments clearly prove that irritation of the pneumogastric nerve weakens or suspends the motor influence, through which other nervous mechanism causes the contractions of the heart. The action of the vagus is, therefore, of an inhibitory, paralyzing character; the fibres charged with this office run originally in the spinal accessory nerve. When the fibres of this latter have been removed from the jugular

foramen, and a few days suffered to elapse, the nervous fibres supplied to the vagus in that position undergo degeneration at their peripheral extremities, and are incapable of being excited; it is then found that irritation of the vagus on that side has no effect upon the frequency of the cardiac pulsations, and certainly does not arrest them.

When a magneto-electric current is applied to the medulla oblongata, the heart's action, after a few pulsations, comes to a complete standstill; and this condition remains until, as a result of the tetanizing, or exhaustion or destruction of irritability of the nervous channels, the action of the heart is restored. The pneumogastric nerves are the channels which conduct the inhibitory influence from the medulla oblongata, for if one of these be divided, and the peripheral end be galvanized, the heart's action is arrested in diastole. Irritation of one nerve is sufficient for this effect to be produced, and not only the number but the force of the pulsations is diminished; and the arrest of the heart's action is sometimes brought about not by increasing the pause between the pulsations, but by lessening the degree of the contractions. The consequent diminution of blood-pressure in the arteries will thus have a two-fold origin.

Division of the pneumogastric nerve is followed by permanent increase in the number of the heart's pulsations and simultaneous elevation of the blood pressure throughout the arterial system, and the amount of work done by the heart is, therefore, increased. The same result is witnessed when both spinal accessory nerves are removed from the base of the skull, and no further effect is produced by subsequent division of the vagus. It is, therefore, clear that those fibres of this nerve, whose irritation causes arrest of the heart's action, are the same as those whose paralysis leads to an opposite result, viz., to increased frequency and strength of action.

In addition to being the channel for inhibitory influences, the pneumogastric furnishes sensory fibres to the heart. These form a plexus beneath the pericardium; when their central portions are irritated, the heart's action is retarded and the arterial blood-pressure is increased. In the natural state, the sensitiveness of the heart is extremely slight; signs of pain are seldom elicited when the organ is mechanically irritated. No reflex movements follow irritation after both vagi are divided; but if one be left intact, movements of this character are found to be produced.

The third class of nerves connected with the heart

are those through whose instrumentality its action is accelerated. These are centrifugal fibres, and when excited, they increase the number of the pulsations by from 30 to 70 per cent., and thus act as the antagonists of the inhibitory nerves just described. Some of these pass, however, with these latter in the cervical portions of both vagi, but a still larger supply is derived from the branches of the first thoracic ganglion of the sympathetic, and these take their course to the heart partly as independent fibres and partly in connection with branches of the vagus. The sympathetic in the neck sometimes gives off similar fibres. The larger portion of these accelerating nerves pass downwards from the medulla oblongata through the cervical and dorsal spinal cord, and thence to the thoracic sympathetic, and finally to the cardiac plexus. The course described by these nerves is therefore loop-shaped, the majority pass downwards in the spinal cord and upwards in the sympathetic. Those fewer fibres which pass with the vagus and the cervical sympathetic do not form such loops, but they probably have the same origin as the others.

These nerves, by means of which the action of the heart is accelerated, are not, as a general rule, in any

way under the influence of the will; but some persons possess the power of voluntarily rendering the heart's action more frequent. Such a result is often produced involuntarily under the influence of emotional causes, and is due less to diminished action of the pneumogastrics than to excitement of the cerebral centres of the accelerating nerves. These nerves and their centres are said to be less easily excited and less readily exhausted than all other nerves, and this difference is very marked when they are contrasted with the vagus. Their excitement increases the force as well as the frequency of the heart's contractions.

There is yet, in some animals at least, a fourth set of nerves, by means of which the action of the heart is influenced. These are the so-called depressor fibres of the vagus, and in rabbits are derived from the superior laryngeal nerve and are sometimes increased by a second branch from the vagus itself and then join the cardiac plexus. Excitement of these nerves is followed by considerable diminution of the blood-pressure in the arteries, and this is not the result of an impulse directed centrifugally towards the heart, but of one transmitted in a central direction to the medulla oblongata. The diminution in pressure is

caused when an induced current is applied to the central end of the divided nerve, but no such result follows the application to the peripheral extremity. In order to explain this curious phenomenon it is assumed that in a reflex manner the depressor fibres lessen or abolish the power of the vaso-constrictor nerves, and especially of those of the abdominal viscera, and bring about the diminution of blood-pressure in the arteries by facilitating the escape of the blood into the capillaries and veins. Irritation of the central portion of these nerves excites the vagus centre in the medulla oblongata, and diminished frequency of the cardiac contractions is the result, which, however, ceases when both vagi are divided below the origin of the depressor nerves. It is doubtful whether this second reflex action of the depressors, which they share with many sensory nerves of the skin and viscera, is peculiar to them, or whether it is derived from other sensory nerves which are associated with them.

The following extract from Dr. Carpenter's "Principles of Human Physiology" gives a short summary of the circumstances affecting the frequency of the heart's action. "The heart not only possesses an internal system of ganglia and nerves, by which its

movements can be maintained and regulated for some time after excision from the body, but it is also under the control of centres situated in the medulla oblongata, and, as there is reason for believing that there are both accelerating and inhibitory centres in the heart and in the medulla, it is obvious that great difficulty must exist in determining the cause of any particular variation in the frequency of its beats that may be observed. We have, however, evidence that the heart may be influenced —

"A. By conditions affecting *the intra-cardiac motor ganglia* which may be (1) excited and the frequency of the pulsations increased; (*a*) by heat; (*b*) by mechanical, chemical, and electrical excitation; (*c*) by increased blood-pressure, which is essentially a mechanical irritant; (*d*) by various poisons; or (2) depressed, and the pulsations lowered; (*a*) by cold; (*b*) by diminished blood-pressure; (*c*) by certain poisons, as chloral.

"B. By conditions affecting the *intra-cardiac inhibitory ganglia*, these being stimulated, and the heart slowed or stopped in diastole by certain poisons (muscarin), and paralyzed by others.

"C. By conditions affecting the *intra-cardiac accelerator ganglia* leading to increased frequency of action.

At present these cannot be satisfactorily distinguished from those affecting the intra-cardiac motor ganglia.

"D. By conditions affecting the cardiac *inhibitory centres in the medulla oblongata,* such as increased blood-pressure, which acts directly upon them, or by irritation of the depressor nerve, or of various other sensory nerves which act upon them in a reflex manner, or by the actions of poisons (digitalis), all of which excite these centres and cause slowing of the heart's action.

"E. By certain conditions affecting the accelerator centres in the medulla, as diminished blood-pressure, mental processes, the action of poisons. They may also probably be excited in a reflex manner. It will be seen from the above that certain conditions, increased blood-pressure, for example, exert a double action on the cardiac nerves. On the one hand, it excites the heart to increased frequency of action by direct irritation of its motor ganglia through filaments distributed to the endocardium; on the other hand, it stimulates the vagal centres in the medulla and thus causes slowing of the heart, the actual result in any given case being dependent upon the preponderating influence of the cardiac motor or medullary inhibitory centres. Usually

the medullary centres are strongest, and increased blood-pressure causes slowing of the heart; but if the vagi be divided so that they can no longer act upon the heart, increased blood-pressure stimulates the heart to more rapid action."

CHAPTER II.

PALPITATION OF THE HEART.

CARDIAC PALPITATION, DESCRIPTION OF—GENERAL SYMPTOMS—ALTERATION IN SOUNDS OF HEART AND IN PULSE—CONDITION OF THE RESPIRATION AND OF THE FEATURES—SUBJECTIVE SENSATIONS—DURATION OF ATTACKS—CAUSES OF PALPITATION—NERVOUS AND TOXIC CAUSES—EXHAUSTION—REFLEX IRRITATION—EXCITING CAUSES — DIAGNOSIS — PROGNOSIS — TREATMENT — RELIEF OF PAROXYSMS AND PREVENTION OF RECURRENCE—POSITION, COLD TO CHEST, MEDICINES—TREATMENT OF NERVOUS SUBJECTS—TREATMENT OF PALPITATION DUE TO INDIGESTION AND GOUT—DURING THE INTERVALS—VARIOUS POINTS TO BE ATTENDED TO.

THIS term is used to signify attacks in which the heart beats with increased frequency, and generally with increased force. Pulsations of this kind are often excited in a perfectly healthy individual by incidents and emotions of every-day life, and under such circumstances they are, of course, not to be considered as morbid. It is only when the attacks of palpitation are very frequent or very easily excited that they constitute disorder. They are, of course, a common symptom of organic cardiac lesions, but they are still more frequent when no such changes exist. Attacks of palpitation

alternate with the normal movements; they may last for a few minutes or for some hours. The frequency with which they occur varies greatly; in some cases scarcely a day passes without one or more; in others there may be weeks or months between the attacks.

A severe attack of palpitation is often ushered in by peculiar sensations in the cardiac region. The patient experiences a feeling of indescribable discomfort; the heart appears to be beating irregularly and with difficulty, or as if it could go on no longer, or there may be a feeling as if something had given way in the heart. During the attack the sensations of distress and oppression continue, and difficulty of breathing is often superadded. The countenance is indicative of the feelings of the patient; the forehead may be covered with cold perspiration. Faintness is sometimes experienced, and headache, noises in the ears, and a feeling of giddiness are not unfrequent. In some cases of palpitation, with irregularity of action, the patients complain of pain in the post-occipital region, where the arteries enter the skull, and occurring at the time of the cardiac intermissions.

On examining the heart during an attack of palpitation its action is found to be tumultuous, abnormally

frequent, and perceptible over a large surface. If the attack lasts for any time, irregularity is generally observed, and the sounds of the heart undergo various modifications. The first sound often has a metallic tone, and can be heard at some distance from the chest. The second sound is sometimes so faint that it may appear to be absent; this change results from the insufficient quantity of blood contained in the aorta and pulmonary artery; it is more and more marked in proportion to the rapidity of the movements. Sometimes the pauses between the sounds of the heart become equalized, so that the comparatively long interval which follows the second sound is very much shortened. The carotids pulsate violently, and on placing a stethoscope over them a systolic murmur is frequently audible. When the attacks of palpitation last for any time swelling and pulsation in the veins of the neck are generally perceptible.

The pulse at the wrist is frequent, hard, and full, less often soft and small, but irregularity is usually noticeable. With regard to frequency, it is difficult to assign any limits; as many as 200 pulsations have been counted in the minute. In examining a pulse of this character it is well to count by fives, and then to add

these up; by this plan mistakes are less likely to happen than if the attempt be made to count by consecutive numbers. It is also well to estimate the number of the heart's contractions by means of auscultation, for during such rapid movements of the heart the pulse-wave will not always extend to the radial arteries, and hence it happens that the pulse there is often intermittent.

In attacks of palpitation the respiration is generally impeded, the patients complaining of the sensation of want of breath. The breathing is frequent and irregular, and liable to be interrupted by deep and sighing inspirations. This difficulty of breathing is aggravated when the patient lies down, but is relieved by raising the thorax, or by adopting a sitting posture. In severe attacks speaking becomes difficult, and the voice may be reduced to a whisper. Sometimes there is difficulty in swallowing, and pain in the stomach with swelling of the abdomen. The features are always disfigured; the face is red and generally covered with perspiration; more rarely the face and extremities are cold, moist, pale, or livid. Elevation of temperature is generally observed.

The duration of the attack varies. In some cases it passes off almost suddenly; in others it subsides very

gradually. After its disappearance the patients feel very anxious lest it should recur. Sudden subsidence of the attack is sometimes associated with vomiting, eructations, or free action of the bowels.

It is worthy of note that there are some cases of palpitation of the heart in which the symptoms are almost entirely subjective. The patient relates many of the details as given above, but no objective disorder is decidedly manifested. Careful examination may, however, detect some irregularity of the pulse during the attacks.

Attacks of palpitation of the heart may be induced by a great variety of causes, the majority of these acting on the nervous system. The attempt has been made to divide these causes into several categories according as the pneumogastric nerve, the sympathetic, the brain, or the spinal cord is the seat of excitement. Such a classification is, however, scarcely possible, but in a general way it may be stated that in most cases of palpitation the condition is that of paralysis of the inhibitory nerve fibres of the heart, which are supplied by the pneumogastric, and less commonly one of irritation of the excito-motor nerves from the sympathetic. For clinical purposes it is convenient to

divide attacks of palpitation into two classes, the first containing those that are due to nervous causes, and the second, those in which toxic matters are present in the blood.

Nervous causes of palpitation, the results of the condition of the cerebrum, are of every-day occurrence, and are typified by the various forms of emotional excitement caused by joy, grief, shock, anxiety, and the like. The effect of the imagination in producing palpitation is sometimes very marked; medical students, for example, in studying diseases of the heart for the first time, often suffer from tumultuous and irregular action of the organ in question, and imagine that they are the subjects of heart disease. I am acquainted with many medical practitioners of nervous temperament, who, as a result of hard work, suffer from attacks of palpitation and intermittency of the heart's action, and think themselves the victims of organic disease. All the symptoms, however, subside after a few days' rest and change. Some persons have the power of voluntarily increasing the frequency of the heart's contractions.

Nervous palpitation is, of course, a common symptom both of organic and of functional nervous disorders.

Thus it often occurs in connection with congestion, hæmorrhage, softenings, and tumours of the brain and spinal cord. Tumours in the neck may cause attacks of palpitation by interfering with the pneumogastric or sympathetic nerves. In a case recorded by myself in the *Archives of Laryngology*, Vol. ii., No. 3, a bony growth from the last cervical vertebra was the cause of attacks of palpitation and of spasm in the throat. Various conditions of exhaustion are especially apt to be accompanied by palpitation of the heart; thus attacks are common in cases of hysteria, spinal irritation, and neurasthenia. They are also frequent results of mental strain, of excesses of all kinds, of chlorosis, of loss of blood, and of severe and exhausting diseases. Persons who work for many hours in small and ill-ventilated rooms and take an insufficient amount of nourishment frequently suffer from palpitation.

Reflex irritation is a common and important cause of palpitation. It is a matter of every-day experience that attacks are often due to a disordered state of the stomach, either a mere temporary indigestion, or a more permanent and serious condition. I have met with several cases in whom palpitation and signs of

violent cardiac disturbance, occurring during the night, and waking the patients from their sleep, were caused by two or three glasses of cheap sour claret taken at dinner. In some persons certain articles of food, even when taken in moderation, are sufficient to induce an attack. In all these cases the pneumogastric is the nerve through which the irritation is propagated. Other causes of a reflex nature are constipation, worms in the intestines, and hæmorrhoids; in the latter case the attacks are wont to come on after the cessation of hæmorrhage. In the case of a gentleman whom I have been recently attending the attacks of palpitation have quite ceased since he has undergone a successful operation for the radical cure of piles. Disorders of the uterus and ovaries are especially liable to cause palpitation and other symptoms of hysteria, and attacks are sometimes observed in connection with renal calculi.

Attacks of palpitation due to toxic causes are very frequently seen. Thus they often follow the immoderate and even the moderate use of alcohol, tobacco, tea, and coffee. Certain peculiarities are sometimes observed; thus I have met with several cases of middle-aged men and women in whom severe palpitation, with an intermittent pulse, was always caused by taking a cup

of tea in the early morning. When cocoa was substituted there were no such effects, and the tea could be taken at other times in the day without causing discomfort. The palpitation in gouty subjects is due in the first place to irritation, propagated from the stomach, and, secondly, to the presence of an abnormal amount of uric acid, which acts as a direct irritant to the heart.

Palpitation of the heart occurs in persons of all ages. In children it is most common during the educational period, and is due to immoderate application to studies, ambition, and anxiety. Other causes, such as debility, indigestion, and worms, are often present. In all cases the attacks are wont to come on spontaneously; sometimes, indeed, they occur when the patient is in bed and arouse him from a deep sleep. In other cases they are the direct and immediate consequences of bodily or mental exertion. I have recently attended a gentleman, aged 45, married (with a family, and not given to sexual excesses), in whom palpitation always occurs after four or five hours' continuous mental work, but not before that time, and ceases when the occupation is relinquished. Among other causes of attacks may be mentioned intestinal disorders, menstrual irregularities, exposure to cold, or to heat, and the like.

Some persons have an attack of palpitation if they lie on their left side.

The diagnosis of palpitation of the heart is seldom a matter of much difficulty. Bearing in mind the fact that similar attacks often occur in cases of organic disease, the actual condition of the heart is the point to be determined. Valvular diseases will, of course, be accompanied by the peculiar murmurs, but abnormal sounds are not infrequent in nervous palpitation during a severe attack. The murmur is, however, always systolic in character, and is never associated with signs of dilatation and hypertrophy. In chlorotic and anæmic cases a permanent systolic murmur is often present, but the detection of the *bruit de diable* and the improvement which almost invariably takes place under treatment will indicate the nature of the case. Pericarditis is often accompanied with severe attacks of palpitation, but the cause of the symptoms can hardly be mistaken.

The prognosis, of course, depends upon the cause of the symptom; in many cases not only can the attacks be relieved, but their recurrence can be prevented by appropriate treatment. In cases in which the cause cannot be dealt with more or less amelioration can almost always be promised, but the patients are apt to

become very low-spirited and even hypochondriacal. However distressing the attacks may be, a fatal termination need scarcely ever be apprehended in the absence of organic disease. In elderly subjects, however, with degeneration of the cerebral arteries, there is risk of rupture of vessels and hæmorrhage during attacks of palpitation. The heart itself is liable to become affected in the course of time, as a result of the over-exertion. Hypertrophy of the organ is generally due to the existence of obstruction, either in the valves or in the vessels, but in a less numerous class of cases hypertrophy is the result of increased cardiac action without increased resistance. Niemeyer's statement on this subject has been already referred to. "In many persons we are forced to assume the existence of an exalted irritability, an erythism of the nervous system, particularly of the nerves of the heart, so that trifling causes serve to excite and strengthen its action."

Treatment. In the treatment of persons subject to attacks of palpitation of the heart there are two principal objects to be fulfilled; the first being to relieve or cut short the paroxysms, and the second to prevent their recurrence. To afford relief during attacks the patient should be placed in a semi-recumbent posture,

with the chest raised and the clothes loosened about the neck and chest; fresh air should be freely admitted. In some cases relief is obtained by the application of cold to the chest, or by sucking pieces of ice. Pressure on the sympathetic and pneumogastric in the neck and on certain spots in the abdomen has been known to cut short attacks.

With regard to medicines, the subcutaneous injection of morphine often has the effect of relieving palpitation, but its use requires caution. Other remedies of the same character, such as chloral, tincture of henbane, æther, and belladonna are also efficacious, but there are no special indications for their use. In cases in which the palpitation is the result of shock, a full dose of the bromide of ammonium will generally allay the discomfort.

In nervous, hysterical, and hypochondriacal subjects, relief will often be afforded by the nervine stimulants, as asafœtida and valerian, camphor, and preparations of ammonia and æther. Aromatics combined with antacids are sometimes useful, inasmuch as they help the expulsion of flatus and correct acidity. With this view a teaspoonful of the compound tincture of lavender, or of the compound spirit of horse-radish, may be given

in combination with half the quantity of aromatic spirit of ammonia.

When an overloaded stomach is suspected to be the cause of the attack, an emetic dose of ipecacuanha will be the best remedy. The hypodermic injection of gr. $\frac{1}{10}$ of the hydrochlorate of apomorphine may be used instead. For attacks of palpitation in gouty subjects, emetics are not advisable unless there be ineffectual attempts to vomit. An alkaline draught with a little æther will serve to quiet the heart.

In order to prevent the recurrence of the paroxysms, the treatment must be directed towards the removal of the cause or modifying its operation. Hygienic measures of all kinds must first be thought of. Thus the diet must be easily digestible and adapted in quantity to the patient's condition. Distension of the stomach and excesses of all kinds, especially in the direction of alcoholic drinks, tea, coffee, and tobacco must be scrupulously avoided; moderate exercise in the open air and attention to the skin will tend to lessen the irritability of the nervous centres. Constipation, if present, must be dealt with by laxatives and mild purgatives. With regard to medicines having a specific action on the heart, digitalis and the bromide of potassium are

likely to be serviceable, either separately or in combination. The digitalis should be given in small doses (m v-x of the tincture) three times a day, and the effects carefully watched. The bromide of potassium may in debilitated cases be combined with a little citrate of iron and ammonia. When the attacks come on at night it is well to apply some belladonna liniment to the left side of the chest before going to bed. Should there be præcordial pain, chloroform liniment, sprinkled on spongio-piline, and applied to the surface for half-an-hour, will generally give relief. In many cases of palpitation, without obvious cause, change of air, especially to the seaside, will prove very advantageous. The place selected should be one that is sheltered from high winds, with level walks, and at no great altitude above the sea.

For palpitation occurring in anæmic subjects, the preparations of iron are always useful. The carbonate is one of the best, and quinine or other bitter tonics may be given at the same time. When the patient is nervous as well as anæmic, and irregularity of the heart's action accompanies the palpitation, I have seen very good effects from small doses of arsenious acid and digitalis, taken in the form of a pill, two or three times

a day, for five or six weeks, under careful medical observation. When the disturbance of the heart's action occurs in persons suffering from hæmorrhoids the condition of the liver will require attention, and purgatives are generally indicated. The question of a radical cure of the hæmorrhoids must also be considered. If there be uterine disorders, as evinced by irregular or suppressed menstruation, special treatment will be requisite. Hot foot-baths may be tried to restore the menstrual discharge, and purgatives are generally indicated. The treatment of palpitation in gouty subjects is that of the uric acid diathesis. It may be briefly summed up as follows: careful attention to the diet, and to the state of the skin; avoidance of stimulants and excesses of all kinds; purgatives and alkalies with tonics. A short course of digitalis will generally be useful in these cases.

CHAPTER III.

SYNCOPE—SWOONING—FAINTNESS.

SYNCOPE. DEFINITION AND SYMPTOMS—INCOMPLETE ATTACKS OR FAINTNESS—DURATION OF ATTACKS—CAUSES, THE NERVOUS SYSTEM, THE STATE OF THE HEART, THE CONDITION OF THE BLOOD—IMPRESSIONS ON THE NERVOUS SYSTEM—DIRECT EFFECTS ON THE HEART—MECHANICAL CAUSES, POISONS—SYNCOPE RESULTING FROM LOSS OR DEFICIENCY OF BLOOD—MIXED CASES—DURATION OF ATTACKS—SYNCOPE DISTINGUISHED FROM EPILEPSY, APOPLEXY, SHOCK, CONCUSSION, AND POISONING—PROLONGED SYNCOPE—PROGNOSIS—TREATMENT—RESTORATION OF ACTION OF HEART, AND SUPPLY OF BLOOD TO THE BRAIN.

SYNCOPE is the term used to express a condition due to diminution or temporary arrest of the heart's action, and characterized by more or less complete suspension of consciousness and of respiration, and usually attended by depression of the temperature of the body. It may be briefly described as inhibitory paralysis of the heart. The condition may come on suddenly, but is more often preceded by a feeling of nausea, sinking in the epigastrium, giddiness, weakness, and loss of balancing power, some disorder of vision and mental confusion, noises in the ears, paleness of the surface,

and chilliness. When the syncope is complete, the consciousness is entirely suspended, the muscles are relaxed, the face is deathly pale and cold, the pulse is imperceptible, and respiration ceases or occurs only at long intervals. Convulsions are apt to occur in cases of syncope due to hæmorrhage. On examining the chest, only the first sound can be heard, and this is much weakened; the second sound may be quite inaudible. This condition lasts a variable time, and the first signs of recovery are a renewal of the respiration and movements of the limbs. After a few deep inspirations, the pulse becomes perceptible, the colour slowly returns to the face and lips, and consciousness is gradually regained.

In less marked instances the loss of consciousness is incomplete, and the respiration is not suspended, but becomes superficial and irregular. The pulse can be felt, and the heart sounds are audible, but much weakened. The patient complains of sinking, giddiness, and nausea, and strives to adopt the recumbent position. This state in its various grades is described as faintness, and is of very common occurrence.

The duration of syncope varies; in the slighter degrees the sensations may last for considerable periods,

alternately diminishing and increasing in intensity until they completely pass off. In complete syncope the duration seldom extends beyond a minute or two, unless the case has a fatal termination. The patient may, however, lie for hours in a semi-conscious condition, afraid to move lest the worst symptoms should recur, but the pulse will be perceptible and the heart sounds more or less audible. These serious attacks, when connected with organic disease of the heart, may recur again and again until a fatal issue takes place.

The causes of syncope are many and various in kind; they all act by disturbing and interfering with the action of the heart. The majority affect the organ through the nervous system; in another class the state of the heart itself is the cause of the attacks. Various conditions of the blood likewise contribute towards the causation of syncope, and in some cases several causes co-operate in producing an attack.

Many causes of syncope act on the heart through the nervous system, and of these violent shocks are the most frequent. Under this heading we may include the effects of injuries to the brain or other parts, and of sudden and excruciating pain, of offensive or fearful sights, of alarm, or of exciting or depressing intelli-

gence. In some cases the same effect is produced upon the heart by less severe impressions on the nervous system, such, for example, as result from certain oppressive odours, slight irritation of the stomach, want of food, the condition of other internal organs, such as the uterus, kidneys, and liver. A draught of cold water, taken when the body is hot and perspiring, and especially if likewise exhausted after exercise, has been known to produce fatal syncope. Persons differ greatly as regards their liability to syncope. In nervous women attacks are somewhat common. Many of the heroines of the novels written in the last century were remarkable for their proneness to faint under the influence of surprise or excitement. Very slight causes are sometimes sufficient to induce attacks of syncope. Many years ago, when I had to perform a large number of vaccinations, many adults who came to be revaccinated used to faint under the slight operation. Several medical friends have informed me that they have met with similar experiences.

The state of the heart often contributes towards the production of an attack of syncope. Thus the symptom is very common in many organic diseases, and especially in aortic stenosis and fatty degeneration. In women the

heart's action is often seriously interfered with by tight lacing. Other causes acting directly upon the heart are a high temperature, and certain powerful drugs, as tobacco, digitalis, hydrocyanic acid, and chloroform. To these may be added attacks of neuralgia of the heart, the metastasis of gouty inflammation, and the presence of air in the heart's cavities.

The most frequent cause of syncope is loss or deficiency of blood, whether due to hæmorrhage or to a slower process whereby the blood is robbed of some of its constituents. The effect is produced chiefly through the brain, and is often suddenly developed in cases of loss of blood. When the supply of blood to the brain is deficient, the consequences are seen throughout the body, and especially in the muscular system. When a person is in the erect position the loss of blood necessary to produce fainting is much less than in the recumbent posture. Hence it not unfrequently happens that a patient, already weak from deficiency of blood, faints suddenly on attempting to rise up in bed; the lesson to be learnt from such experience is, of course, obvious. The loss requisite to produce faintness varies in different individuals and in different states of the system. The more rapidly the blood is lost, the less the

quantity necessary to produce an effect. Profuse discharges, as in cholera and diarrhœa, will lead to the same results, and the sudden removal of pressure, causing a rapid removal of blood from one part of the body to another, will also cause faintness. This may be sometimes seen after the operation of tapping the abdomen, unless proper care has been taken to keep up the pressure by means of a bandage. As an illustration of a parallel character, I have known faintness to occur from the abrupt discharge of a large quantity of wind from the stomach, following oppressive distension of that organ. A marked case of this nature has recently been published by Dr. Goodridge (*Lancet*, April 21, 1888).

In many attacks of syncope several of the causes above described co-operate in the production of the result. Thus in anæmic subjects, the effect of shock or grief is aided by the weakened condition of the heart and the deficiency in the quantity and quality of the blood. Also in cases in which there is organic cardiac disease, an attack of syncope may be easily induced by slight causes, and particularly by gastric distension.

The duration of attacks of syncope has been already alluded to; it may extend to some seconds or minutes,

in rare cases the condition, with various modifications, continues for hours. Incomplete attacks, *i.e.*, those in which the consciousness is not entirely lost, are the most common; several of these sometimes follow each other, with intervals of partial recovery. Except in cases of organic disease of the heart and in syncope due to hæmorrhage, complete recovery is the rule, though for some time after the attack the patient may feel anxious and giddy. In cases in which the symptoms are prolonged for many hours, a condition of apparent death is established; consciousness is completely lost, while pulse and respiration are both imperceptible. Very careful auscultation will, however, detect a slight sound over the heart.

Attacks of syncope require to be distinguished from other conditions attended by loss of consciousness, and mainly from epilepsy, apoplexy, the symptoms of shock, of concussion of the brain, and of poisoning by various substances. In epilepsy, the loss of consciousness is sudden in its onset, and is frequently accompanied by tonic spasm, succeeded by convulsive movements. The change in colour which the face undergoes from pallor to lividity is a distinguishing feature of epilepsy as compared with syncope. Apoplexy

is sometimes ushered in with an attack of syncope, the patient becoming faint and collapsed, with pale face, cold damp skin, frequent, feeble and irregular pulse, nausea, and vomiting. These symptoms are soon followed by insensibility and coma. Paralysis also supervenes, and its presence is sufficient to explain the nature of the case. During the continuance of the coma the insensibility is profound, the face is flushed and the skin moist, the pulse is slow, full, and hard, and the respiration stertorous. All these symptoms are sufficient to distinguish the attack from one of syncope.

The symptoms of syncope are often the result of shock, but in cases of the latter kind consciousness is less interfered with, and may be almost completely preserved. In pure shock of a severe character the patient is at first stunned, but gradually he becomes more or less aware of what is going on, and is able to answer questions, and this state of partial recovery may continue indefinitely. In shock with excitement the movements of the patient are sufficient to distinguish the symptoms from those of syncope. In the collapse due to cerebral concussion the insensibility is seldom quite complete. The pupils are dilated, and in other

respects the symptoms resemble those of syncope. The collapse may last for some hours when the pulse becomes full, the skin relaxed and hot, and the face flushed. A condition of drowsiness then supervenes.

Loss of consciousness results from the operation of several poisons, especially of those of the narcotic class. With regard to all these, however, the history of the symptoms will be enough to distinguish them from those of syncope. In opium poisoning, moreover, the face is suffused, the skin warm, the breathing slow and deep, and the pupils are contracted. In the later stages the surface becomes cold, and the face is pale and cyanotic. In alcoholic coma the pulse is slow and laboured, and the breathing is stertorous. In profound insensibility due to chloroform the breathing is apt to become stertorous, while the face is generally suffused; the pulse may remain unaffected. Pallor of the countenance is a symptom showing that an excessive quantity of the anæsthetic has been given; it denotes a condition of syncope from failure of the heart's action.

In cases of prolonged syncope, with pulse and respiration imperceptible, the appearances may very closely resemble those of death. The heart should be very carefully examined, and the temperature should be taken in

the rectum. The setting-in of rigor mortis will, of course, determine the real nature of the symptoms, but in the absence of this conclusive sign of death, it may be difficult to express a positive opinion.

The prognosis in cases of syncope will, of course, mainly depend upon the cause of the symptoms; it is generally favourable unless the syncope depends upon organic disease or profuse hæmorrhage. The facility and rapidity with which treatment is obtainable may, in severe cases, turn the scale in a favourable direction. In the case of severe shocks to the nervous system, and the syncope which is apt to follow slight exertion in debilitated subjects, much will depend upon the state of the patient and the gravity of his previous condition. In ordinary cases of partial syncope, or faintness, due to heat, fear, or excitement, or to impressions on the nerves of special sense, the attacks generally pass off in a few minutes if proper treatment is adopted; but they are very liable to recur, either speedily or after a longer interval. In cases of organic disease of the heart successive attacks of syncope are often noticed.

Treatment. In dealing with a case of syncope we have to endeavour to restore the action of the heart and to supply as much blood as possible to the brain. The

second indication can be fulfilled while remedies to act on the heart are being sent for. The patient should be placed on the back in a horizontal position, with the head as low as or even lower than the rest of the body. This simple measure often serves to cut short an attack; a patient subject to faintness instinctively seeks the recumbent position when he feels any of the premonitory symptoms. In severe cases, as after excessive hæmorrhage, it is necessary to maintain the horizontal position for some time, and to be very careful in rising from it. At the same time that this position is adopted all pressure from tight articles of dress should be carefully removed from the neck, chest, and abdomen; pure, fresh air should be freely admitted, for which purpose the windows and doors should be thrown open and persons should be prevented from crowding round the patient. If hæmorrhage be the cause of the attack, and is still going on, measures must be adopted to arrest it. All the above-mentioned steps should be taken as rapidly as possible.

Measures should also be employed to restore the action of the heart, and for this purpose smelling salts should be applied to the nostrils, and diffusible stimulants should be given. A little spirit of ammonia,

brandy, or eau de Cologne are those which are generally at hand. Sprinkling cold water on the face is also useful, inasmuch as it incites respiratory efforts by which the irritability of the cardio-inhibitory centre is much lessened. A still greater effect in this direction is produced by the act of swallowing; sipping cold water acts as a powerful cardiac stimulant, and in most cases of syncope recovery is not long delayed after the patient is able to swallow. If, however, this power be still in abeyance, a stimulant enema should be injected into the rectum, or æther may be administered subcutaneously. If these measures fail, the limbs should be firmly and energetically rubbed in an upward direction, and warm applications should be applied to the body, while ammonia is held to the nostrils.

When the syncope is the result of an overloaded stomach, it will be well to administer an emetic of mustard and warm water, with the addition, if necessary, of a little ipecacuanha. I have seen three cases, in elderly persons, of syncope from an overloaded stomach; life was apparently saved by the prompt administration of an emetic. In cases in which the attack has resulted from a draught of cold water taken while the body was heated, the patient, if able to swallow, should take a full

dose of compound spirit of æther with hot brandy and water, and in cases of complete unconsciousness, these remedies may be administered by means of the stomach pump or in an enema. At the same time, hot fomentations with a little turpentine, or a mustard plaister, should be applied to the epigastrium. As a matter of course, in syncope the result of serious hæmorrhage the question of transfusion will have to be considered.

In all cases, after the attack has been recovered from, great care is necessary in order to prevent a recurrence; the erect position should be gradually assumed and exertion abstained from until sufficient rest and nourishment have been taken to restore the nervous energy regulating the heart's action. In cases in which the attack has been due to distension of the stomach, the production of this condition must be prevented by appropriate diet and medicines. Food should be taken in small quantities, and articles likely to engender flatulence should be rigorously forbidden.

CHAPTER IV.

NEURASTHENIA OF THE HEART.

WEAKNESS OF THE HEART IN NEURASTHENIA—SYMPTOMS—PALPITATION, PAIN, AND SLEEPLESSNESS—HYPOCHONDRIASIS—SPECIAL CARDIAC SYMPTOMS—PERIODICITY SOMETIMES NOTICED—CAUSES OF CARDIAC NEURASTHENIA—PROGNOSIS AND TREATMENT.

THE influence of the nervous system upon the movements of the heart accounts for the frequency with which symptoms of cardiac disorder occur among the subjects of neurasthenia. Weakness of the heart's action and excessive excitability are the predominant features, and are apt to give rise to the suspicion of organic disease. In typical cases, however, there are no valvular or pericardial lesions, though there are sometimes grounds for suspecting that a slight degree of fatty degeneration may exist. It is impossible to do more than speculate as to the nature and seat of the nervous disorder. The cardiac ganglia, the sympathetic system, the medulla oblongata, and the pneumogastric nerves may all be implicated.

The special symptoms connected with the heart may

be the first to appear, but it more commonly happens that they set in at a later stage. They are more frequent in men than in women. Palpitation and pain in the precordial region are first complained of, and appear to aggravate the already existing weakness. Attacks of faintness are prone to occur, and obstinate sleeplessness is invariably associated with the cardiac symptoms. Severe attacks of hypochondriasis, profound melancholia, incapacity for mental exertion, sometimes to such an extent as to suggest softening of the brain, are observed in some cases. The hands and feet are cold and moist, the face and lips are either pale or bluish; numbness and formication are occasionally present in various parts.

The special cardiac symptoms are a small and infrequent pulse, weakness of the heart's impulse, and faintness of the sounds. In some of these cases the number of the pulsations is as low as 40 in a minute; after a meal it may rise to 50 or perhaps 60 if stimulants are taken, but it seldom goes beyond the latter number. In severe cases intermittency of the pulse and symptoms resembling those of angina pectoris may occur from time to time. For some months past I have had under my care a young man aged 27, with-

out any sign of organic disease, but who after a day's hunting invariably suffers from pain in the cardiac region with an intermittent pulse. I advised him to relinquish hunting, and he has since had no return of the pain in the chest, while his pulse has kept quite normal. A curious periodicity is sometimes observed in the occurrence of the symptoms. The heart may act normally for some hours, the patient continuing his occupation and being either quite or comparatively free from any feeling of discomfort. At a certain time of the day, however, perhaps towards evening, the symptoms begin to show themselves ; there is a sensation of pain and oppression in the cardiac region, and the heart is felt to be acting irregularly. All these symptoms become aggravated if work is persisted in, but they subside under the influence of rest. They recur from time to time under similar circumstances ; it would seem as if the nervous mechanism of the heart would permit of a certain definite amount of physical or mental exertion and would work smoothly for a limited period, but no longer. Many instances of this kind have come under my notice. Undue excitability is always superadded to the weakness of the heart's action ; palpitation and pain are set up by very slight

causes. Few of these patients can take a cup of coffee or tea without suffering for it.

It is very necessary in these cases of cardiac neurasthenia to inquire particularly into the habits of the patient in order to discover the exciting causes of the symptoms. It will generally be found that some form of excess is the source of the mischief. Alcohol and tobacco, abuse of sexual intercourse, prolonged mental exertion, an insufficient amount of sleep, worry, and anxiety are the most frequent contributaries. In the absence of treatment the symptoms are always chronic, and may continue for some years. They are not dangerous to life, but should the patient be attacked by any severe disease his chances of recovery are decidedly lessened. Acute bronchitis, pneumonia, and any form of fever may easily be fatal in this weakened condition of the heart.

The treatment consists first and foremost in the avoidance of the causes (and of all excesses in particular), and, secondly, in the adoption of all measures calculated to improve the general health. The physician should lay down definite rules for the guidance of the patient in all such matters as diet, exercise, occupation, rest, etc. The food must be of a decidedly nutritious

character, not too bulky and not such as to distend the stomach and engender flatulence. Mutton and beef, game, chicken, eggs, and white fish may be allowed; green vegetables are suitable, but potatoes and farinaceous food in general should be taken very sparingly. Some of these patients are unable to digest bread; it causes great distension of the stomach and much discomfort. Toast is more suitable; but sometimes it will be found advisable to forbid the use of bread altogether, and let the patient take plain biscuits instead. Tea and coffee must be interdicted; cocoa is well adapted for these cases. The nibs should be reduced to a coarse powder and boiled gently for three hours; the liquor is then strained, and when cold the fat is skimmed off. Thus made, the decoction will keep good for two or three days; it is warmed up for use as required. Great moderation as regards stimulants is, of course, required. If the patient will submit, it is sometimes well to try the effects of abstinence; but for most cases a little sound claret or burgundy, or weak whisky and water (not more than two ounces of the spirit in twenty-four hours, and taken *only with meals*), will do good rather than harm. Tobacco must be strictly forbidden. A proper amount of sleep is all-important,

and whenever symptoms of fatigue come on during the day the patient should discontinue his occupation and lie down for an hour or two. Warm baths occasionally (to be always followed by rest); change of air to the sea-side, or other suitable locality, and the administration of suitable tonics, as described in the chapter on neurasthenia, constitute the remainder of the treatment.

CHAPTER V.

ANGINA PECTORIS—NEURALGIA OF THE HEART.

Angina Pectoris, Definition of—Peculiarities and Symptoms of the Attacks—The Cardiac Pain and Pulsations—Sounds of the Heart—Respiratory Symptoms and Expression of Countenance—Pains in the Shoulder and Arm—Indications of Vaso-Motor Disorder—Measures Adopted by Patients to Relieve Distress—Results of Attack and State of Health in the Intervals—Causes of a Fatal Termination—Causes of Angina, Essential and Symptomatic—Influence of Tobacco Smoking—Lesions Found after Death in some Cases—Nature of the Disorder—The Nervous Apparatus of the Heart—Three Sources, the Cardiac Ganglia, the Pneumogastric, and the Sympathetic—Vaso-Motor Angina Pectoris — Diagnosis — Prognosis — Treatment, Relief of Attacks and During Intervals—Subcutaneous Injection of Morphine — Inhalations of Nitrite of Amyl — Nitro-Glycerine Internally—Stimulants—Hygienic Measures—Arsenic—Treatment of Gouty Subjects.

Angina pectoris is by no means a common affection, but inasmuch as cases sometimes occur in which no organic lesion is discoverable, and as the symptoms have not been shown to depend upon any specific alteration, the complaint must be included in the category of functional disorders of the heart. The affection is characterized by attacks of pain which begins in the

cardiac region and extends along the course of various nerves. Alterations in the movements of the heart and in the force of its contractions are almost always associated with the pain.

Attacks of angina pectoris are wont to occur in the absence of any obvious cause. Sometimes they come on just as the patient is going to sleep, or they serve to rouse him after a normal sleep of some hours. In the case of a married lady whom I have lately attended, the attacks, hitherto three in number, have invariably come on just as the patient was falling asleep. In other cases the attacks occur irregularly, and are, perhaps, traceable to such antecedents as exposure to cold, bodily or mental exertion, indigestion, and the like. The attacks may last only for a few minutes, or they may be prolonged for hours. In rare cases the sensations persist with remissions only for several days. With regard to their recurrence there may be months or even years of freedom, while in other cases attacks come on daily, or even several times a day. As a general rule, the attacks become more frequent and more severe as time goes on. They generally occur without any premonitory symptoms, but in some cases they are preceded by vertigo, noises in the ears, ocular

spectra, nausea, difficulty of swallowing, chilliness, and various other uncomfortable sensations.

The strongest possible epithets are used by the patients to describe the character of the pain which is felt beneath the lower half of the sternum and in the region of the left nipple. It is said to be of a pricking, burning, boring character, as if a hot iron were being driven into the chest, or as if the heart were being torn out of it; in other cases the sensation is one of pressure and constriction. A sensation of impending dissolution is always superadded. The objective symptoms are also likewise prominent; the heart beats tumultuously and with greatly-increased frequency and strength. The first sound is accompanied by a metallic ringing; the pulse at the wrist is hard, but intermittent. An opposite condition of the heart's action, viz., diminished frequency and strength, with a weak pulse, is less frequently noticed.

Respiratory troubles are always associated with the symptoms just described. There is an intense feeling of want of air in the chest, but the inspirations are irregular, superficial, jerking, and sighing, and suffocation appears imminent. These symptoms are due to reflex action, resulting from the cardiac pain, for

there is no disease of the respiratory organs, and by a strong effort of the will the patients can take deep and regular inspirations. The expression of the countenance indicates the patient's sufferings in an unmistakable manner; the features are distorted and pale, and the face is covered with cold perspiration.

Neuralgic pains, due presumably to irradiation, are almost always felt along the course of various nerves. The region of the shoulder and the left arm are the parts most commonly affected, but sometimes the suffering is confined to the back and inner side of the arm which is supplied by the internal cutaneous nerve. In other cases the pain reaches to the forearm, following the course and distribution of the ulnar nerve. The patients generally complain of a sense of numbness and stiffness in the arm, and sometimes of formication, and these feelings may persist long after the pain has abated. The pain in the arm is sometimes a premonitory symptom, and not unfrequently the part is the seat of severe cutaneous hyperæsthesia. It rarely happens that the pain affects both arms or the right arm alone, but it often extends to the left side of the neck. Pain in the face is rare, but uncomfortable sensations are often felt in the upper part of the thorax,

and the nipple is sometimes very painful and tender on pressure. In exceptional cases pain radiates to the back, and likewise over the abdomen and downwards to the legs. I have witnessed one attack in an old man in which the pain extended behind the left shoulder-blade down the left arm, and was also felt in the left iliac fossa. Indications of spasm are witnessed in many cases; thus, swallowing is often difficult, while vomiting, difficulty of speaking, hiccough, and epileptiform convulsions are not unfrequent.

Indications of vaso-motor disorder are always present. The extremities are pale and marked with livid discolorations, while their temperature is lower than normal. These phenomena are attributable to spasm of the minute cutaneous vessels, and are occasionally so decided as to give rise to the supposition that the nervous disorder is not of a secondary character, but that the vaso-motor changes are the primary factors, and that they precede and cause the attacks of cardiac pain. Cases such as these have been described as *vaso-motor angina pectoris,* and are explained by supposing that the spasm in the cutaneous arteries raises the blood-pressure in the aorta, and causes the alterations in the heart's action.

When an attack of angina is impending, most patients know by experience that they will be relieved by fresh air, and they consequently hurry to a window or out of the house. As a general rule they find that the erect posture serves to mitigate their sufferings; besides this they often seize the nearest object and press it against the chest, or they clasp the left side of the thorax with their hands. When the attack is at its height, the slightest noise or disturbance worries the patient, whereas he is relieved by quiet and a darkened room. The urine passed after an attack is pale, watery, and copious in quantity. If a paroxysm lasts for some time the patient may become quite prostrate, or even completely unconscious; the respiration almost ceases, the pulse is imperceptible and the heart sounds scarcely audible, so that the patient is reduced to a condition of apparent death.

Sometimes the attack passes off suddenly; in other cases it subsides after eructation, vomiting, or diarrhœa; copious expectoration has been observed in a few instances.

In the intervals between the attacks, the majority of the patients feel comparatively or even quite well, but they are always disturbed by fear that recurrences may

take place. If organic lesions be present, their symptoms will be more or less troublesome. The first attack of angina is sometimes fatal, as in the case of the late Dr. Arnold, of Rugby; on the other hand, attacks may continue to recur during many years and without much apparent injury to the general health. In fatal cases death generally occurs from paralysis of the heart; rupture of the organ and cerebral hæmorrhage have been occasionally observed. Some patients gradually fall into a low cachectic state, and eventually die. Sudden death under the influence of strong emotion has been recorded in a few subjects of angina pectoris.

Nothing definite can be stated with regard to the causes of angina pectoris. The complaint is much more common in males than in females, and the majority of the sufferers are over fifty years of age. Hereditary predisposition is sometimes traceable, as in Dr. Arnold's case; in other instances there is a family history of other nervous disorders. Rheumatism, gout, and excesses in alcohol and tobacco play a more or less active part in the causation of angina pectoris. Certain it is that in some cases the attacks cease when tobacco-smoking is given up, and recur on resumption of the habit. The complaint is said to be more common in

well-to-do persons, leading sedentary lives, and disposed to obesity. It is much more frequent in cold than in warm climates.

In endeavouring to trace the disorder to its cause, it is well to divide the cases into two groups, the first of which embraces those in which no organic lesion is discoverable, and the second those in which certain organs are manifestly diseased. To the first class the term "essential" has been applied; it includes not more than five per cent. of the total number of cases. Among the most prominent causes which have been assigned for cases of this kind are exposure to cold, mental excitement, and excessive indulgence in alcohol and tobacco. With regard to cold, it may be supposed to contribute at least towards the causation of vaso-motor angina pectoris, examples of which are usually seen in cold and damp climates when the weather is very severe.

In cases of symptomatic angina, the most common changes found after death are those which affect the organs of the circulation, such as atheromatous degeneration in the aorta and coronary arteries, aneurism of the aorta, and insufficiency of the aortic valves. Angina is a less frequent accompaniment of mitral disease and

fatty degeneration and of pericardial adhesions. Gout and rheumatism seem to play an important part in the production of the disorder. As of purely reflex origin, symptoms of angina have been observed in diseases of the kidney, liver, and uterus, and in a case of stone in the bladder.

Many attempts have been made to explain the symptoms and nature of angina pectoris. With regard to the changes found in the heart and in the blood-vessels, it cannot be regarded as certain that these are the cause of the attacks, for hundreds of patients suffering from diseases of the heart never exhibit any symptoms of angina pectoris. On the other hand, in some fatal cases of the disorder no morbid changes whatever have been discovered in the organs of circulation.

If we regard the symptoms as the result of disordered innervation, it is well to inquire as to the changes that have been discovered in the nervous apparatus of the heart. There are, unfortunately, but few accounts giving trustworthy details. Pressure on the cardiac branches of the pneumogastric by enlarged bronchial glands, and increased vascularity and hyperplasia of the connective tissue of the cardiac plexus have been noticed in a few cases. The most important changes are those which

have been discovered in the cardiac ganglia themselves. These organs in one case, in which during life there were symptoms of angina pectoris, were found to be in a state of hyperæmia with interstitial inflammation and increased growth of connective tissue; some of the ganglia were destroyed, and the interstitial tissue was infiltrated with calcareous matter.

The physiological explanation of paroxysms of angina is extremely difficult on account of the complex manner in which the heart is supplied with nerves. It has been pointed out in the introductory chapter (see page 362) that this supply is derived from three sources: in the first place there are the ganglia in the substance of the heart itself; and these are independent centres of nerve force. In the second place there are the branches of the pneumogastric, which regulate the action of the heart; and, lastly, there are the branches of the sympathetic, which, with those just mentioned, form the highly complicated cardiac plexus. It cannot be wondered at that many symptoms of disorder of this plexus should fail to correspond with those of experiments made upon the vagus and upon the sympathetic.

It has been proved that the cardiac ganglia can be irritated or paralyzed by solutions of various substances

brought into contact with the endocardium; and it may be inferred that a similar result might follow alterations in the quantity or quality of the blood. If the ganglia are irritated the heart's action is increased and accelerated; if they are paralyzed an opposite condition of things is set up, and may go as far as to amount to suspension of the heart's action. Such a condition might, therefore, result from narrowing or closure of the coronary arteries which supply blood to the ganglia. It can easily be imagined that in atheromatous degeneration of the aorta and in disease of the aortic valves the blood supply of these ganglia might be much diminished, or even temporarily cut off.

The pneumogastric nerve may be affected either directly or by reflex action. Stimulation of the cardiac branches may be produced by irritation of the abdominal organs, as in the experiment of Goltz, of tapping the intestines. In cases of angina, provoked by indigestion, the irritation is propagated by the sympathetic nerves through the cervical spinal cord to the pneumogastric. The result is diminished frequency of the heart's action, amounting, perhaps, to temporary suspension, with impediments to intonation and to swallowing. The pain, which is likewise present, is due to

irritation of the sensory fibres which are contained in both the vagus and the sympathetic. The extension of the pain to the shoulders and arms is due to the connections which these nerves form with the brachial plexus.

The last set of nerves to be considered in connection with this affection of the heart are those derived from the sympathetic system. Irritation of these nerves accelerates the heart's action. In vaso-motor angina pectoris increased force of the cardiac contractions is requisite in order to overcome the obstacles in the peripheral vessels. The forced contractions give rise to pain analogous to that felt in the calves of the legs, and in some disordered states of the uterus. The paroxysm of angina comes to an end as soon as the spasm of the cutaneous vessels has been relieved by warmth or otherwise, and an impediment to the free circulation of blood no longer exists. It has been supposed that congenital weakness of the cardiac nerve-centres exists in some cases, and that in others a weakened condition may result from immoderate muscular or mental exercise. Attacks of angina have been observed for the first time in persons who, after recovery from serious illness, have overtaxed their strength, and in others who have been reduced by mental strain or want of sleep.

The *diagnosis* of angina pectoris is for the most part easily made, the distinguishing feature being the severe paroxysmal pain in the cardiac region. The attacks can scarcely be mistaken for those of ordinary palpitation or of asthma, or hysteria. It is, of course, important to determine whether there be any organic affection of the heart or vessels. These should always be carefully examined, and if the physician sees the patient during an attack, he can scarcely make a mistake as to the nature of the symptoms.

The *prognosis* is always more or less unfavourable. If an organic lesion be present, its nature will determine the opinion of the physician, but even in the absence of any such change angina is always a serious complaint, and may either cause sudden death or may wear out the patient by the frequency and severity of the attacks. The vaso-motor form and those in which the affection is connected with some abdominal disorder, or with excess in alcohol or tobacco, admit of a somewhat more favourable prognosis.

The *treatment* of angina pectoris resolves itself into a consideration of the measures to be taken to relieve an attack, and of those best adapted to prevent recurrences. When a paroxysm of angina is threatening, the patient

should be placed in a quiet, airy room, with the windows open, but somewhat darkened; and the clothes about the neck and chest should be loosened. Most patients find that a sitting posture affords most relief. Sucking ice tends to mitigate the distress, and cold applications to the præcordia are generally grateful to the patient.

As a general rule in all cases of functional disorder of the heart, attended by palpitation and irregular action, it is of great importance that the physician should gain the confidence of the patient by assuring him that he has no organic disease, and that the attack will yield to treatment.

With regard to medicines, the subcutaneous injection of gr. $\frac{1}{6}$ of morphine will sometimes speedily relieve all the symptoms, but the practice is not without risk in cases of fatty degeneration of the heart. The same remark applies to the use of chloroform and æther, the former of which has been known to cause epileptiform attacks, followed by severe collapse. Inhalations of the nitrite of amyl are often very efficacious, and they are especially suitable for cases in which there is coldness and pallor of the skin or livid discoloration, symptoms due to spasm of the cutaneous vessels. The remedy may be used by dropping ♏v on a handkerchief, and allowing

the patient to inhale it until the face becomes red and there is a feeling of pulsation in the head. It is well to let the patient have the nitrite enclosed in capsules, each containing three minims and encased in cotton wool and silk. When used the glass capsule is broken, the liquid soaks the cotton wool and silk cover, and can be conveniently inhaled.

Dr. Murrell has recently recommended nitro-glycerine for the relief of, or to ward off attacks of angina pectoris. A 1 per cent. solution in rectified spirit is prepared, and of this 3 to 5 minims are given when an attack is impending. In some cases it gives complete relief, and is thus a great boon to the sufferers who acquire perfect confidence in being able to control the attacks. The remedy may also be conveniently administered, combined with chocolate in the form of lozenges, each containing $\frac{1}{100}$ of a grain. Stimulants must be given if during an attack there be evidences of cardiac exhaustion, such as a much weakened impulse, with scarcely audible heart-sounds and a very feeble pulse. Under such circumstances brandy should be given if the patient be able to swallow, and if not, some æther should be subcutaneously injected. At the same time the feet should be placed in hot water, and a mustard plaster

applied to the chest. In vaso-motor angina pectoris the application of heat to the extremities is always useful.

In order to prevent recurrences of the attack the patient's habits and mode of life must be carefully regulated. All excess in eating and drinking, and in the use of tobacco is to be strictly prohibited; it is, indeed, well to forbid tobacco altogether. The bowels should be kept regularly open; the patient should take a fair amount of exercise in the open air, but always short of fatigue; he should have a tepid sponge bath daily, and scrupulously avoid exposure to cold and mental excitement. Change of air often does good to these patients; the seaside suits some; others are benefited by a sojourn in elevated districts if sheltered from high winds. If organic disorders be present, these, of course, require appropriate treatment; anæmia must be combated by iron and quinine, and nutritious diet; nervous excitement by bromide of potassium and various tonics. If there be valvular, or other disease of the heart, with irregular action, digitalis is likely to be suitable. When there are evidences of fatty degeneration of the heart, a course of arsenic, with strychnine, may be tried. Arsenic is also useful in cases in which

the patients are much depressed. A case has been recorded in which the attacks were aggravated by the condition induced by a hot summer; other remedies had been tried without avail, when an immediate improvement followed the administration of Fowler's solution in doses of two-and-a-half minims three times a day. For gouty cases the treatment of the uric acid diathesis should be rigorously carried out. A course of bicarbonate of sodium, combined with ammonia and some bitter tonic, is certain to be useful. The diet and condition of the stomach will require careful attention.

SECTION III.

FUNCTIONAL DISORDERS OF THE RESPIRATORY ORGANS.

INTRODUCTORY CHAPTER.

FUNCTIONAL DISORDERS OF RESPIRATION—NERVES OF SENSATION OR MOTION IMPLICATED—DISORDERS OF THE VOICE—HOARSENESS—APHONIA AND ITS CAUSES—LARYNGEAL GROWTHS, CATARRHAL SWELLING, PARALYSIS OF THE LARYNGEAL MUSCLES, HYSTERIA, ANÆMIA — DYSPHONIA CLERICORUM — INSUFFICIENT STREAM OF AIR—TREATMENT OF HOARSENESS AND APHONIA—INHALATIONS —TONICS — MINERAL WATERS — FARADISM — ANÆSTHESIA AND HYPERÆSTHESIA OF THE RESPIRATORY NERVES—NEURALGIA OF THE LARYNX — TREATMENT — NERVOUS COUGH — SYMPTOMS — CAUSES—CONNECTION BETWEEN COUGH AND AFFECTIONS OF THE EAR—TREATMENT.

FUNCTIONAL disorders of the respiratory organs are characterized by symptoms referable in the main either to the nerves of sensation or those of motion or to both at the same time. Moreover, in the larynx, disorders are apt to occur involving alterations in the voice, independently of inflammation or other organic

change; and it will be convenient to consider these first.

The condition of the voice known as *hoarseness* is most often caused by mucus upon the vocal cords; it may be also due to swelling, roughness, and defective tension of these structures. If while speaking the cords suddenly come together, the speech is broken, owing to the formation of nodal points (Landois). Hoarseness sometimes precedes complete loss of voice or *aphonia;* but the latter may occur alone and come on either gradually or suddenly.

Aphonia is liable to occur when anything prevents or impedes the free vibrations of the vocal cords. A tumour on one or both of these structures is a cause of this character, and the same effect may be produced by catarrhal swelling of the cords, and likewise by a similar condition of the false vocal cords and adjacent parts. The swollen mucous membrane impedes the vibrations, by encroaching on the space in which these take place.

Another cause of aphonia is paralysis or weakness of the laryngeal muscles. Examples of such paralysis, of a functional character, are seen in cases of hysteria. In such patients there is no considerable alteration in the mucous membrane which is healthy and of normal

colour, or at most but slightly congested. The hyperæmia, which is an occasional accessory, is due perhaps to the same causes as those which produce the aphonia, or is of a secondary character. In not a few of these cases the vocal cords approximate as in health.

In another class of cases belonging to this category, the mucous membrane of the larynx is pale and anæmic, a condition which coincides with the aspect of the patients. The aphonia is due to imperfect approximation and insufficient tension of the vocal cords. There are yet other patients who present this symptom, but are neither hysterical nor anæmic, and the aphonia must be regarded as due to some perverted distribution of nerve-force. Such purely functional aphonia appears generally in girls and young women under thirty. In loss of voice occurring in the patients just referred to, the symptoms may come on suddenly, as a result of sudden and strong mental emotion, caused, for example, by joy, anger, or fright. In other cases its accession is gradual, depending upon general debility, as after long-continued and exhausting diseases. The aphonia in another class of cases is due to debility of the laryngeal muscles, as when these have been overstrained by ex-

cessive or protracted use in speaking or singing. The voice may be reduced to a whisper, or perfectly inaudible. In so-called *dysphonia clericorum*, chronic catarrh and swelling of the mucous membrane of the larynx are combined with loss or impairment of muscular power, but the latter may exist alone. Under such circumstances, the patient can read or talk for half an hour or more, but then the voice becomes feeble, and less and less audible. There is a sensation of fatigue and pain in the larynx, but there is no decided change visible on examination, certainly none sufficient to account for the loss of voice.

Another cause of aphonia is an insufficient stream of air; "the vocal pipe feebly blown through refuses to speak." This condition is seen in cases of faintness and collapse from various causes, in emphysema, and in attacks of asthma. Intercostal neuralgia is another cause of this character; the patient fears to use his chest in consequence of the pain; and atrophy of these muscles leads to a similar result. It must not be forgotten that acute enlargement of the tonsils may cause almost complete aphonia, owing to the insufficient amount of air which is allowed to pass upwards.

The treatment of hoarseness and aphonia depends

upon the cause of the affection. When catarrh is present, cold compresses to the throat, local astringents, and the inhalation of medicated vapours are likely to prove serviceable. One of the best local astringents is the chloride of zinc (gr. xxx to ℥j glycerine) applied by means of a brush daily or every alternate day. Carbolic acid pigment of the same strength is useful when the mucous membrane is dry and shining (Mackenzie). The vapour of Scotch pine (Pinus sylvestris) forms a mild stimulant inhalation for slight laryngeal catarrh, and the vapours of creasote, juniper, and benzoin may be employed for the same purpose. These inhalations should be used twice or three times daily for about ten minutes at a temperature of 140°. Another useful remedy is powdered gum eucalyptus gr. ¼ with an equal quantity of powdered starch, applied by means of an insufflator, and when the pharynx is affected, the same drug may also be used in the form of a lozenge. Iron, quinine, and other tonics, change of air, rest, and hygienic measures of all kinds are likely to be serviceable for cases of aphonia due to slight laryngeal catarrh. When the disorder has subsided, precautionary measures should always be taken in order to lessen the susceptibility of

the part. A daily bath of tepid water, in which a little salt has been dissolved, followed by friction over the whole body; flannel next the skin; outdoor exercise adapted to the patient's state, and avoidance of over-heated rooms, constitute the principal measures of this character. The waters of Ems, Selters, and Ober-salzbrunnen, and those of Aix-les-Bains and Marlioz, are useful in many cases of chronic laryngeal catarrh.

In functional aphonia, depending on inaction of the adductors on both sides and consequent non-approximation of the vocal cords on attempted phonation, the treatment consists in stimulating the mucous membrane of the larynx in various ways. Sir M. Mackenzie has known the voice to be restored by the use of a vapour impregnated with ammonia; but he recommends as more efficacious inhalations of oil of calamus aromaticus and of creasote. Either 40 minims of the latter or five minims of the former are mixed with 20 grains of magnesium carbonate and one ounce of water, and used at a temperature of 140°. Other local remedies are stimulating or astringent solutions, such as nitrate of silver (ʒj to $\bar{ʒ}$j) or perchloride of iron (ʒij to $\bar{ʒ}$j) applied with a brush to the interior of the larynx, or introduced in the atomized form. All the above-

mentioned remedies often fail; on the other hand, Sir M. Mackenzie* states that endo-laryngeal faradism is almost always successful. The electric current should, however, not be applied until any hyperæmia of the mucous membrane has been got rid of.

In using faradism to the larynx, one pole is passed within the glottis and placed on the vocal cords and the other applied externally by means of a necklet. The laryngeal rheophore is so constructed that the current does not pass until the metalled point or sponge is in contact with the vocal cords. It is kept in this position for a second or two, and then withdrawn, and the current may be applied five or six times at a sitting. A distinct laryngeal sound will generally be produced on the first application of endo-laryngeal faradism, and the voice will get stronger on each succeeding application. After it has been restored, faradism should be applied externally either daily or every other day for a week or two in order to keep up the effect, and the patient should be directed to count and read aloud several times daily so as to exercise the voice. In hysterical cases, the general treatment suitable for

* "Diseases of the Throat and Nose," Vol. i., p. 467.

the neurosis should be put in force at the same time. These cases are often very obstinate, but they are almost always cured at last, even when the aphonia has existed for several years.

It remains to consider various conditions of anæsthesia, and of hyperæsthesia of the respiratory nerves. The former is of very rare occurrence, except in connection with coma as a result of poisoning, and in certain cerebral diseases. Sir M. Mackenzie states that laryngeal anæsthesia as a serious manifestation appears to be confined to cases of diphtheritic and bulbar paralysis. In affections of the former class, recovery takes place under ordinary tonic treatment; if the disorder becomes chronic the application of faradism as described in the previous paragraph is likely to prove successful.

The opposite condition of hyperæsthesia may result from catarrh, from the irritation produced by a foreign body, from excessive use of the organ, and as a symptom of general nervous irritability. When associated with any of these conditions the hyperæsthesia is liable to be complicated by a troublesome dry cough of a spasmodic character, and in some cases, notably in hysterical subjects, a cough of this kind may exist without perversion of sensation.

The symptoms of laryngeal hyperæsthesia are a feeling of more or less discomfort, such as dryness or rawness of the part, or even actual pain of a burning, pricking, or constrictive character, and they are apt to be increased by coughing and swallowing, while spasm of the muscles of the throat and larynx is sometimes superadded. Some patients also complain of various perversions of sensation, *e.g.*, of a feeling as though a foreign body were present in the larynx, whereas nothing can be detected after the most careful examination. Such a feeling is, of course, common in cases in which some offending body has been removed, and it is apt to last for some time.

Cases of true neuralgia of the larynx have been placed on record by Drs. Handfield Jones, Graves, Mackenzie, and others, but the affection is very rare. In Dr. Graves' case* the patient, a young lady, was originally of vigorous constitution, but had suffered for some time from menstrual irregularity and hysteria. Antiphlogistic treatment of all kinds had been tried without avail; the pain, though not violent, was almost constant, and was liable to occasional aggravation. The

* Graves' "Clinical Medicine," New Syd. Soc. Ed., Vol. i., p. 656.

feeling was one of distress about the whole region of the larynx; there was no external tenderness, and the throat was healthy. The paroxysms were attended by a change of tone and weakness in the voice. It was curious that in this case the employment of tonics (iron, quinine, and arsenic) had the effect of rendering the attacks perfectly periodic.

For laryngeal neuralgia, Sir M. Mackenzie recommends that the patient's general condition should, when necessary, be improved by such measures as change of air, sea-bathing, or a course of hydropathic treatment. If the malady appear to be of purely local origin, persistent pencilling of the laryngeal mucous membrane with chloroform and morphine would seem to be the best means of curing it. Should these fail to afford relief, Indian hemp and bromide of potassium may be tried either separately or combined. The same remedies would probably be serviceable in cases of perverted sensibility of the larynx.

We occasionally meet both in children and in adults with a condition in which a troublesome cough is the only symptom. It is not accompanied by any catarrh of the air passages, or by any morbid sounds in the chest; it appears to be a purely nervous affection, the

result of some morbid condition of the respiratory nerves. The cough is almost always dry unless a violent paroxysm gives rise to the formation of a little mucus; the attacks come on at irregular intervals and last for indefinite periods. Sometimes the coughing is almost incessant for days, being checked only by sleep; in other cases it comes on mainly at night, and prevents the sufferer from getting any sleep. Its character varies; the sound is sometimes hollow and loud, sometimes it resembles the barking of a dog. Sir M. Mackenzie records the case of a young lady whose "cough was so loud and constant that her friends were required by the proprietor of the hotel in which she was staying to have her removed, as she was a nuisance to all the other guests." In such cases nothing abnormal can be detected with the laryngoscope, nor does the general health suffer. Trousseau, however, states that when the disorder is much prolonged it is apt to affect injuriously the general health, and especially when the cough is complicated with obstinate vomiting. A cough of this kind is not unfrequent in hysterical subjects, and the majority of the patients are young girls between 16 and 20 years of age. There is sometimes tenderness of the spine between the scapulæ; and in other cases

the cough is the result of reflex irritation of the stomach or intestines. In some patients the cough would seem to be the result of gouty or rheumatic irritation.

Certain morbid states of the ear are apt to be associated with a spasmodic cough, and this organ should never be neglected in cases in which this latter symptom occurs. Dr. C. Fox has published a case of a woman aged 50, who for eighteen months was troubled by laryngeal irritation and cough; the throat and lungs were healthy and the larynx normal, but the patient was deaf in the right ear, in which a plug of wax and a small ulcer were found. The cough ceased after the removal of the wax. In another case the cough was associated with the presence of dead bone in the meatus. The irritation in these instances is conveyed by branches of the auriculo-temporal of the fifth to the vagus, the deep origin of which in the medulla oblongata is close to that of the sensory root of the fifth nerve. The irritation is referred to the larynx because the medulla oblongata is wont to receive impressions through the vagus from that organ. Vomiting and cough sometimes arise from the state of the teeth; dentists know that irritation of the dental branches of the fifth nerve may give rise to cough.

The treatment of these cases of spasmodic cough is apt to be difficult, but the complaint generally yields to remedies. Atropine is one of the best of these; it should be given in doses of gr. $\frac{1}{120}$ combined with various tonics, such as iron, quinine, or nitric acid. Morphine may be substituted for the atropine, should the latter fail to relieve. Valerianate of zinc and asafœtida may be tried for hysterical cases, while for rheumatic and gouty subjects, alkalies and purgatives will generally be serviceable. When the cough appears to depend upon disorder of the stomach or bowels, the remedies must be directed to these parts. Purgatives are usually indicated, and bismuth with hydrocyanic acid and henbane will probably lessen or cure the paroxysms of cough. In nervous and weakly subjects, change of air, travelling, and the use of chalybeate waters will be found the best treatment. There is one other cause of spasmodic cough which must not be overlooked, namely, tapeworm. Dr. Graves records the case of a young lady whose medical attendants (himself among the number) had exhausted their list of remedies, but without the least benefit to the patient; the fits of coughing went on for several hours with extraordinary intensity; the cough was dry, extremely loud, hollow,

and repeated every five or six seconds, night and day. This patient was completely cured by an old woman, a servant in the family, who suggested a dose of turpentine and castor-oil for the relief of an attack of colic. The result was the passage of a mass of tapeworm and the immediate disappearance of every symptom of pulmonary irritation.

Another functional disorder of the larynx and similar affections of the lungs will require special chapters for their consideration. All these disorders are characterized by muscular spasm; in the one case affecting the larynx, and in the other, the smaller bronchi, dyspnœa being the prominent symptom in both sets of cases.

CHAPTER II.

LARYNGISMUS STRIDULUS—LARYNGEAL ASTHMA.

LARYNGISMUS STRIDULUS—NATURE AND CAUSES—AGE, RICKETS AND SCROFULA, HEREDITY, MALNUTRITION — EXCITING CAUSES OF ATTACKS—SYMPTOMS OF A PAROXYSM—SPASM OF LARYNX—CARPO-PEDAL CONTRACTIONS, ECLAMPSIA — ANATOMICAL CHANGES — THEORIES AS TO NATURE OF COMPLAINT—SIR M. MACKENZIE'S VIEWS— DIAGNOSIS—PROGNOSIS—TREATMENT, PROPHYLACTIC AND DURING ATTACKS—CHLOROFORM, MUSK, PURGATIVES, BROMIDE OF POTASSIUM, ETC.

LARYNGISMUS STRIDULUS is a somewhat rare complaint; but inasmuch as it appears in the majority of cases to be a pure neurosis of the larynx, it must not be passed over. It consists of paroxysmal attacks of difficulty of breathing, which are due to spasm of the muscles of the glottis and of the diaphragm. These attacks occur almost exclusively in children; they are rare before the first dentition and after the end of the third year, the majority of the patients are between six months and two years old. The disorder is more common in boys than in girls; rachitic and scrofulous children and those brought up by hand are especially liable to suffer; a

large proportion of the cases (from 80 to 90 per cent.) are the subjects of rickets.

Hereditary predisposition is sometimes traceable, and it not unfrequently happens that several children in one family are similarly affected. Other nervous symptoms are often noticeable in the subjects of laryngismus, such as restlessness, abnormal excitability, disturbed sleep, etc. The complaint first appears in some cases when attempts at weaning are being made, and the child is fed on farinaceous food; it is more common in winter than in summer, and in cold than in hot climates. Ill-nourished children, living in badly-ventilated rooms, are most liable to attacks. Epidemics of laryngismus have been occasionally noticed.

With regard to the exciting causes of the paroxysms, the most powerful of these are exposure to cold, gastric and intestinal disorder, dentition, and mental excitement of all kinds. Raising the child in the arms and letting it fall through the air will often excite a paroxysm. In some cases even the first attacks appear to be of spontaneous origin. Efforts at sucking, loud screaming, and catarrh of the larynx are frequent precursors of a paroxysm.

Slight premonitory symptoms are sometimes ob-

served, but the attack is often sudden, and may occur at any time, even when the child seems quite well; it is most frequent during sleep, from which the child suddenly awakes in a state of alarm. It is seen that he is unable to breathe naturally; the respirations are irregular, stridulous, and labouring, each being a little longer than the preceding one; the head is thrown back, the nostrils are expanded, and the mouth open, and the muscles of inspiration act convulsively, and at last respiration ceases. The child either closes its eyes or stares wildly about him, the face becomes pale and then livid, the heart beats rapidly and irregularly, the pulse is small and frequent, and the veins of the neck and head are prominent. Percussion shows that the upper boundary of the liver, and with it the diaphragm, are much lower than normal. Urine and fæces sometimes escape voluntarily. Symptoms of asphyxia soon appear, and the spasm of the glottis then relaxes; improvement is ushered in by a deep inspiration, to which a loud whistling or crowing sound is generally superadded, and which can be heard at some distance. The child then opens its eyes, begins to cry, and after a few hurried inspirations appears to be as well as usual.

An attack, as just described, generally lasts for a few seconds only, but it may be prolonged for half a minute or more. In some cases the spasm is so slight and transient that it is detected only on close examination of the child. The complaint sometimes comes to an end after a few attacks; in another class of cases the attacks are spread over considerable periods, and occur at intervals of some weeks or months, and there are yet other cases in which many attacks occur during twenty-four hours, with very short intervals between them. It often happens that the spasms are not confined to the constrictors of the glottis, but likewise involve some of the muscles of the trunk and extremities, and the convulsive movements thus caused may precede, accompany, or follow the spasm of the laryngeal muscles. These movements are most often observed in the hands and feet; the thumbs are drawn across the palms, the fingers are separated, the hands are flexed on the wrists, and the feet are flexed and turned outwards. General convulsions and loss of consciousness are sometimes superadded, and under such circumstances the child may remain very weak and prostrate for some time after recovery. Death from suffocation has been known to occur during an attack;

in other cases the fatal issue is gradually developed, and is preceded by symptoms of profound debility.

There are no constant anatomical changes discoverable in fatal cases; that is to say, there is nothing to which the symptoms can always be referred. Among the various morbid conditions that have been found in fatal cases the following are the most remarkable: Changes in the bones, due to rickets; hydrocephalus; enlarged thymus; enlarged bronchial and tracheal glands; hyperæmia of the brain and meningeal hæmorrhage; enlargements and fatty infiltration of the liver, and swelling of the lymphatic follicles in the intestines. Various theories have been put forth with regard to the starting-point of the symptoms. Thus they have been supposed to originate in the brain, as a result of hyperæmia, hydrocephalus, or softening; as a result of rickets and craniotabes and consequent pressure on the posterior part of the skull and brain; in the spinal cord; as a result of enlargement of the thymus and bronchial glands; of enlargement of the liver; and of spasm of the diaphragm. According to a still more elaborate theory the ligament in the jugular foramen which separates the jugular vein from the vagus is abnormally flexible and allows the vein to compress the nerve, whereby irritation

is set up with muscular spasm as a result. None of these explanations, however, are of universal applicability; a consideration of the symptoms and of the post-mortem appearances in different cases shows that the complaint is sometimes of central, sometimes of peripheral, and sometimes of reflex origin. Sir M. Mackenzie thinks that "the weight of evidence points to the probable existence of molecular changes in the nerve-centres as the essential cause of the phenomena. These changes are the result of malnutrition affecting all the structures of the body. . . . Looking at the immediate phenomenon of the disease, it must be regarded as a spasm of a limited number of muscles brought about by an abnormal condition of certain nerve-centres. The various nerve-centres, as Dr. Hughlings Jackson has pointed out, are probably not knit together so closely in the infant as in the adult, and a partial convulsion—such as is seen in laryngismus—points to an imperfect union of different sections of the nervous system."

There is seldom any difficulty in diagnosing attacks of laryngismus; the absence of fever, and the intermittent character of the symptoms serve to distinguish it from laryngeal diphtheria and laryngitis. The attacks of

dyspnœa which terminate in crowing or whistling inspiration are peculiar to this complaint. There is only one other affection, viz., paralysis of the abductors, which is liable to be mistaken for it; but the former is rare in children, and is characterized by constant dyspnœa, increased on exertion.

The prognosis is for the most part favourable, but the statements of different authorities on this point vary considerably. The danger increases with the youth of the child, the duration of the attacks, and the appearance of symptoms of eclampsia. Cases due to defective feeding, provided that the system be not too much reduced, admit of favourable prognosis.

The treatment of laryngismus divides itself into the measures to be adopted in order to avert attacks, and those suitable for cutting short or lessening the severity of a paroxysm. In dealing with children belonging to a family in which the complaint has already shown itself, prophylactic measures are all-important. The diet should receive careful attention; it should be nourishing and non-irritating, and the child should be protected from exposure to cold and excitement of all kinds. If there be evidences of scrofula or of rickets,

the treatment suitable for these conditions should be prescribed.

In dealing with individual attacks, the child should be raised and placed in a sitting posture, and brought into a large room with the windows open so that he may have plenty of fresh air; cold water should be dashed on the face, neck, and breast, and ammonia or acetic acid held to the nose. If these remedies are not successful, the child should be placed in a warm bath while cold water is dashed on the face and neck as before. Emetics may be given to excite vomiting, and one of the best of these is apomorphia, injected subcutaneously. An old-fashioned method of producing this result is to tickle the fauces with a feather, and some authorities recommend that the index finger should be introduced into the opening of the larynx, and an attempt made to raise the epiglottis. Should the spasm continue, chloroform may be cautiously administered, and the same remedy is almost always useful whenever there are repeated attacks in quick succession. Sir M. Mackenzie recommends that when the attack is over and the child is able to swallow, the following mixture should be administered:—℞ Moschi, gr. iss; Sacch. Alb., gr. ij; Pulv. Acaciæ, gr. ij; Syrup. Aurantii Flor., ♏xx; Aquam ad ʒj.

In order to prevent recurrences, every endeavour should be made to ascertain the cause of the attacks; if they are due to indigestion or to constipation, an emetic or purgative will be indicated. Calomel or grey powder in combination with rhubarb and soda will be found useful, and the musk mixture should be continued for 24 hours. If the fits usually occur at night, five grains of chloral should be given to the child before putting it to bed, and in most cases of laryngismus it is well to prescribe a short course of the bromide of potassium in doses of gr. v three times a day. If the child is being brought up by hand a wet nurse should, if possible, be obtained; but if this arrangement be impracticable, its diet should consist exclusively of milk and other forms of animal food. Cod-liver oil is useful in most cases, and change of air, with tepid salt-water baths, will do much to prevent recurrences of the attacks. When the latter come on in children who are being weaned, the breast must again be given to them; but if the spasm appear during sucking, attempts must be made to feed the child with a spoon.

CHAPTER III.

ASTHMA.

Asthma, Meaning of Term — Causes—Age, Constitutional Conditions, Weather, and Climate — Idiopathic and Symptomatic Asthma—Bronchial and Nasal Affections—Dust and Emanations of Various Kinds — Abdominal Disorders — Renal Affections—Asthma and Gout—Symptoms of Asthma—Objective Symptoms During an Attack—Pathogeny—Sequelæ—Diagnosis—Prognosis — Treatment during the Paroxysm, Narcotics and Antispasmodics — During the Intervals — Removal of Causes—Inhalation of Oxygen and of Condensed Air—Change of Air—Treatment of Gouty Cases—Purgatives—Alkalies—Iodide of Potassium—Electricity.

The term asthma is apt to be somewhat vaguely applied to express attacks of difficulty of breathing in general, and patients suffering from chronic bronchitis, emphysema, or heart-disease are often regarded as asthmatic. The two disorders, however, bronchitis and asthma, are perfectly distinct, and either may exist without the other. Bronchial asthma, which I am now about to discuss, consists of attacks of difficulty of breathing which depend upon the periodical recurrence of spasmodic contraction of the bronchial muscles. The pneumogastric is the nerve distributed to these structures,

and inasmuch as in cases of essential asthma, anatomical changes which would account for the attacks are not to be discovered, the disorder must, at least for the present, be regarded as a neurosis of the nerve just mentioned.

Nothing of a very definite character can be stated with reference to the causes of asthma; the complaint is more common in the well-to-do than in those differently situated; males are more often affected than females in the proportion of two to one; as age advances the numbers become more nearly equal. The majority of the sufferers are under 40 years of age, and children form a comparatively large contingent; in many cases the first attack occurs during the first decade. Heredity plays a certain part in the causation of asthma, and it is not uncommon to find several members of the family suffering from the complaint or from other forms of nervous disorder. With regard to constitutional conditions, the disorder is said to be more frequent among the subjects of rickets, scrofula, anæmia, and those of a decidedly nervous tendency. Some forms of asthma are affected as regards prevalence by climate and season; cold and damp weather produces bronchial catarrh, which in its turn may lead to a development of a

symptomatic asthma. Change of weather and of locality has a different influence on different asthmatic subjects. Most of them are relieved by a moist air and a residence in low-lying places; but peculiarities of an opposite kind are sometimes noticed. Many asthmatic patients feel decidedly better in London than in country air.

Two forms of the complaint have to be considered, viz., the idiopathic or essential asthma, and that which is symptomatic or of reflex origin. In the former of these no obvious cause can be demonstrated; in the latter there are lesions of organs more or less distant, the irritation resulting from which is propagated to the pneumogastric nerve, with spasm of the bronchial muscles as a result. The existence of such a connection is proved by those cases in which the attacks cease after the cure of the lesions by which they were excited. In rare cases, changes have been found in the nuclei of the vagus itself, and in other parts of the brain and cord, but the significance of such lesions is doubtful. Not a few cases, however, have been reported in which the nerve itself was compressed by various growths, such as enlarged lymphatic glands either in the neck or connected with the bronchi, or by an enlarged thymus

gland. Enlargement of the bronchial glands is a frequent result of measles, scarlet fever, and whooping cough in children, and attacks of asthma are thus liable to be produced in these subjects. Swellings of a like character are somewhat frequent in scrofulous and rachitic cases.

The mucous membrane of the nose or of the naso-pharynx is the spot whence the irritation proceeds in another class of cases, and this condition of morbidly increased irritability may exist either with or without definite changes. In most persons, cough is excited by irritating the terminations of the fifth nerve in the nasal mucous membrane, and there are many curious idiosyncrasies in respect of the irritability of this part. Thus in some persons a severe attack of bronchial asthma is brought on by inhaling powdered ipecacuanha; and in others by the pollen of grasses, oats, and maize. Certain chemical irritants have a similar power in some cases; thus chlorine gas and even perfumes and emanations of various kinds, such as the scents of violet, heliotrope, and peppermint, are sufficient to provoke symptoms of asthma. Emanations from animals are said to produce the same effect in some persons. Such causes would be more likely to prove operative in persons

with a tendency to the disorder, than where such a proclivity was absent.

Attacks of asthma are not uncommon in cases of nasal polypus and other affections of the nose, the nasal nerves being in a condition of abnormal reflex irritability. The attacks subside after removal of the growths; but they sometimes recur with any fresh development. Affections of the inferior turbinate bone are especially liable to lead to these consequences, and chronic rhinitis of an atrophic character has been observed to be attended by symptoms of asthma. With regard to throat affections, a granular condition of the pharynx and even enlarged tonsils have occasioned similar attacks. I have known two cases of asthma in children the subjects of enlarged tonsils; removal of the latter was followed by cessation of the asthmatic attacks. Bronchial asthma often complicates bronchitis; but the disorder must be distinguished from the attacks of dyspnœa, so common in the latter complaint. Similar symptoms are likewise observed in many cases of heart disease.

Disorders of the abdominal organs are potent causes of asthmatic attacks in those predisposed to them. Thus severe paroxysms are often occasioned by overdistension of the stomach whether by food or by the

gaseous products of fermentation, and in some persons such a result is occasioned by the ingestion of certain articles of food even in moderation. Constipation and the presence of worms are other causes of this character. Asthma is sometimes connected with disorders of the uterus and ovaries, and hence attacks are not unfrequent in hysterical and nervous women. In some women, the symptoms come on during pregnancy and cease after delivery. Certain peculiarities are sometimes exhibited by hysterical subjects; thus in the case of a girl aged twenty, with marked hysteria, attacks of asthma are apparently brought on by taking a cup or two of tea.

Symptoms of asthma are sometimes associated with renal disorders; in uræmia, the difficulty of breathing is caused by the excessive amount of urea and other urinary constituents present in the blood. A similar causation, uric acid being the offending material, is seen in cases of gouty asthma. The connection between the bronchial disorder and the gouty diathesis is shown by the fact that the former either subsides or remits on the development of the articular inflammation. It is said that asthma is sometimes associated with eczema; in such cases the two affections have probably a common origin, both being symptoms of the uric acid diathesis.

Lastly, symptoms of asthma are occasionally seen in cases of chronic poisoning by lead and mercury.

Difficulty of breathing constitutes the principal symptom of attacks of bronchial asthma, the expiratory movements being especially affected and the lungs remaining in a condition of acute over-inflation.

Attacks of asthma occur either with or without premonitory symptoms. In the former case, the patient complains of general malaise, a feeling of pressure in the head, an uncontrollable desire to yawn, eructations, vomiting, distension of the abdomen, or chilliness. In other cases there are signs of catarrh of the conjunctiva, and nasal mucous membrane, the bronchial tubes becoming gradually involved. Some patients know that an attack is impending, because they have exposed themselves to influences against which their experience has warned them.

Paroxysms of asthma exhibit many peculiarities, and among these that of being most frequent in the early morning is one of the most marked. The patients are often aroused from their sleep with a feeling of suffocation, which rapidly becomes worse; violent attempts are made to obtain air; many patients get before an open window and expose themselves to a cool draught. At this

stage whistling rhonchi are heard, and are sometimes so loud as to be audible throughout the house. The attack after lasting a variable time, during which the condition of the patient may have been most alarming, gradually subsides. The breathing becomes more free, cough with a muco-purulent expectoration sets in, the respiratory movements are less and less embarrassed, and yawning, eructations, or vomiting are apt to take place. The skin during an attack feels cool to the touch, but the thermometer indicates some rise of temperature. The pulse is small, generally hard and frequent. The attacks vary in duration from a few minutes to several hours, and they may occur daily or even several times a day, or at longer or shorter intervals, which are sometimes regular.

Certain of the symptoms require a more detailed examination, and especially the respiratory acts. The alteration is mainly in the expiration, but the auxiliary muscles for inspiration are also called into play. The action of the expiratory muscles is very marked; the recti abdominis and the transverse muscles are forcibly contracted during expiration. The time occupied by the two acts shows considerable alterations; inspiration is slower than usual, but the expiratory act is very much

prolonged. It may be three times as long as that of inspiration; the number of respirations is, therefore, much reduced, and the pause between the two acts is altogether absent. The distended lung prevents the movements of the heart from being visible.

The position and aspect of the patient are very characteristic. He sits up, supporting himself on his elbows, with his mouth open, his shoulders elevated, and his head thrown back; his countenance betrays intense anxiety. The sterno-mastoid muscles project, like hard cords, from the sides of the neck. Indications of cyanosis soon show themselves; the cervical veins form hard, blue cords, and the eyes appear to be starting from their sockets; sometimes blood escapes beneath the conjunctiva. The face is covered with copious perspiration, and if the attack lasts for any length of time, the countenance becomes livid and pale, and there is more or less insensibility with delirium and muscular twitchings.

The thorax on examination is found to be greatly expanded; the percussion sound all over the chest is loud, deep, and tympanitic. In the lower regions of the thorax, especially behind and at the sides, there is a modification of the tympanitic note, described by Prof.

Biermer, of Zurich, as the *bandbox* note, from its resemblance to the sound given by such a box when struck; it depends upon the increased tension of the alveolar tissue. On further examination the borders of the lungs are found to extend lower, and also further inwards towards the sternum than under normal circumstances, and they are little if at all affected by the respiratory acts. The upper margin of the liver is one or two intercostal spaces lower than natural, and the cardiac dulness is considerably reduced. These changes likewise remain unaffected by respiration, but when the attacks cease the lungs return to their normal positions, unless emphysema has been set up. The diaphragm is considerably depressed and moves but little during respiration. Its position is the result not of tonic spasm of its fibres, but of an increase in the amount of air in the lungs, an excessive inflation, so to speak, and this depends upon the spastic contraction of the bronchi.

On auscultation during an attack the vesicular respiratory murmur is either altogether absent or else concealed by the sibilant or sonorous rhonchi. When the spasm is slight the sibilant rhonchi are almost equally loud in both acts; in more marked spasm they

are louder in expiration, but when the spasm has reached its height they are no longer audible, because the interchange of air has been reduced to a minimum, and the conditions are absent for the production of any respiratory murmur in the finer air-passages. For the most part we hear a short and weak whistle in inspiration, and a longer and stronger in expiration (Biermer). As the attack passes off the sibilant rhonchi gradually cease and give place to mucous râles. While the attack is at its height the patients speak in a hoarse, low voice, and often with great difficulty, so that they prefer to make signs for anything they require. The heart-sounds may be almost inaudible, owing to the manner in which the organ is covered up by the lungs.

Expectoration is for the most part absent during the attack, but at its termination cough is apt to set in, and is accompanied by the expectoration of more or less greyish-white, tenacious and frothy matter, which is sometimes thick, like gelatine. Besides various flakes, threads, and little clots, the expectoration often contains twisted threads, greyish or yellowish in colour, and somewhat regular in form. Their length is from two to three centimetres, and sometimes more, and the largest is about a millimetre wide; they are supposed

to originate in the finest divisions of the bronchial tubes, and to be the results of exudation. Curious octahedral crystals, similar to those met with in the tissues of leukæmic subjects, are sometimes found in the expectoration. Their chemical composition is unknown, but they are not peculiar to asthma; they have been found in cases of bronchial catarrh and phthisis. Oxalate of lime crystals also occur in the expectoration.

Pathogeny. Several explanations have been offered as to the manner in which a paroxysm of bronchial asthma is induced. The important point to be borne in mind is that nervous influences are not only present, but play the most considerable part in causing the attacks. The following would appear the most probable view: the smooth muscular fibres in the middle-sized and smaller bronchi, to which the pneumogastric nerve is distributed, are thrown into a state of tonic contraction; the interchange of air is thus rendered not impossible, for then life would cease, but extremely difficult. The powerful muscles of inspiration are able to overcome the increased resistance, but the expiratory muscles fail in this respect. Their action is hindered by the fact that the pressure in expiration acts not only

from below upwards, but also in two other directions, viz., from the sides towards the middle line and from before backwards. Hence the minuter bronchi, together with the alveoli, are laterally compressed; and inasmuch as both parts are under the same pressure, the escape of air from the one into the other can take place only as the result of pressure exercised from below upwards. The lateral pressure may, however, be so strong that the walls of the finer ramifications of the tubes, in which all traces of cartilage are wanting, are compressed so as to meet, and in such a case the resistance would be more than could be overcome by the abdominal pressure. If the interchange of air were reduced below a certain point, death would, of course, follow; but here the self-regulatory power of the respiratory act comes into play, the accumulation of carbonic acid in the blood acts upon the vagus centres, the spasm of the bronchial muscles is relaxed, and expiratory acts are once more possible.

In addition to the spasm, the fluxionary hyperæmia of the bronchial and alveolar vessels increases the obstacles to the admission of air, and diminishes the extent of surface from which interchange of gases takes place. Such hyperæmia may be inferred to exist from

the fact that in some cases of asthma a watery fluid exudes from the nose and eyes, both which parts are obviously hyperæmic. This condition would still further impede the exchange of air as occurs in capillary bronchitis. It is also highly probable that when the finer air-tubes are much contracted the forcible inspiratory movements exercise an aspirating effect upon the contents of the alveolar vessels, and that thus œdema is set up. Even when the degree of spastic contraction is small, any swelling of the bronchial mucous membrane will suffice to induce the phenomena of asthma.

With regard to the position of the diaphragm, it is due to the over-distension of the lungs, but the suggestion has been made that this muscle is thrown into a state of clonic spasm by reflex action transmitted by the vagus to the phrenic nerve. Such a condition cannot be regarded as that of tetanus; it is much more probable that the muscle is for the time in the condition it occupies during inspiration, as a result, it may be, of irritation, and that during expiratory efforts only very little relaxation occurs. The bronchial spasm must be regarded as the predominating factor; its existence explains the alterations in the respiratory acts, the distension of the lungs, the occurrence of various

kinds of rhonchi, and the position of the diaphragm. It may, however, be admitted that in some cases a certain degree of spasm of this muscle, and likewise of fluxionary hyperæmia, contribute toward the development of the symptoms.

Asthma rarely continues for any length of time without giving rise to organic affections of the lungs and heart. Emphysema is the most common sequela; as a result of the constant distension of the alveoli, their elasticity is lost, and they become permanently dilated. Rupture of their walls is also apt to take place, with the formation of large air-sacs as a result. Chronic catarrh of the tubes is a frequent accompaniment. With regard to the heart, the right ventricle is apt to become hypertrophied and dilated, in consequence of the obstruction during the attacks to the course of the blood through the lungs.

The diagnosis of bronchial asthma is for the most part easily made; there can be no doubt as to the nature of the complaint in typical cases. The sudden and paroxysmal character of the attacks; their most frequent occurrence in the latter half of the night; the expiratory dyspnœa, with the whistling and wheezing sounds that accompany it; the signs of over-distension

of the lung; the catarrhal expectoration at the close of the attack, and the freedom from disorder during the intervals constitute a group of features not met with in any other complaint. Asthmatic attacks may, however, complicate various affections of the heart and lungs, and in some affections of the nervous system attacks of difficulty of breathing are apt to occur.

Dyspnœa frequently complicates bronchitis, but the attacks do not come on suddenly, and are usually referable to a distinct cause, such as an extension of the original disorder. Moreover, in bronchitis the state of the lungs in the intervals is sufficient to determine the nature of the case. The two conditions may, of course, co-exist; either having preceded the other.

Attacks of shortness of breath are common also in emphysema, but they do not come on suddenly and unexpectedly. On the other hand, they are noticed to be an exaggeration of the patient's ordinary condition, they can generally be induced by exertion, and they subside only in an incomplete manner. On examining the chest during the intervals, evidences of changes in the lung-structure will be easily discovered. Asthmatic patients often become emphysematous.

Attacks of dyspnœa are common in patients suffering from diseases of the heart; in these cases they are apt to be provoked by exertion and excitement. There are also the various murmurs and the condition of the patient between the paroxysms, to determine the diagnosis.

Similar attacks occur in croup, and as the result of the presence of foreign bodies in the larynx or trachea, but in all these cases the difficulty of breathing will be connected with the inspiratory acts, and the lungs are incompletely filled. Expiration, on the other hand, in the absence of complications is performed quickly, and with comparative ease, and the chest resumes its normal form.

Spasm of the diaphragm sometimes occurs in hysterical subjects, and the effects closely simulate an attack of asthma. The thorax remains for some seconds in the inspiratory position; the inspirations are short and spasmodic, like the movements in hiccough; the epigastrium projects; the heart is drawn downwards, and towards the median line, and the patient complains of pain in the region of the diaphragm.

Another condition, simulating asthma, likewise occurs in hysterical subjects, viz., paralysis of the posterior

crico-arytenoid muscles. The difficulty is, however, connected with inspiration, the current of air causing the vocal cords to approximate, thus preventing its ingress. The dyspnœa in such cases is continuous rather than paroxysmal. It is possible that attacks of nightmare may be mistaken for asthma when the dyspnœa occurs only during sleep, and the physician has no opportunity of noticing the course of the symptoms, but has to depend upon the statements of the patient. When due to asthma, the dyspnœa increases after the patient wakes, whereas it soon ceases when consciousness is restored in cases of nightmare.

The *prognosis* of asthma in general is much more favourable than might be supposed from the severity of the symptoms. Death very rarely occurs during a paroxysm; for when the excess of carbonic acid in the blood reaches a certain degree, the spasm of the bronchial muscles gives place to a condition of paralysis. With regard to the cure of the complaint, this depends upon the condition to which the symptom is due; if removable, the attacks may be expected to cease. Age is a consideration in the prognosis; the younger the patient the greater the probability of recovery. In not a few cases the complaint continues throughout life, the

results depending in great measure upon the circumstances and habits of the patient. With the development of complications the prognosis becomes more and more unfavourable.

The *treatment* of asthma divides itself into a consideration of the measures to be adopted during a paroxysm, and of those which should be taken during the intervals in order to prevent recurrences. When a paroxysm is impending the patient's clothes should be freely loosened about the neck and chest, and cool, pure air admitted into the room. As a matter of course, all objects, the presence of which is likely to induce an attack, should be at once removed. Some patients find by experience that a cup of strong coffee, a cigar, or a few pieces of ice will afford much relief. In one case recorded by Trousseau benefit was obtained by lighting up the room with several lamps.

With regard to medicines, certain of the narcotics yield very satisfactory results, and the most potent of them is chloral, which should be given in full doses, say 30 grains at once, or in half this quantity, to be repeated in half-an-hour. These large doses are much more efficacious than small ones. Instead of chloral we may have recourse to hypodermic injections of mor-

phine, gr. $\frac{1}{3}$-$\frac{1}{2}$, or the same drug may be given internally. Other narcotics have also been found efficacious —among them belladonna, cannabis indica, lobelia, and cocaine. Atropine is said to paralyze the constrictor fibres of the vagus which supply the bronchial muscles. Good results have been obtained from cocaine injected subcutaneously.

Anti-spasmodics may likewise be administered by inhalation, but they are seldom so efficacious as chloral. Chloroform, amyl nitrite, sulphuric æther, ammonia, hydriodic æther, and oil of turpentine, are used for inhalation purposes; and other remedies similarly employed are arsenical cigarettes, the fumes of nitrate of potassium, stramonium cigars, the vapour of camphor, etc. Some patients are benefited by cigars composed of belladonna, stramonium, henbane, and opium, and by others to which nitre is added. The alcoholic extract of grindelia robusta is likewise used in a similar manner, and it is sometimes given internally; half-a-teaspoonful of the fluid extract is stated to have afforded almost instantaneous relief in several cases of asthma occurring in old persons. Whenever there are indications of a distended stomach in connection with the attack, an emetic should, of course, be administered; sulphate of

zinc or mustard will answer this purpose, but the subcutaneous injection of apomorphine gr. $\frac{1}{6}$ will prove more efficacious.

In order to fulfil the second indication, viz., to prevent recurrences, a careful inquiry should be made into any possible causes of the complaint; and should such be discovered, whether in the abdomen or elsewhere, they should be properly dealt with. The nose especially should be carefully examined, and if there be any growth on the inferior turbinate bones, surgical treatment will probably cure the bronchial complaint. Dr. Woakes, in his work on "Nasal Polypus," has clearly explained the pathogeny of nasal asthma, and has cited several cases in which the attacks were obviously dependent on the presence of polypi and hypertrophy of the tissues covering the inferior and middle turbinate bones. He recommends the galvano-cautery and chromic acid. When bronchial catarrh is present this will require appropriate remedies, to which may be added the inhalation of condensed air. For some cases of this kind the inhalation of oxygen has been found serviceable. I have made trial of this remedy in several cases of asthma, and have had every reason to be satisfied with the results. An inhaler suitable for

the administration of nitrous oxide answers the purpose very well; it should be used about an hour-and-a-half after a meal, and either in the morning or afternoon. Oxygen-water, as prepared by Messrs. Brin, is also serviceable in asthma. In using condensed air the patient is either placed in a pneumatic cabinet or a portable apparatus is used, by which the lungs alone are acted upon. It has been recommended that the patient should inspire compressed and expire into rarefied air, and apparatus have been constructed for fulfilling these purposes.

Change of air often proves most efficacious for asthmatic subjects. Dr. Hyde Salter remarks that residence in one locality will often radically and permanently cure asthma resisting all treatment in another locality. The localities most beneficial for the great majority of cases are large, populous, and smoky cities, the effect depending probably on the air. It is curious that the air which would be imagined to be the worst for the general health should be the best for asthma, though this is not always the case. When the patient's means are sufficient, a change of residence from time to time is often beneficial; thus, during the summer, the seaside or any good country place may be chosen; in

the winter the south of France or the Italian coast, Madeira, or Egypt may prove suitable. The condition of the bronchial tubes during the intervals will serve in some measure as a guide in selecting the locality. Exercise in the open air, and warm, tepid, or cold baths are all likely to be serviceable according to circumstances.

For asthma occurring in gouty and dyspeptic subjects the regulation of the diet and mode of living is all-important. The meals must be small, and the food easily digestible. The patient should dine at two o'clock, and should take nothing but a light supper afterwards; breakfast should be the chief meal, when meat, eggs, and cocoa may be taken in moderation. Stimulants should generally be avoided, save with meals; a little good brandy or whisky, well-diluted, may then be allowed. Distension of the stomach is likely to prove very mischievous, and should be carefully guarded against. For plethoric subjects of this kind a course of treatment at Carlsbad, Marienbad, Kissingen, or Homburg is likely to be serviceable. In all cases constipation must be prevented by laxatives or purgatives.

Whenever decided periodicity is a feature of the attacks quinine should be given in full doses. For

anæmic subjects iron is, of course, indicated; and whenever there are indications of nervous depression or irritability we may try the bromides, oxide of silver, or arsenic. This last is sometimes very efficacious, and is always worthy of a trial.

In some forms of asthma, notably those for which no special cause can be discovered, iodide of potassium sometimes proves very useful; it should be given in doses of gr. v-x three times a day, and continued for several weeks. A few drops of tincture of belladonna with each dose would not interfere with its efficacy, and would obviate the production of disagreeable symptoms. It has also been recommended that the tincture of iodine should be applied to the sides of the neck.

Electricity has, of course, been tried in cases of asthma, and the poles are recommended to be applied in various positions. Thus they can be placed one on each side of the thyroid cartilage, or the positive pole applied to the neck, while the negative is placed between the larynx and the sterno-mastoid muscle. The faradic current has also been used, the electrodes being placed one on each side, either below the angle of the jaw or on a line with the thyroid cartilage.

CHAPTER IV.

HAY-ASTHMA—HAY-FEVER.

HAY-ASTHMA, QUESTIONS AS TO ITS NATURE—GENERAL DESCRIPTION—FIRST RECOGNIZED BY DR. BOSTOCK—CAUSES, PREDISPOSING AND EXCITING—THE POLLEN OF GRASSES, AND OF VARIOUS CEREALS—DR. BLACKLEY'S EXPERIMENTS—SYMPTOMS—AFFECTIONS OF THE NOSE, EYES, AND THROAT—COUGH AND DIFFICULTY OF BREATHING—APPEARANCES OF THE AFFECTED PARTS—DIAGNOSIS—TREATMENT, PROPHYLACTIC AND CURATIVE.

IT is doubtful whether, in the present state of our knowledge, hay-asthma can fairly be classified among functional disorders. It is, however, very closely allied to them; and although the theory of its origination from pollen has been placed on a very sure footing, it is by no means certain that the symptoms cannot be excited by other causes.

The complaint, variously termed hay-asthma, hay-fever, summer catarrh, and June cold, is a catarrhal affection implicating the conjunctivæ, mucous membrane of the nose and of the entire respiratory tract; appearing in the early summer or autumn and attacking predisposed persons in the same manner and at the same

time every year. Its symptoms resemble those of influenza; the implicated mucous membranes being red, swollen, and covered with increased secretion; sneezing, fever, cough, and attacks similar to those of asthma make up the clinical features of the disorder.

It is interesting to find that an English physician, Dr. Bostock, was the first to recognize and describe this complaint. He read a paper on a "Case of a Periodical Affection of the Eyes and Chest" before the Medico-Chirurgical Society in 1819, the description given being that of his own case. Some years afterwards, he had collected nearly 30 additional instances, and he advanced the theory that heat was the real cause of the complaint, in opposition to the popular idea which attributed it to emanations from hay and flowers. Since the period specified the number of reported cases has enormously increased. It may be that the disorder is more common now than it was in former times, in which case, its increased frequency is analogous to that of many nervous disorders: possibly, however, increased accuracy of diagnosis may account for the difference in the number of cases. The disorder was not clearly recognized in Germany till 1859.

With regard to the causes of hay-asthma, there is still much diversity of opinion. Ordinary heat and exposure to the sun's rays, artificially heated air, as that of greenhouses, and the pollen of certain grasses have been credited with the causation of the complaint. Before examining the evidence in favour of the claims of any of these, it will be well to notice the persons who are especially prone to be attacked. Statistics show that hay-asthma is more prevalent among males than females; that the majority of the patients are under 40 years of age, and that those whose pursuits involve mental toil are very much more susceptible than labourers of all kinds. A predisposition to attacks is often transmitted from one generation to another; a nervous temperament is said to characterize the majority of the patients. Some authorities state that decided swelling of the nasal mucous membrane, especially of that covering the inferior turbinate bones, is an antecedent condition in many cases of hay-asthma.

It is with regard to the exciting causes of the complaint that many different views have been and still are held. Dr. Bostock considered that excessive heat was the chief cause; but it would appear that something else is necessary. Dryness of the atmosphere is one

requisite; moreover, in damp and cloudy weather the sufferers always feel relieved. The dust of hay has long been supposed to contain the exciting causes of the affection; patients are attacked when the grass becomes quite ripe, and when haymaking is going on the cause becomes still more active. If persons, predisposed to attack, leave the country district, where they have suffered for many years previously, and spend the summer in a large city or by the seaside, they remain free from the symptoms. The pollen of the grasses contained in hay would appear to be the agents whereby the attacks are excited; and a similar power is possessed by wheat, oats, and rye in bloom, and the pollen of many sweet-scented flowers. Emanations from animals are said to produce a similar effect on some persons. The pollen of ragweed (Ambrosia artemisiæfolia) is a potent cause of the autumnal variety of the complaint frequently seen in the United States.

Dr. Blackley, of Manchester, has performed a great many experiments which show that the symptoms may be induced in certain individuals by applying a small quantity of the pollen of various plants to the mucous membrane of the nostrils. He also detected pollen grains in the air, and determined their amount at different

altitudes, by attaching to kites glass slides covered with a mixture of water, proof spirit, and glycerine. Fully 95 per cent. of the pollen belonged to the Graminaceæ, and it appeared that the rise and progress of the complaint corresponded with the amount of pollen present in the atmosphere. The chain of evidence connecting hay-asthma with pollen would, therefore, seem to be complete; but some other observers still believe that the complaint may be produced in another way, having noticed that strong light or sunshine falling on the face will produce a paroxysm of sneezing and that the other symptoms then follow in quick succession.

Symptoms. In many cases of hay-asthma the effects rapidly follow the operation of the cause. The first symptoms are often noticed soon after a walk through a hay-field; but sometimes there are premonitory symptoms, such as a feeling of malaise, loss of appetite and feverishness, and these may last for a few hours or even a day or two. The symptoms of the attack closely resemble those of coryza; there is a feeling of heat and irritation in the nose, frequent sneezing, increased secretion from the nasal mucous membrane, and obstruction of the passages; swelling of the membrane covering

the inferior turbinate bones can often be discovered; taste and smell are generally much impaired. The conjunctivæ are likewise affected; there is a sensation as if the eyes were full of dust, the lachrymal secretion is increased; there is intolerance of light, hyperæmia, and perhaps œdema of the lids. The mucous membrane of the throat often participates; it seems to be hot, dry, and rough, and there is much uneasiness or even difficulty in swallowing; in some cases the throat-affection is the first to appear. These symptoms may constitute the whole of the complaint; but in many cases laryngeal and bronchial catarrh is superadded, and sometimes there is a considerable amount of fever, pain in the forehead or back of the head, or a feeling of pressure and lowness of spirits. Itching of the skin is very common, the face, back, and chest being mainly affected; an eczematous eruption is sometimes present. Some patients are conscious of a feeling of cold in the nose, and especially at the tip of the organ, which is likewise cool to the touch. The symptoms occasionally pass off after a few hours or in a day or two, but more frequently they continue for several weeks. Relapses are common, especially if the patient remain in the neighbourhood of hay-fields.

Symptoms resembling asthma are frequently superadded, but they are not present in all cases; they seem to result from extension of the laryngeal catarrh. There is at first a frequent and dry cough, associated with a sensation of tickling in the larynx, and the expectoration of a little transparent mucus. The severity of these symptoms is much influenced by the state of the atmosphere; they are aggravated during hot and dry weather and considerably relieved after a rainfall. The cough is often spasmodic in character; the attacks occurring in paroxysms of considerable duration and causing much distress to the patient. It is stated that small crystals, resembling those found in ordinary asthma, have been discovered in the expectoration.

The nasal secretion, which is often very copious, contains vibriones and the pollen of grasses, either unchanged or swollen and flattened; the granules sometimes exhibit spontaneous movements, and occasionally form small chains.

With regard to the appearance of the affected parts, the mucous membrane of the nose, throat, and larynx is much swollen, hyperæmic, and covered with secretion. Recovery from the attacks is, of course, the general rule; it is scarcely possible that death should

ever be caused by them, except in the subjects of severe organic disease. Immunity from attacks is scarcely if ever attainable by those who have already suffered unless the patient takes up his abode in a large city.

The diagnosis of the complaint can seldom be a matter of difficulty; the local symptoms in the nostrils, eyes, and throat, and the attacks of sneezing, and of difficulty of breathing, are sufficient to indicate the nature of the case.

Treatment. The only way to avoid attacks is to remove to a locality, *e.g.*, a large town or seaside place, in which the complaint is unknown. The patient must, of course, leave the country before the hay season commences, and remain till harvest is gathered in. For persons who are obliged to stay in the country, Dr. Blackley recommends the use of a respirator moistened with a weak solution of carbolic acid, and at the same time the wearing of spectacles provided with closely-fitting gauze guards. Something may be done to diminish susceptibility to attacks by prescribing hygienic measures of various kinds, such as cold baths, liberal diet, with tonics and stimulants. When a patient has been exposed to the causes of attacks the nose should be syringed out with weak solutions of quinine

or carbolic or salicylic acid, and the same remedies may be freely used during the continuance of the nasal catarrh. For the same purpose a powder has been recommended consisting of calomel and alum, of each 9 parts, hydrochlorate of morphine, 1 part; about a grain to be used three times daily as a snuff. Such remedies as arsenic, strychnine, camphor, and bromide of potassium are recommended for lessening the severity of the attacks, and small doses of morphine will usually aid in relieving the patient's distress. For the same purpose Sir A. Clark recommends the local application of cocaine (a 5 to 15 per cent. solution) to the mucous membrane of the nose and back of the pharyux, on a camel-hair brush. A weaker solution may also be used by means of a spray-apparatus. In cases in which the mucous membrane of the inferior turbinate bones is congested and hypertrophied it has been advised to remove the diseased tissue with the galvanic cautery, or by the application of glacial acetic acid.

SECTION IV.

FUNCTIONAL DISORDERS OF THE ORGANS OF DIGESTION.

INTRODUCTORY CHAPTER.

VARIETIES OF FUNCTIONAL DISORDERS NOW TO BE DISCUSSED—AFFECTIONS OF THE STOMACH, INTESTINES, AND LIVER—THEIR PECULIARITIES AND CAUSES—ERRORS IN DIET—EXCESS OF NITROGENOUS FOOD—KIDNEY AFFECTIONS AS A SECONDARY RESULT—DEFICIENT SUPPLY OF NITROGENOUS MATERIALS—BREAD AS A FOOD—INFLUENCE OF THE TANNIN OF TEA ON SALIVARY DIGESTION—EFFECTS OF IMPROPER FOOD—PECULIARITIES IN CERTAIN INDIVIDUALS—EFFECTS OF NERVOUS EXHAUSTION—SPASM OF THE STOMACH AND INTESTINES—SPASM OF THE ŒSOPHAGUS—PERVERSION OF GASTRIC AND INTESTINAL SECRETION—EFFECTS OF NERVOUS INFLUENCE—HEPATIC AND PANCREATIC SECRETION—EFFECTS OF NERVOUS INFLUENCE ON INTESTINAL MOVEMENTS—EFFECTS OF ALTERATIONS IN THE BLOOD SUPPLY—ENUMERATION OF THE SYMPTOMS OF FUNCTIONAL DISORDERS OF THE STOMACH AND INTESTINES.

FUNCTIONAL disorders of the organs of digestion offer a wide field for study. Those in which the stomach, intestines, and liver are respectively implicated form a large and important category, and will be considered in this section. In connection with the intestinal tract we meet with disorders of sensation, motion, and secre-

tion; functional affections of the liver are evidenced by perverted sensations, secretions, and metabolic processes. Disorder of sensation is exhibited in such complaints as gastralgia, enteralgia, and hepatalgia; disorders of motion in colic, constipation, and diarrhœa; while disorder of gastric and biliary secretion is shown in many forms of dyspepsia, which are also often accompanied by pain and disorder of movement in various parts of the intestinal tract. These functional affections differ in one important respect from those already considered, for they are often traceable to distinct causes, *e.g.*, in the case of the stomach, to the ingestion of food improper in quality, or excessive in amount. Another marked peculiarity consists in the fact that the occurrence of one condition is often quickly followed by another; thus indigestion is frequently associated with gastralgia, and both with constipation or diarrhœa, of which the indigestion is the primary cause. Disturbance of one function is speedily followed by disorder of another, so close is the mutual interdependence of the various organs and processes of which they are the seats.

The causes and symptoms of the functional disorders of the alimentary tract will be minutely discussed in

succeeding chapters; but it seems advisable to make a few general remarks on these subjects before entering into particulars. With regard to causation, the influence of errors in diet is daily becoming more and more obvious, and nothing is more certain than that the majority of functional disorders of the stomach, liver, and intestines belong to the class of preventable diseases. If we take as an example any one of the forms of indigestion we shall almost invariably find that it is traceable to errors in diet, and that it can be relieved or cured only by dealing with its cause. The same holds good of those secondary results of such errors which constantly obtrude themselves in the form of hepatic derangements, gouty symptoms, urinary deposits, and the like.

Among the well-to-do classes dyspepsia is by far the most common complaint, and its causes are seldom far to seek; excess of nitrogenous food is the most potent of these. As direct consequences of such excess, the organs engaged in preparing and assimilating food in order that it may serve to nourish the body, become over-worked and eventually break down. Moreover, when too much nitrogenous food is taken some of it is eliminated without having undergone the necessary

changes, and acts injuriously upon the excretory organs, and especially upon the kidneys and skin. Albumin not unfrequently appears in the urine after habits of indulgence in excess of albuminous food; some portion of the excess is, doubtless, got rid of by this channel, but at the risk of setting up destructive changes in the kidneys. In my work on Gout I have endeavoured to show that defective assimilation may ultimately result in irritation and chronic inflammation of the kidney, and may, therefore, be regarded as one cause of Bright's disease. Cutaneous affections, notably eczema and acne, are additional consequences of malassimilation, and the general health of the patient sooner or later suffers, as shown by the occurrence of such symptoms as lassitude, incapacity for exertion, disturbed sleep, headache, and impairment of the mental faculties. If, as is often the case, a deficient amount of exercise be taken at the same time, the symptoms are more marked and more rapid in their onset.

A deficient supply of nitrogenous materials is a far less common source of gastric and general disorder; but severe suffering is occasionally traceable to this cause. Some patients, poor women especially, live mainly on bread and tea, and meat in any shape forms

a very small part of their diet. Life can, of course, be supported on good wheaten bread, which (always provided that whole meal be used for its manufacture) contains all the elements necessary for nutrition, though not in the proper proportions, for to obtain the 300 grains of nitrogen required daily by the system, it would be necessary to eat at least three pounds of bread. This would involve the ingestion of nearly double the quantity of carbon required, and the bulk of the food would give rise to much inconvenience. In the patients referred to the amount of bread taken is much less than this, and as such persons almost invariably choose white bread, the quantity of nitrogen is altogether insufficient for the wants of the economy. There is, however, another drawback connected with the diet referred to, viz., that tea is a powerful retarder of salivary digestion, and it owes this property to the large proportion of tannin that it contains. Hence, a diet composed of tea and bread is a fertile cause of dyspepsia and gastralgia, for much of the starchy matter remains for some time in the stomach, and passes out of it in an undigested condition. Peptic digestion is retarded by malt liquors as well as by tea and coffee.

The effects of improper food may be described in a few words. In this category are included substances, either naturally indigestible, or imperfectly prepared. Disorder of the digestive organs is often traceable to this cause. It is only necessary to mention unripe fruits, the rinds and seeds of fruits, and the stalks of leaves; very few uncooked vegetables are thoroughly digested. The symptoms which matters of this kind induce are of common occurrence, and are generally recognized. Eating unripe fruit, or even ripe fruit in excess, is apt to be followed by colic and diarrhœa, and some persons are very susceptible in this respect. There are also many curious idiosyncrasies in reference to the effects of articles of food, some of which, harmless to most people, act as poisons upon a few individuals. Thus we find that some persons cannot eat eggs in any form without very severe suffering; others, again, are affected by shell-fish; intense gastric irritation, conjunctivitis, or severe urticaria being the invariable penalties. The effect of cold drinks in retarding digestion has long been recognized, but the warnings of experience are apt to be neglected. Iced drinks, taken with or soon after meals, are powerful causes of indigestion.

In order that the food should be thoroughly mixed with the secretions of the stomach, and converted into chyme, the movements of the organ must be perfectly carried on, and in various disordered conditions these movements are either exaggerated or impaired, or associated with various kinds of painful sensations. Among the causes which impair the activity of the movements, may be mentioned nervous exhaustion in general, and especially when due to excessive mental strain. Very decided symptoms, referable to gastric paralysis, are not unfrequentiy seen in persons who after a heavy meal, perhaps towards the close of the day, at once occupy themselves with severe mental work. The nervous energy necessary for digestion is diverted into other channels, and the processes in the stomach come to a standstill, or are very imperfectly performed. The same result sometimes follows violent and protracted bodily exercise taken under similar circumstances.

In another class of cases the disorder takes the form of spasm, and this is often set up by the presence of articles of food; the spasm is paroxysmal, and always accompanied by severe pain. It must not be forgotten that symptoms of a like character are sometimes con-

nected with spinal disorders, and notably with locomotor ataxy. When the intestines are affected the condition is known as colic; it may be due to articles of food, to lesions of the intestines, to lead poisoning, or to strangulated hernia. The last-named cause should never be forgotten in all cases of abdominal pain, and especially in women, in whom a small femoral hernia may easily escape observation, and, though the cause of severe pain, perhaps in the umbilicus or upper part of the abdomen, may itself be almost painless.

In connection with the subject of spasm of the stomach and intestines, it is worth while to refer briefly to a similar condition of the œsophagus. This is of rare occurrence, but it may easily be mistaken for gastric disorder, and for organic stricture of the œsophagus itself. The contraction takes place at or near the pharyngeal end of the tube; there is a sore spot or downright stoppage with return of food: in some cases swallowing is painful and performed irregularly. When spasm exists the regurgitation is almost immediate; the food is flung back and not retained for 40 or 50 seconds, as occurs in organic stricture of the œsophagus, and liquids generally are more resented than

solids. The history also presents certain characteristics; there is generally dyspepsia of a gouty character; the urine is abnormally acid, and the stomach and intestines are liable to tympanitic distension. Dr. Brinton, who has described several of these cases (*Lancet*, Vol. i., 1866) explains them as follows: the muscular contractions of the intestinal tube are influenced by irritations extrinsic to itself. Acidity causes spasm of the muscular walls, and the end of the pharynx is especially liable to be affected, because the voluntary part of swallowing is there translated into an involuntary act.

Perversion of secretion is another and very important factor in the production of functional disorders of the alimentary tract; and when we reflect upon the number and variety of the secretions poured into the intestinal canal, the uses for which they are adapted, and the innumerable kinds of food which are subjected to their action, we cannot but marvel at the comparative infrequency of signs of irregular action. Secretion is well known to be under the influence of the nervous system; the salivary secretion is the most prominent instance of this character, and we may easily believe that the gastric, intestinal, and hepatic secretions are

similarly influenced. We know that the state of the tongue and throat is often affected by nervous excitement; that swallowing is sometimes impossible, even in the absence of organic disease, and there is every reason to suppose that the stomach may be subject to influences of this character. There is no nerve passing to the stomach, whose stimulation causes a secretion of gastric juice, as the chorda tympani does in the submaxillary gland; but certain experiments point to the existence of local secretory centres in the stomach, and there is evidence to show that there is some connection between the central nervous system and the gastric glands. In a case of gastric fistula it was found that even the sight or smell of food caused secretion (Landois). With regard to the effect of nervous influence upon the secretion of bile, very little appears to be known, and the results of experiments are contradictory. It has, however, been proved that dilatation of the abdominal vessels, such as follows section of the splanchnics or of the spinal cord, is followed by an increased flow of bile, while irritation of the cord has opposite effects on the vessels and secretion respectively.

Still less is known as to the effect of nervous influence upon the pancreatic secretion. The latter is

excited by direct stimulation of the gland itself, and by irritating portions of the medulla oblongata; while it is lessened or suppressed by stimulation of the central extremity of the vagus, and by irritating other sensory nerves, as the crural and sciatic. How far the nervous system is concerned in connection with intestinal secretion is a matter of complete uncertainty. On the other hand the influence of nerves on the intestinal movements is very considerable, and has, to some extent at least, been ascertained. The intestinal canal contains an automatic motor centre within its walls, between the longitudinal and circular muscular fibres. When this plexus is unaffected by any stimulus the movements of the intestines cease; when food passes from the stomach into the bowels peristaltic contractions of a reflex nature at once begin. The effect of the food is heightened by the condition of the blood-vessels; when these latter are turgid with blood the irritability of the nervo-muscular apparatus is considerably increased, so that slight stimuli produce a comparatively strong effect. Venous congestion causes increased peristalsis; and the active movements of the intestines, which often occur as the result of mental excitement, are due to derangements of the circulation.

The continuous application of strong stimuli causes complete paralysis of the intestine, as is seen in acute peritonitis and enteritis.

The movements of the small intestines are increased by stimulating the vagus; the splanchnic, on the other hand, is an inhibitory nerve, at least to some extent, but when the blood in the capillaries becomes venous, stimulation of this nerve increases the movements. The splanchnics are the vaso-motor nerves of the abdominal viscera; when they are irritated all the intestinal vessels, which contain muscular fibres in their walls, contract; when they are divided the vessels dilate, and anæmia consequently results in the other parts of the body. The splanchnic is also the sensory nerve of the intestine, and as such, under certain circumstances, it may give rise to extremely painful sensations.

The effects of alterations in the blood-supply have been incidentally alluded to in preceding paragraphs; but changes in the quality of the blood also play a certain part in the causation of disorders of the abdominal organs. Blood in which some of the normal constituents are defective will not yield proper secretions, and thus the food will be liable to be imperfectly acted

upon. In this way a vicious circle readily becomes established, inasmuch as the secretions themselves are dependent on the pabulum which the blood receives through the instrumentality of the assimilating organs. In like manner, when the blood is overloaded with impurities, the secretions derived from it cannot fail to be abnormal in many respects.

With regard to the symptoms of functional disorders of the stomach and intestines, these will be fully described and their significance pointed out in succeeding chapters. They may be briefly recapitulated and summarized as those which are referable to the affected organ, and those which make themselves felt in other parts. In the former category will be included such symptoms as derangements of appetite, perverted sensations, flatulence and eructation, nausea and vomiting, constipation and diarrhœa. A numerous category of symptoms are connected with other organs. The kidneys have been already alluded to. They are often the first to suffer, and cutaneous affections are frequently superadded. The action of the heart is generally interfered with; palpitation and intermittency are common symptoms of dyspepsia. Even the lungs occasionally become affected; dyspnœa and attacks of asthma are

sometimes traceable to the state of the stomach. The nervous system especially suffers in another class of cases, the symptoms exhibited being more marked in this portion of the organism than in the abdominal viscera themselves. Headache, vertigo, depression of spirits, irritability, incapacity for mental exertion, sleeplessness, hypochondriasis, and many forms of neuralgia often owe their origin to functional disorders of the stomach, liver, or intestines. Nutrition also is affected in not a few of these cases, the patients becoming thin, anæmic, and debilitated, and these symptoms are sometimes so prominent as to give rise to the suspicion of serious organic disease. It only remains to add that patients who have long suffered from the effects of these functional disorders are especially prone to fall victims to attacks of infectious diseases. Tuberculosis, for example, is often preceded by indications of gastric and intestinal disorder. No reference has been made to the symptoms of hepatic functional disorders; they are of an important character, and require to be discussed in a separate chapter.

CHAPTER II.

DYSPEPSIA—INDIGESTION.

Functions of Stomach and Intestines—Mechanical Actions and Chemical Changes Therein—Meaning of Term Dyspepsia—Relations with Catarrh—The Vascular Apparatus of the Stomach—Strong and Weak Digestions—Causes of Dyspepsia—Faults Connected with the Diet—Use of Fluids, Alcohol, Tobacco—Positions of the Body, Exertion after Meals, Nervous Excitement, Disorders of Stomach—Anatomical Changes in Catarrh—Symptoms of Acute Dyspepsia—Chronic Forms—Influence on the Mental Condition—Results of Repeated Attacks—Matters Ejected from the Stomach—Formation of Organic Acids—Increase of Salivary Secretion—Pyrosis—Constipation—Diarrhœa—The Urine and Skin—General Condition of the Patient—Cardiac Symptoms—Vertigo — Course and Duration — Diagnosis — Prognosis—Treatment of Acute Attacks—Rest—An Emetic—Alkalies—Laxatives—Treatment of Chronic Forms—Attention to Diet—The State of the Teeth—Articles of Diet Suitable—Fluids—Milk Diet—Treatment of Constipation, Laxatives Suitable—Aloes, Cascara, Salines—Stronger Purgatives—Hygienic Measures as Change of Air, Exercise, Baths—Medicines such as Acids, Alkalies, Bismuth, and Charcoal—Treatment of Irritative Dyspepsia—Arsenic, Ipecacuanha—Question of Health-Resorts.

The stomach and the intestinal canal have a double task to perform. They have to act mechanically upon the materials which are introduced into them, and they

are the seat of not a few chemical processes, set up by the secretions of glands which form an important part of their structure, or whose excretory ducts open into their cavities. The chemical changes are intimately connected with the mechanical action of the parts concerned, for they are altered in various ways when the food introduced into any portion of the digestive canal is detained for too long or for too short a time. Pathological disorder of the movements of the intestines is, therefore, generally associated with disorder of digestion, and when the chemical processes are at fault the imperfectly-prepared materials influence the mechanical action of the viscera.

As a general rule, functional alterations involve a large portion of the digestive tube; they remain confined to one spot only when the irritation is comparatively slight. Disorders of the stomach and bowels are, therefore, frequently associated; it rarely happens that the one is affected without the other being more or less implicated.

The term *dyspepsia* is used to describe functional disorders in which the stomach is principally involved, and is contrasted with those changes designated by the word *catarrh* which are of an inflammatory nature, and

affect the surface, or at least the mucous membrane, principally. No such sharp line of demarcation can, however, be drawn between the two conditions, for experience teaches us that the difference is only one of degree, and that many of the transitional stages are not to be separated from each other. Long-continued indigestion invariably leads to catarrh, just as the latter, sooner or later, involves the former.

The relations between these two processes may be easily traced. If undigested materials remain in the stomach, they undergo fermentative and putrefactive changes, with, as a result, the formation of substances, *e.g.*, butyric and acetic acids, which are especially qualified to provoke inflammation. A similar result may follow the operation of a very different cause. When the stomach contains food, mental excitement may check the secretion of gastric juice and the movements of the organ, and may thus produce catarrh. This, however, is a less common cause. Individual peculiarities, dependent upon a variety of circumstances, tend to increase or lessen the susceptibility of the gastric mucous membrane. The epithelium of the stomach and intestines and the number and activity of the glands vary in different subjects, as we find to

be the case with corresponding portions of the cutaneous integument.

As contributing to the production of functional disorder, we must not forget to mention the irritability of the vascular apparatus of the stomach, and the manner in which it responds to the influence of the nervous system. Other elements in the calculation are the power of resistance possessed by the cellular structures and the tissues which they compose; and, lastly, the quantity and condition of the muscular coat of the stomach and intestines. It is only by assuming the existence of differences in the powers of these parts that we are able to explain how it is that one individual can, without apparent difficulty, eat and digest substances which would upset another person for hours or days. The terms "weak" and "strong" applied to stomachs may not be very scientific, but they serve to express differences which undoubtedly exist. It is easy to explain the frequent association of disorders of the stomach with those of the intestines. When any irritating ingesta are not rejected by the stomach they pass into the intestine, where they excite increased peristaltic action, and possibly diarrhœa. If, however, they remain in

the intestine, and are not rendered innocuous by the various secretions which there become blended with them, they will at all events cause irritation, and possibly inflammation of the bowels.

Irregularities and disorders of digestion are due to a great variety of causes, some of them being connected with the mechanical movements of the parts, and others with the necessary chemical processes. It is important to bear both factors in mind when treating a case of indigestion.

The causes of indigestion may be grouped under the following heads :—

1. Food of an unsuitable character and imperfectly prepared.—The object of the cook's art is to render food pleasant to the palate and fit for digestion. If the first object be accomplished the second is apt to be regarded as comparatively immaterial. If the palate be pleased, and fashionable tastes be gratified, other considerations are neglected. It must be admitted that some amount of improvement has taken place of late years in England; we have learnt that a reduction in the quantity of nitrogenous food is not only practicable, but very beneficial in a large majority of cases. There is, however, much still that is faulty; too much

authority is still left to the palate, with little consideration for the powers of the stomach.

2. Improper intervals between meals.—Two faults may be included in this category, the one being much more common than the other. Indigestion is sometimes caused by eating too frequently; the stomach is never allowed to be at rest; but a far more frequent source of mischief is the long interval that busy men especially are apt to allow between meals. This is certainly the case with reference to the modern dinner and the hour at which it is taken. Many a man works hard all day, takes little, if anything, at luncheon, and does not sit down to dinner till eight or half-past eight. His nervous system is too much exhausted to be able to supply the force requisite for digestion.

3. Insufficient division and preparation of the food while in the mouth.—This is a very common cause of indigestion; persons whose thoughts are fully occupied, either with work or play, are apt to think that the time spent in eating is wasted, and meals are got through as quickly as possible. It is true that common propriety necessitates the use of a knife, but this implement is employed as seldom as possible, the teeth do little or nothing, and the aid of saliva is almost refused: the

food is swallowed, but not eaten. Immoderate eaters often sin against themselves in the manner just described; some of them, indeed, never seem to use the muscles of mastication. Persons with defective teeth unwittingly offend in a similar manner. There is another source of mischief connected with bolting the food; it is apt to reach the stomach while still at a very high temperature, and to disorder the secretory action of the glands by the irritation it creates.

4. The drinking of a large quantity of fluid at a low temperature is a potent cause of indigestion. Too much stress cannot be laid upon this fact; persons are far too apt, especially during hot weather, to take immoderate quantities of iced fluids during meals. The symptoms, in some cases, quickly follow their cause; the cold applied to the lining membrane of the stomach converts its hyperæmic state to one of anæmia, and cannot fail to disorder the muscular movements of the organ. It is true that the feeling of exhaustion, and likewise of hunger, is allayed by the cold fluid, but the stomach has to pay the penalty.

5. The use of strong alcoholic fluids, especially when these are taken upon an empty stomach.—The operation of this cause is universally recognized; the

worst use to which stimulants can be put is to take them between meals; they irritate the stomach, set up hyperæmia in portions of its mucous membrane, and cause increased secretion of mucus, which acts as a ferment. They are, moreover, speedily absorbed and conveyed to the liver, whose function they disturb, and in whose tissues they produce serious alterations. Besides causing local changes, alcohol, after acting as a stimulus, depresses the nervous system and thus interferes with digestion, and the fermentation which some alcoholic liquors undergo in the stomach is a source of further mischief.

6. The use of strong tobacco comes next in order as a cause of indigestion, the mischief being proportionate to the strength and other peculiarities of the narcotic. The dryness in the mouth and throat, doubtless, extends to the stomach, and if the saliva be ejected starchy articles of food will be insufficiently prepared for digestion.

7. Constrained positions of the body and tightly fitting clothes may contribute to the causation of dyspepsia by interfering with the movements of the stomach and bowels. Tight lacing among women comes under this head, and among the lower classes, the stooping

posture adopted by tailors and shoemakers, and also by some clerks, is a fertile source of indigestion.

8. Exertion after a full meal. For digestion to be properly accomplished the organs at work must receive a sufficient supply of blood. This process is, however, obstructed if the activity of other portions of the body simultaneously claims an increased supply of that fluid. Thus it is that active mental or bodily exertion immediately after meals checks digestion, for it causes the blood to be diverted into other channels. On the other hand, deep sleep is almost always prejudicial, for it lessens the excitability of the nervous system in general and retards the circulation. There is, however, some difference in opinion with regard to the desirability of an after-dinner nap. Those who advocate it cite the example of animals, but these gorge themselves with food, and are heavy and drowsy in consequence. A short rest is, however, different from lethargic sleep, and often appears to do good. Severe brain-work after dinner is certainly mischievous, and should always be forbidden: the interval between a late meal and bed-time should be devoted to recreation and amusement.

9. Nervous excitement is another cause of indigestion. It is well known that during such a condition

the want of food is scarcely felt, and that when a meal is taken discomfort is very apt to be created. Nervous exhaustion, already alluded to in a previous paragraph, is another cause of this character. A man may feel terribly in want of food after a hard day's work, but he has little or no power of digestion left. If, as is often the case under such circumstances, he eats freely and rapidly when opportunity occurs, one form of discomfort is speedily exchanged for another.

10. The last cause of indigestion which requires notice is that which is connected with diseases of various kinds. Disorders of the stomach and bowels, febrile affections, and severe diseases of all kinds are accompanied by more or less decided symptoms of indigestion, due to the fact that the stomach is insufficiently supplied with blood, and also to the disturbances in the nervous system.

Acute dyspepsia, uncomplicated by organic disease, leaves no traces discoverable after death. We know, from observations on animals and on persons with gastric fistula, the changes which the mucous membrane undergoes during digestion, but these disappear after death. The indications of gastric catarrh are often visible, and take the form of marked hyperæmia,

sometimes associated with extravasation of blood in points or patches. The mucous membrane is swollen, covered with a tenacious adherent layer of mucus and epithelial cells of various kinds; sometimes the deeper seated vessels show signs of inflammation. The evidences of chronic dyspepsia or catarrh are often seen in the dead body; they consist mainly of atrophy of the mucous membrane, and of the submucous connective tissue. Thickening of the connective tissue, with deposits of pigment and destruction of the glands, and either hypertrophy or atrophy of the muscular fibres are frequently discoverable.

The symptoms of an acute attack of dyspepsia are of a marked character, but they vary with the cause and with the individual. In the most common form there is nausea and eructations, with increased secretion of saliva, and followed by retching and vomiting, by means of which the contents of the stomach are sooner or later discharged. Sometimes a portion of the fluid matters contained in the duodenum is also ejected; the greenish colour and bitter taste indicate the presence of bile. If the matters vomited have been but a short time in the stomach, the other symptoms will soon pass off; disorder of the intestines will either be very

slight or altogether absent. On the other hand, under opposite conditions, diarrhœa is very apt to be set up. Persons differ very considerably in their proneness to vomit; as a general rule, other things being equal, an irritable stomach affords a better protection against the bad effects of ingested materials than one which is less sensitive. When the vomiting is over, but little discomfort may remain beyond a transient feeling of exhaustion. When, however, severe irritation has been set up the suffering may be proportionately great. There is, for example, great pain in the stomach, with intense and persistent nausea, and even after the organ is empty the patient may be greatly distressed by efforts at retching, during which a little mucus or bile may be ejected. Diarrhœa is likely to set in, accompanied by colicky pains, and the whole of the abdomen is tender on pressure. The tongue is swollen and thickly coated, there is severe prostration and headache; food of all kinds is regarded with loathing, but water is often taken ravenously only to be rejected immediately. There is no elevation of temperature; the pulse, if altered at all, is less frequent than usual. These symptoms last for a variable period, sometimes for several hours, and they may subside from time to time, and again recur.

Chronic forms of indigestion are much more common than the acute type; they make up, indeed, no small proportion of the ills to which flesh is heir. Whatever be the character of the discomforts, their development is a more or less chronic process. In very many cases the first evidence of disorder is denoted by the patient's becoming aware of the fact that he possesses a stomach. He is apt to find this out after substantial, though by no means necessarily immoderate meals. The discovery is associated with the desire to loosen the clothes round the lower part of the chest, inasmuch as the pressure seems to be the cause of the discomfort. In all but the slightest attacks, further symptoms are superadded, and take the form of eructations, first of gaseous matters, and then of particles of food, the taste of which is perceptible some hours after it has been swallowed, a feeling of heat in the throat and stomach, with increase of saliva. These may be the only symptoms, and they may recur more or less frequently during long periods. Retching and vomiting are, however, often superadded. The bowels, too, are apt to become irregular in their action; sometimes there is constipation, and sometimes diarrhœa, especially after eating. All these symptoms may go on for years without apparent influence upon the patient's health.

Unless much pain be likewise present, they are often unheeded. A careful person will notice that the symptoms are liable to be provoked by sundry articles of food, and he will abstain from them, or take them only in great moderation. It is only a select few, however, who can exercise such restraint, more especially if the food to be avoided is of a highly palatable character. If the warnings given by the stomach be neglected a variety of ill consequences sooner or later make themselves felt. The mental condition shows signs of change; application to study becomes difficult, ideas soon get confused and do not flow readily, the temper becomes irritable, the patient feels either depressed or excited, and takes pessimistic views of things in general. All these symptoms are aggravated by constipation, which so often accompanies dyspepsia, and in not a few cases a condition of melancholia or hypochondriasis supervenes.

In chronic cases, in which, owing to their frequent repetition, the symptoms have reached a high degree of severity, the condition of the patient is far more serious. There is loss of appetite, which may so far be described as complete, inasmuch as whatever is taken has to be forced down, and these attempts are followed by a

feeling of weight and pain, which may amount to cardialgia. A burning sensation at the back of the throat, attended by retching, eructations of acrid matters, vomiting, and constipation, alternating with diarrhœa, and such like symptoms, are more or less troublesome in different cases. The abdomen is at first generally prominent, but later on it is apt to be retracted. The passage of flatus from the lower bowel is often a prominent symptom. There are disagreeable tastes in the mouth, and the breath has an unpleasant, and sometimes even putrid odour, which is especially marked whenever the mouth and teeth are not kept clean. The emaciation which sets in is a measure of the serious disorder of nutrition.

Certain of the symptoms require to be considered somewhat more in detail. An examination of the matters ejected from the stomach demonstrates the presence of acetic and butyric acids, which are the products of the fermentation of amylaceous substances. Carbonic acid is sometimes present in large quantities, and is derived from the same source. The products of the decomposition of albuminous substances can be detected in some cases, and among these sulphuretted hydrogen is the most common; it may become absorbed and cause

symptoms of poisoning. The idea has for a long time been prevalent that the symptoms of mental depression, so common in cases of dyspepsia, are attributable to the absorption of the products of putrefactive decomposition, and this notion is supported by the knowledge recently obtained of the properties of the ptomaines.

The formation of the organic acids in the stomach prevents the preparation and solution of albuminous matters, and the acids, moreover, act as direct irritants. In dyspeptic cases the quantity of hydrochloric acid in the gastric juice is generally much diminished, and the conversion of albumen into peptone is therefore limited. The pepsine, also, is less than the normal amount, but is generally sufficient for the digestion of albumen, though the process may be a very tedious one. The accumulation of peptones leads to a similar result, and the delay thus caused is further increased by the inordinate secretion of mucus and the less frequent and active movements of the stomach, which retard absorption, and the passage of its contents into the duodenum. Under such circumstances, and bearing in mind the fact that excitants of putrefaction readily gain access to the stomach with the food that is swallowed, it is no wonder that this process so often becomes developed.

The salivary secretion is often much changed in cases of dyspepsia. It is generally increased as a result of reflex action set up by the abnormally acid state of the stomach. If swallowed it may produce vomiting, especially if, as often happens, much air be mixed with it. The term *pyrosis* is applied to describe a profuse flow of saliva and consequent discharge from the mouth of a clear fluid, often occurring in the course of acid dyspepsia. The discharge is attended with more or less cramp in the stomach, and both are paroxysmal, but there is no ejection of the contents of the stomach. Sir W. Roberts, who has carefully studied this symptom, states that the "gush of saliva is something tremendous, often greater than incessant swallowing efforts can dispose of, and the surplus flows out abundantly from the mouth. . . . A paroxysm of this kind only occurs during the presence of surplus acid in the stomach." In gastric catarrh occurring in drunkards, the quantity of saliva swallowed during the night is sometimes so great that its presence can be detected by chemical tests in the matters vomited in the morning.

With regard to the other abdominal symptoms the constipation is due in some measure to the fact that an abnormally small quantity of food passes into the intestines, and the result is aided by the diminished

energy of the peristaltic action. The food remains for lengthened periods in the large intestine, and loses much of its watery constituents. The attacks of diarrhœa are the consequence of catarrh of the colon, which in its turn is produced by the presence of fæcal masses. The attacks may, however, be due to irritation of the small intestines, the result of the passage into them of imperfectly digested matters from the stomach. The abdominal tenderness which often accompanies dyspepsia may be due to irritation of the peritoneum, caused by distension of the intestines, or possibly to the accumulation of the products of retrogressive metamorphosis. The circulation of the blood through the abdominal organs is more or less retarded ; the sensitiveness to pressure extends over the whole abdomen, or at least over large portions of it, and the pain is everywhere of the same character, and cannot be localized in any one organ. Spontaneous pain in the back and loins is also a common symptom.

The condition of the urine varies in different cases, and in the same patient at different times. The secretion often contains a disproportionate quantity of urates, which are deposited on standing, and oxalate of lime and deposits of the amorphous phosphate of lime

are not unfrequent. In cases of gouty dyspepsia the urine is often scanty and high-coloured, and contains a minute quantity of albumen, the presence of which is due to derangement of the functions of the liver and consequent defective metamorphosis of nutritive materials. Disorders of the skin are also common in cases of dyspepsia, and take the form of acne, eczema, erythema, or urticaria. In gouty cases eczema is frequently present.

The influence of indigestion upon the general condition of the patient is often very marked. The principal agents concerned in producing the effects are the products of decomposition set free in the intestines, but other causes are often at work. The effects, for example, of anæmia are frequently traceable, and besides these the results of irritation of the vagus and sympathetic nerves which supply the stomach and intestines are seen in the psychical disorders so common in dyspepsia. Among these may be mentioned that inactive condition of the brain which shows itself in sluggishness of the flow of ideas, and difficulty in forming conclusions and following them out, and this may well depend upon a deficient supply of blood to the nerve-centres, or upon alterations in the composition

of that fluid. The rapid variations in the mental state of the patient may be thus accounted for. More or less pronounced sleeplessness is a very common accompaniment of indigestion, and is due either to distension of the stomach or to the presence of imperfectly assimilated matters in the blood, or possibly to both causes.

The last set of symptoms requiring to be noticed in any detail are those which refer to the organs of circulation. The action of the heart is often much modified in cases of dyspepsia. As a general rule the pulse is less frequent than natural, but this condition is often rudely interrupted by attacks of palpitation, attended by a feeling of distress and violent pain shooting down into the left arm. These symptoms may be so severe as closely to resemble angina pectoris, attacks of which are, as is well known, often provoked by the condition of the stomach. Vertigo from gastric causes is another troublesome symptom in not a few dyspeptic patients. The symptom has been fully discussed in a preceding chapter; it is only necessary to say here that it is often associated with disorder of the heart's action and cerebral anæmia. The sensation in these cases is generally described as though surrounding objects were in motion around the patient, or as though the ground

were coming up to meet him. This form of vertigo is very common, but it must never be forgotten that some auditory lesion may exist, and that the state of the stomach may serve only to excite an attack.

The special condition known as nervous dyspepsia will be discussed in a separate chapter, as it presents several features which distinguish it from the more ordinary forms of the complaint.

The course and duration of the symptoms of indigestion depend for the most part on their causation and severity. In acute forms the symptoms rapidly subside under proper treatment, and may not recur if suitable rules for living be enjoined and obeyed. On the other hand, some chronic forms of dyspepsia constitute the most tedious and obstinate complaints which the physician has to treat, but, as in all similar cases, very much depends upon the individuality of the patient, the circumstances by which he is surrounded, and his willingness and power to act upon medical advice.

The *diagnosis* that dyspepsia exists is an easy task; but the difficulty is to determine whether the symptoms are purely functional, or whether they depend upon some organic lesion. A catarrhal state of the gastric mucous membrane is rarely absent in severe cases, and

is evidenced by the quantity of mucus which is discharged from time to time by vomiting. With regard to serious lesions affecting the stomach, the physician has to think especially of malignant disease and of ulceration. In the former, a tumour will be sooner or later perceptible in the neighbourhood of the pylorus, and the matters vomited will at some time or other contain blood. The absence of free hydrochloric acid from the gastric juice is indicative of cancer. If no tumour be discoverable, such other symptoms as cachexia, swelling of the supraclavicular lymphatic glands on the left side, and the age of the patient will point towards malignant disease. In cases of gastric ulcer, the patients are usually anæmic or chlorotic; the pain is often very violent and referred to one spot, and it is almost certain to be induced by taking food. Hæmorrhage is also a common symptom, the blood at times appearing suddenly and in considerable quantities.

The *prognosis* in cases of dyspepsia depends, of course, upon the diagnosis. It is favourable in acute cases provided that no organic disease can be detected. In chronic cases we must take into consideration the general condition of the patient, the severity of the

symptoms, and the other points referred to as influencing the course and duration of the complaint. In old people in whom there is reason to suspect atrophy of the mucous membrane of the stomach, the prognosis cannot be otherwise than unfavourable.

The *treatment* of acute attacks of dyspepsia is easy and simple; the irritated organ must be placed at rest. For this purpose food of all kinds should be interdicted until the symptoms have completely subsided; a little water or soda-water may be sipped from time to time, the patient keeping perfectly quiet, and in the recumbent position. A mustard plaister applied to the epigastrium will not only relieve pain, but will have a soothing effect upon the irritated organ. If there be ineffectual attempts at vomiting, it will be well to administer an emetic, and this treatment is especially suitable for cases in which the attack is obviously due to some marked error in diet. A scruple of ipecacuanha in half a tumbler of tepid water, or a teaspoonful of mustard similarly administered, will be found suitable for these cases; and tepid water alone is sufficient for some patients. If the efforts at vomiting continue after the stomach has been emptied, we may allow the patient to suck ice, or administer a little effervescing water containing five or six minims of

tincture of opium; the mustard plaister is especially suitable for such symptoms.

If there be excessive secretion of gastric juice, and the eructation of a highly acid fluid, half-a-teaspoonful of sodium bicarbonate dissolved in a little water will afford relief. Should diarrhœa set in, it is well not to attempt to check it unless it persist after the bowels have been thoroughly emptied of fæces; in that case we may give a few drops of laudanum with chalk mixture and aromatics. Warmth to the abdomen is generally grateful and can be supplied by means of poultices, or an india-rubber bag. If there be constipation, a mild but efficacious laxative should be given after the gastric symptoms have subsided; from gr. $\frac{1}{2}$ to gr. ij of calomel, followed by a little solution of magnesia, may prove sufficient, and a draught, containing rhubarb, magnesia, and soda, may be used to produce a more decided effect. After the symptoms have passed off a warm bath, followed by rest in bed, will help to remove any feelings of discomfort. The patient must be very cautious in returning to ordinary diet; light and easily digestible articles should be taken in moderation, and excesses of all kinds should be avoided. The patient should likewise beware of exposure to cold and damp.

In the treatment of chronic indigestion the condition of the stomach must, of course, occupy the first place in the consideration, but the functions of the body generally must on no account be neglected. Each case has to be studied separately, and even though it may prove impossible to discover the primary cause of the symptoms, yet it will generally be feasible after careful examination to detect errors in diet and living which contribute to perpetuate the disorder. Bearing in mind the causes noticed in preceding paragraphs, and after making himself acquainted with the symptoms, the physician should inquire as to the food, the time for meals, the manner in which these are taken, the fluids used, and the other points already referred to. It often happens that something faulty can be detected referable to all these headings, and it is, therefore, desirable to lay down rules for the patient's guidance both as to the quality and quantity of the food. To quote what I have elsewhere said on this subject, "I have, for some time past, been in the habit of supplying my patients with printed diet rules. I keep at hand a set of forms on which the hours for meals and the articles that *may* be taken, and those that *must* be avoided are clearly specified. As a matter of course modifications by way of

addition or subtraction are sometimes required, and spaces are therefore left for additions. I attach the greatest importance to these diet rules; a patient is far more likely to obey instructions contained in a printed form than verbal directions, however emphatically expressed."

Before considering the question of diet, the physician should always inquire into the state of the teeth, and this precaution is especially necessary in treating middle-aged and elderly patients. Defective teeth are a fertile cause of indigestion, the remedy for which, under such circumstances, is to be found in the skill of the dentist. Having attended to this particular, we must next prescribe the diet, and it is often necessary to remind the patient that it is a bad habit to take only one good meal per diem, and little or no nourishment at the other meal hours. On the other hand, the daily amount of food should be divided into three approximately equal portions, and taken at intervals of four or five hours. The last meal should be eaten two or three hours before bed-time. The work thrown upon the stomach is thus fairly distributed; the organ is never overburdened, and it has its periods of rest. When small quantities of food are frequently taken the stomach is constantly being excited

to increased activity, and is never quite emptied ; fatigue of its muscular coat and exhaustion of the nervous energy which presides over secretion must sooner or later occur. In regulating the diet for chronic cases we get but little aid from the experience of the patients, for they have often forgotten what the sensation of perfect digestion really amounts to. The object to be compassed is to restore this sensation, and we endeavour to do this by supplying food in sufficient quantity to nourish the system, while it makes as slight a call as possible upon the powers of the stomach, and does not by its tastefulness invite to excess.

With regard to the articles of diet from which a selection must be made, mutton, beef, game, chicken, fish, and eggs make up the list of animal substances; green vegetables, stale bread, and a small quantity of butter may generally be allowed. The mutton and beef should never be overdone; the eggs, too, should be lightly cooked; the other articles are dressed in the usual way. They are all easy of digestion and are not likely to set up acid fermentation in the stomach. The patients should always be warned against the ill effects of rapid eating. Fluids should be taken sparingly at meal-times, and for most dyspeptics two or three glasses

of sound claret with some alkaline effervescing water will be found suitable. If the patient prefer it, an ounce of good brandy or whisky, well diluted, may replace the claret. For many patients hot water (with or without a little sugar) may be mixed with the claret with advantage; iced drinks are to be scrupulously avoided. The stomach should never be distended; many dyspeptics should on this account avoid soup; others may take a few spoonfuls with advantage. Pastry of all kinds must, of course, be forbidden; milk puddings are generally allowable. Most dyspeptic patients have to be very careful in the use of bread; for some, indeed, it is better to prescribe toast and plain biscuits. Whenever there is much flatulence, all kinds of starchy food, *e.g.*, bread, potatoes, rice, etc., must be avoided; and when bread is again allowed it should have been baked at least twenty-four hours previously. Aerated bread is better than the ordinary kind, which is too often sour and indigestible. For the morning meal, cocoa made from the nibs is preferable to either tea or coffee; the latter, indeed, must be forbidden to most dyspeptic patients. Tea may sometimes be allowed, but it must be taken in strict moderation and with plenty of milk. The highly astringent Indian teas are not advisable for these patients.

In dyspeptic patients who are at the same time the subjects of anæmia, the loss of appetite which is often noticeable is sometimes due to the fatigue which the act of eating produces; and under such circumstances after a few mouthfuls the patient is disinclined to make any further attempts. The difficulty should be overcome by administering fluid or semi-fluid nutriment, which makes little demands upon the muscles of mastication. Milk thickened with amylaceous materials and peptonized milk are very suitable for these patients, and in extreme cases peptonized nutrient enemata or suppositories may be used. With regard to a milk-diet in general, we know that this fluid contains everything that is necessary for nutrition, and that life can be maintained for almost indefinite periods upon it alone. But in order that the necessary quantity of nutriment should be introduced, a large volume of milk, perhaps five or seven pints, must be supplied. In an ordinary stomach, however, there is great risk of undue distension if so large a quantity be taken, and this condition cannot but impede the movements of the organ. Moreover, the casein is apt to form hard lumps, for the solution of which much time may be required. These large quantities of milk are therefore badly borne by many patients, and some modifications are rendered necessary. Three

or four pints may be tolerated without difficulty; but the amount of nutriment therein contained is insufficient for the daily wants, and some addition is requisite. Several slices of well-toasted bread, or a corresponding number of biscuits, may be soaked in the milk, and such diet may be persevered with for several days, often with great advantage to the patient, provided, of course, that he is kept at rest at the same time. The transition to a more nutritious diet should be very gradually made; some peptonized food, either Savory and Moore's or Benger's, may first be tried, and these can be followed, if the patient likes them, by lightly boiled eggs. After a few days sweetbread and boiled fowl may be allowed, and these may be replaced by boiled or roast mutton, roast fowl, and roast beef. The directions given in preceding paragraphs with regard to the meal-times and the avoidance of rapidity should, of course, be carefully attended to.

The cure of dyspepsia is not to be regarded as complete until the patient has regained the sensations which a healthy stomach experiences after food is taken. When this stage has been reached, and provided that the patient is capable of exercising a due amount of self-control, he may be allowed some latitude in the choice

of viands. If any difficulties recur he should at once go back for a day or two to his former restricted diet.

The condition of the bowels always requires attention, and when constipation is present, means must be adopted for its relief. Laxatives are often required, but these should be given with the view of restoring the natural action of the bowels. This latter should be further encouraged by a visit to the closet at a regular hour daily, even if there be no desire to defæcate. Drastic purgatives are always to be avoided; their use would only exaggerate the evils they are intended to remove. The extract of aloes is one of the best remedies for the cases under consideration, and it may be advantageously combined with belladonna, quinine, and henbane, or with the dried sulphate of iron in lieu of the quinine. The following prescription will be found useful in many cases:—℞ Extract. Aloes Socot. gr. j-jss; Quininæ Sulphat. gr. j (vel Ferri Sulphat. Exsiccat. gr. ½); Extract. Belladonnæ gr. ⅛; Extract. Hyoscyami gr. j; misce, fiat pil j. This pill may be taken daily, or as required, before or after the midday meal, or at bedtime, and when regularity of the bowels is attained the aloes should be diminished in quantity. For some patients the new laxative,

cascara sagrada, acts satisfactorily. It is best given in the form of the liquid extract, of which ♏xv-xxv may be taken night and morning, the dose being regulated according to circumstances. Messrs. Squire have introduced a palatable and convenient elixir of cascara, of which the dose is a tablespoonful. Saline purgatives are suitable for some cases of dyspepsia, and especially for gouty subjects of full habit. The salts may be very conveniently administered in some one or other of the natural mineral waters, a host of which are at our disposal. The most efficacious are those of Carlsbad, Marienbad, Hunyadi Janos, Friedrichshall, and a newly introduced Spanish water, the Rubinat-Condal. The best way to take any of these is to mix from 4 to 6 ozs. with an equal quantity of hot water, and this is to be drunk on rising, or while dressing. The quantity should be sufficient to move the bowels once or twice after breakfast, but undue purgation is to be avoided. In some cases it is found that saline purgatives cause a great deal of depression, and for these they are not suitable. Whenever a more decided purgative action is required we may have recourse to the rhubarb draught with soda and magnesia, to the compound liquorice powder, or to colocynth and henbane pills. For

debilitated subjects small doses of aloes are usually the most appropriate; and some effervescing preparation of magnesium will often answer the purpose, but this drug should not be administered continuously for any length of time.

The improvement of the general health is an all-important object in the treatment of dyspepsia, and change of air under proper regulations will often do more good than any other measure. In prescribing this change the habits and tastes of the patient must, to some extent at least, be consulted. The town-dweller will, probably, be benefited by a change into fresh country air, or to the seaside, while a change of an opposite character will sometimes assist a patient depressed by the tranquillity and dulness of a country life. In some of these cases the benefit is due really to the change of environment, and not to the hygienic qualities of the place. New scenes, agreeable society, recreation, rest, or at least freedom from toil and ordinary avocations, assist very decidedly in the restoration of shattered nerves and broken health, which are both causes and consequences of gastric disorders. Exercise is another subject requiring careful attention; it must be adapted to the powers and tastes of the patient. Walking,

driving, and horse-exercise are all likely to be useful; in any case fatigue must be avoided, and rest should be enjoined after meals. It is also well to prescribe half-an-hour's rest before meals, especially for weakly subjects. The Swedish system (Dr. Ling's) of medical gymnastics, massage, or the Zander system of exercise by mechanical means will be serviceable in appropriate cases. Many muscles are thus brought into play without undue fatigue. When the strength has improved a sojourn for some weeks in a mountainous district will tend to restore the patient to perfect health. Attention to the functions of the skin and the use of tepid baths will assist the cure.

With regard to medicines for cases of dyspepsia they are sometimes indispensable, but they should be regarded for the most part only as adjuvants to more rational measures. To improve the condition of the stomach, and to supply a constituent of the gastric juice, often deficient in these cases, hydrochloric, or nitro-hydrochloric acid may be given with advantage. The following combination will be found to suit many patients:—℞ Acid. Nitro-hydrochloric Dil. ♏x-xv; Tinct. Nucis Vom. ♏v-x; Tinct. Hyoscyami ♏x-xv; Infus. Lupuli vel Calumbæ, vel Chirettæ ℥j—to be

taken three times a day, half-an-hour before meals. It may be continued for several weeks; the mouth should be washed out with water containing a little sodium carbonate after each dose. When constipation is present and flatulence is also troublesome I find a pill, composed as follows, to be most useful:—℞ Podophylli Res. gr. $\frac{1}{8}$; Creasoti ♏$\frac{1}{2}$; Ext. Col. Co.; Pil. Rhei Co.; Ext. Hyoscyami āā gr. iss.—to be taken at bedtime as required.

Whenever there is excessive formation of acid in the stomach, a process which is usually the result of fermentation, and is attended with much pain, an alkali, the sodium bicarbonate, is preferable to the hydrochloric acid. It should be given in quantity sufficient to neutralize the acid; and even if the reaction of the stomach be rendered alkaline, this condition will be of short duration, inasmuch as the bicarbonate excites the secretion of gastric juice. Distension of the stomach is by all means to be avoided, for it will add to the patient's discomfort, and probably provoke retching or vomiting. The salt should be given slowly and in small quantities at a time; a teaspoonful should be dissolved in about half a tumblerful of water not too cold, and mouthfuls of this should be taken at intervals

of several minutes. An indication for the employment of the soda is increased secretion of saliva, and a feeling of rawness or burning in the throat. The alkalies should not be given too frequently, but should be retained for acute attacks; the administration of hydrochloric acid, as above directed, will prove more efficacious for relieving the chronic state of acidity so frequent in dyspeptic cases. It is almost invariably serviceable in cases of oxaluria, in which the eructations often consist of much sulphuretted hydrogen. For gouty dyspepsia this acid is often useful combined with ɱij-iv of acid. hydrocyanic. dil. and a vegetable bitter, and taken before food. The acid is also efficacious when given before a meal, for cases of pyrosis in which the fluid that rises has an acid reaction; if this symptom occur after meals the alkalies are indicated. For paroxysmal pyrosis Sir W. Roberts recommends lozenges, and especially gum lozenges. When these are taken salivation is promoted, the blood itself is made the source of the alkali, and the excessive acidity of the stomach is neutralized by the passage downwards of the alkaline saliva.

For some cases of dyspepsia in which the prominent symptoms are pain at the pit of the stomach extending

to the back, and the development of flatus, a preparation of bismuth with a little nux vomica will often prove valuable. The bismuth appears to be especially efficacious when the pain is of a cramp-like character and comes on in paroxysms. Dr. Leared has recommended the purified oxide of manganese as a remedy for this class of cases, and exceeding bismuth in power. The dose is from three to ten grains made into pills with syrup, and taken three times a day. For dyspepsia with foul eructations vegetable charcoal is often a good remedy, and the author just quoted recommends that it should be given hermetically sealed in gelatine capsules. In this country charcoal is occasionally prescribed in mixtures, and in the form of biscuits or lozenges. The two latter must, of course, be thoroughly mixed with saliva before being swallowed, and charcoal taken in this way cannot be of much efficacy as an absorbent of gases. Dr. Leared's capsules contain more than ten grains of charcoal made from vegetable ivory, and of these three or four should be taken at a time. Creasote is also a valuable remedy for the relief of flatulence and pain occurring after food. It may be given in doses of one minim made into a pill with a little myrrh. The sulpho-carbonate of sodium is another remedy of this

class. The dose is 10 or 15 grains taken in water either before or after meals according to circumstances. In many cases of flatulent dyspepsia I often see great benefit from a lozenge prepared for me by Messrs. Squire, and containing subnitrate of bismuth and sulphocarbolate of sodium. One or two of these should be taken either one hour before or two hours after a meal. For dyspepsia marked by hepatic derangement I find salicin and sodium salicylate often useful. As a purgative in these cases a pill containing podophyllin, euonymin, and pil. col. et hyoscyam. will generally be found suitable.

For so-called irritative dyspepsia, when pain comes on after food is taken and diarrhœa is apt to be set up, arsenic is often a very useful remedy. In these cases the tongue is furred and its papillæ red and prominent, especially at the tip, and vomiting of food soon after taking it is a frequent symptom. The arsenic should be given in doses of two or three minims shortly before meals. Ipecacuanha is useful in some forms of dyspepsia. It may be added to the purgatives with a view of increasing the secretion of mucus in the intestinal canal. One grain given each morning is said by Ringer to relieve constipation depending on great torpor of the

intestines and the dyspepsia therewith associated, which is "characterized by depression of spirits, some flatulence, coldness of the extremities, and by the food lying on the stomach like a heavy weight." Pepsin in doses of two to five grains, taken with meals, is often useful in these cases, and Benger's liquor pepticus I find to be an excellent preparation. As an adjuvant to all the remedies just mentioned quinine is useful in most cases of indigestion, and especially when the acute symptoms have subsided. Nux vomica is also a very valuable remedy, and may be advantageously combined with most other medicines suitable for dyspeptic patients.

In cases of dilatation of the stomach, which is a not unfrequent consequence of long-continued dyspepsia, much improvement may sometimes be produced by regularly washing out the organ with warm water. In the case of a lady, aged 38, brought to me by a medical man some time ago, this plan, carried out three or four times at weekly intervals, was attended with excellent results.

It only remains to notice the methods of treatment carried out at the various health-resorts where the water and climate are suitable for dyspeptic cases. Much good is often obtained by a sojourn of four or six weeks

at some one or other of these places. The water, the diet, the change of air and scene, the regular exercise, and the daily routine all combine to produce the desired effect, and patients who in their own houses are often somewhat refractory generally submit without a murmur even to severe restrictions and regulations at a foreign watering-place. The choice of the health-resort always requires consideration. Gouty cases may be sent with advantage to Carlsbad, Marienbad, or Vichy; more delicate patients may go to Kissingen and afterwards to Schwalbach, while such places as Wiesbaden, Baden-Baden, and Homburg will suit mild cases of dyspepsia presenting no very special indication. It must never be forgotten that in this country we have many excellent health-resorts suitable for cases of dyspepsia. It is only necessary to mention Buxton, Bath, Harrogate, and Woodhall Spa. Properly selected and with good sanitary surroundings, almost any country place may be utilized as a health-resort. As regards seaside health-resorts, no country in Europe presents so many or such a variety as our own.

CHAPTER III.

NERVOUS DYSPEPSIA AND PERVERTED APPETITE.

CAUSES OF NERVOUS DYSPEPSIA—SYMPTOMS—GASTRIC AND NERVOUS TROUBLES — DIAGNOSIS — TREATMENT — DIET AND REGIMEN—EXERCISE—DRUGS, QUININE, ARSENIC, AND BELLADONNA—THE WEIR MITCHELL TREATMENT AS FOR NEURASTHENIA—PERVERSION OF APPETITE — APPETITE ABNORMALLY INCREASED — SYMPTOMS AND CAUSES—TREATMENT—DIMINUTION AND LOSS OF APPETITE OR ANOREXIA—CASE AND TREATMENT—DEPRAVED APPETITE—SYMPTOMS AND TREATMENT.

IN the preceding chapter on Indigestion in general, reference was made to a form of the complaint to which the epithet "nervous" may be suitably applied, inasmuch as the symptoms make themselves felt for the most part in the nervous system. As a matter of course the symptoms in question may be associated with various lesions of the stomach, such as catarrh, ulcer, or malignant disease, and it is only when these can be excluded that we are justified in regarding the attacks as of neurotic origin.

Nervous dyspepsia is more common in men than in women, and it occurs for the most part among the

dwellers in towns or cities, and upon whose nervous energies demands are constantly being made; such patients are usually between 30 and 40 years of age. The symptoms in many cases are associated with those of other neurotic complaints, such as neurasthenia, hypochondriasis, and hysteria. Prolonged mental strain, deficiency of sleep, and sedentary habits are common causes of nervous indigestion. In other cases the symptoms are associated with those of anæmia, and are thus sometimes witnessed in the subjects of chlorosis and tuberculosis, and as the result of excesses, sexual and otherwise. In other cases the symptoms are the consequence of immoderate use of alcohol and tobacco; malarial poisoning, also, is able to cause symptoms of nervous dyspepsia. As of reflex origin, these latter are sometimes noticed in cases of disorders of the uterus, ovaries, kidneys, and intestines.

Nervous dyspepsia is distinguished from other forms of the complaint by the fact that there are no appreciable alterations in the mechanical and chemical processes of digestion, but that the preparation of the food for its absorption is accompanied by local troubles, and by nervous symptoms of a general character having their starting-point in the stomach, and propagated by

reflex action. The symptoms for the most part come on after the principal meal, but not until several hours have elapsed; they are not due to errors or excesses of any kind in connection with the food then taken. On the contrary, the patient may have been careful as regards both quality and quantity, yet at the time specified he is conscious of an unpleasant sensation of fulness, distension, and pressure in the epigastrium. Sometimes there is more or less decided pain, which is relieved by pressure; eructation of odourless gaseous matters is a frequent symptom; burning sensations in the throat are less common, but there is sometimes nausea, and an inclination to vomit. The patient feels thirsty, but has no appetite; the tongue may be normal, but an unpleasant taste in the mouth is a common symptom. Some patients complain of fulness and constriction in the œsophagus, and of a feeling more or less resembling the globus hystericus. Constipation is generally present, and various uncomfortable sensations are experienced in the intestines.

The nervous symptoms are, however, the most troublesome to the patient; he complains of a feeling of beating in the head, coupled with that of rushing of blood to the part, of confusion of thought, noises in

the ears, spots or sparks before the eyes, headache, and giddiness. The spirits are depressed, sleep is disturbed and unrefreshing; some patients are much troubled with drowsiness and languor, and constant yawning, especially after eating. Palpitation of the heart and attacks resembling asthma are not uncommon in these patients. If vomiting takes place, nothing abnormal is discoverable in the ejected matters; on the contrary, there are evidences that digestion has been well performed. The complaint must, therefore, be attributed to undue sensitiveness of the nerves of the stomach. The patient's condition is apt to be seriously influenced by these attacks; he becomes pale, and loses flesh and strength.

The *diagnosis* of nervous dyspepsia is sometimes difficult; the important question for determination is whether any organic lesion of the stomach is the cause of the symptoms. This latter question may usually be settled in the negative if the symptoms disappear and the digestion be quite normally performed from time to time. The *prognosis* in cases of nervous dyspepsia must be regulated by the nature and duration of the symptoms.

The *treatment* of this affection consists, first, in

attention to diet and hygiene; and, secondly, in the administration of certain drugs. The diet requires careful study, inasmuch as these patients differ considerably in their powers of digestion. One preliminary point must be borne in mind, viz., that a definite period of rest should be allowed between exercise and a meal, and also after the latter has been taken. To sit down to dinner when tired, or to exercise mind or body while digestion is in progress, will nullify all attempts at relieving the symptoms. As to the diet itself, it should be of a nutritious, easily digestible character, and the food should be well masticated and eaten slowly. Stimulants in moderation are likely to do good, but much fluid should not be taken during eating; some hot claret and water will be found to suit most cases. Every endeavour should be made to secure a fair amount of sleep at night; the exercise taken should be proportioned to the strength, and always short of fatigue; a change of air to the seaside or to a mountainous district is generally desirable for these patients. With regard to drugs, the most useful are quinine, nux vomica, and arsenic; if there be much pain belladonna will probably be serviceable. The arsenic should, of course, be given after meals; the

bowels should be kept open by means of mild laxatives, such as cascara, an elixir of which, prepared by Messrs. Squire, will be found to be quite palatable, the disagreeable flavour of the drug being completely masked. If, as often happens, there be decided evidences of neurasthenia, the best course to pursue will be to place the patient under the Weir Mitchell system of treatment, for a description of which the reader is referred to p. 47.

In connection with nervous dyspepsia, some reference must be made to certain alterations or perversions of appetite presumably due to nervous disorder. Such perversion occurs in three principal forms: in the first, the desire for food is abnormally increased; in the second, it is very much diminished, or altogether lost; while in the third, the appetite is directed towards unusual objects. All these conditions may be quite independent of organic disorder in the stomach; their causes are those of gastric neuroses in general, and they are most frequently seen in the subjects of hysteria, neurasthenia, and hypochondriasis.

I. In the first form above mentioned, the appetite is excessive or voracious; there may be only a slight increase or a constant and well-nigh insatiable craving for food.

In extreme cases the amount consumed has reached 20, 30, and even 60 pounds weight in a day. When food is withheld there is a feeling of uneasiness and even faintness, with an indescribable sense of sinking in the stomach, and of a void that must be filled. Such patients are usually thin and emaciated, inasmuch as the food either passes through the bowels without being digested, or the greater portion of it is vomited. In other instances the patients become enormously fat. I have seen two cases of neurotic dyspepsia in mentally over-worked men, in whom the appetite was enormous, and constant craving and uneasiness were complained of when food was withheld; these patients were thin almost to emaciation.

With regard to the cause of this condition we know that hunger, though always referable to the stomach, may be produced by impressions sent to the brain from various parts of the body, and it would therefore appear that a voracious appetite may depend either upon an abnormal condition of the stomach, or upon the general state of the nutrition. Excessive appetite referable to the latter cause is seen in persons after long fasting, and in convalescents from acute diseases, as well as in those suffering from disorders accompanied by excessive

waste of tissue, as consumption and diabetes. Disordered innervation of the stomach itself may arise from causes affecting the nervous system in general, as in hysteria, and the same effect is sometimes due to reflex action, as in cases of worms in the bowels. In some instances the condition has been attributed to preternatural capacity of the organ, and to enlargement of the pyloric orifice, whereby the food is allowed to pass into the duodenum before digestion is completed. In another class of cases the excessive appetite is due to habits of indulgence, while in others the condition is referable to the existence of some cerebral lesion.

With regard to treatment, any attempt to cure an established habit of over-eating must be gradually made. Medicines should be given to relieve any catarrhal condition that may be present, whether of the stomach or intestines. Compression of the abdomen by a tight band has been recommended as a palliative. When the complaint depends upon any morbid state of the system the remedies must be directed towards the cure of the primary disease. In cases of downright gluttony we may give with advantage small doses of tartar emetic, just sufficient to nauseate the patient. In dealing with convalescents we must prescribe the quantity and quality

of food to be taken, and point out the great danger attendant upon excess. This caution is especially necessary in cases of typhoid fever and dysentery.

II. An opposite condition, loss of appetite, or anorexia, accompanies almost all kinds of disorders of the stomach, and these in their turn are frequent concomitants of febrile and other affections. In acute gastritis the patient has no desire whatever for food, and in the chronic forms the appetite is generally much diminished, or, at least, very irregular. In ulcer of the stomach there may be no loss of appetite, but the patient fears to eat owing to the pain that is produced. In malignant disease the appetite varies, but it tends to fail as time goes on, and the secreting structure of the stomach is destroyed. Anorexia is a common symptom in some hysterical subjects, and is often very difficult to treat, as it is usually impossible to accept the statements of the patient with regard to the amount of food really taken. Reference has been made to this subject in a previous chapter (see p. 107). A typical case of this character has recently been placed on record by Sir William Gull (see *Lancet*, March 17th, 1888). The patient, a girl, aged 14, was healthy and well until the beginning of 1887, when, without apparent cause, she

began to evince a repugnance to food, and soon after refused to take any whatever, except a small quantity of tea or coffee. As a matter of course, in a few weeks she became extremely emaciated, weighing only 4 stone 7lbs., her height being 5ft. 4in. She was placed under the care of a hospital nurse, who was ordered to administer light food every few hours. In six weeks the patient had much improved, and she progressed steadily toward recovery. Sir William Gull refers to a curious feature in this as in other cases, viz., the persistent desire to be on the move, though the emaciation was so great and the nutritive functions so much reduced. In 1885 I met with a case of profound emaciation from loss of appetite in a young lady, aged 17, who presented most of the symptoms described by Sir W. Gull; she rapidly improved under enforced feeding. In some cases, which come under the heading of nervous anorexia, the distaste for food is due to the pain consequent on eating.

Cases of nervous anorexia must be treated according to circumstances: in hysterical cases a nurse is always required, and the exhibition of a little firmness will generally prove sufficient. For other patients change of air, tonics, especially quinine and nux vomica, and stimulants in moderation will tend to effect a cure.

III. Examples of depraved appetite are most often afforded by hysterical and chlorotic subjects, and there is scarcely any object, which can be swallowed, which the patients will not endeavour to introduce into the stomach. Pregnant women sometimes exhibit remarkable symptoms of this kind. Indigestible substances, such as slate pencil, chalk, clay, paper, and even offensive and disgusting materials are thus taken. Such practices are sometimes indulged in from time to time; occasionally they become habitual, and chronic gastritis and general disorder are thus induced. The practice may depend upon some form of gastric irritation, upon deranged innervation of the stomach, or upon cerebral disorder. When chalk is swallowed it is possible that undue acidity of the stomach has created a desire for alkalies, and the swallowing of rough hard substances may have for its object the relief of feelings of sinking.

In treating such cases the general state of the system requires special attention. Any existing gastric disorder should be relieved by antacids, tonics, and anodynes according to circumstances. The diet should be carefully regulated, and every attempt made to improve the mental condition of the patient, and to restore the appetite to a normal state.

CHAPTER IV.

GASTRALGIA—GASTRODYNIA—CARDIALGIA.

PAIN IN THE STOMACH AS A DEFINITE COMPLAINT—CAUSES—CONDITIONS UNDER WHICH IT OCCURS—GASTRALGIA IN GOUTY SUBJECTS—IN LOCOMOTOR ATAXY—OF REFLEX ORIGIN—DUE TO RENAL DISEASE—SYMPTOMS—DURATION AND EXCITING CAUSES OF PAROXYSMS—SPASMODIC FORM OF GASTRALGIA—DIAGNOSIS, FROM INTERCOSTAL NEURALGIA, MYALGIA, COLIC, PERITONITIS, GALL-STONES, ETC., AND FROM GASTRIC DISORDERS, AS ULCER, CANCER, AND CATARRH — PROGNOSIS AND TREATMENT — LAXATIVES — QUININE — ARSENIC — ALKALIES — IPECACUANHA — MORPHINE, STRYCHNINE, CHLORAL, ELECTRICITY — TREATMENT OF GOUTY CASES.

PAIN in the stomach is a symptom of many organic diseases of this portion of the alimentary canal, and especially of cancer and ulcer. It also occurs in several forms of dyspepsia; but in another class of cases it appears to be a pure neurosis and independent both of anatomical change and of disordered functions of the stomach. It would then seem to be a neuralgia of the sensory nerves of the organ, and is probably due to perverted nutrition of these structures. The stomach is by far the most frequent seat of abdominal neuralgia (Allbutt).

Gastralgia is more frequent in women than in men,

and the majority of the sufferers are between fifteen and forty-five years of age. It tends to die out in middle life, and is less often attended with vomiting as age increases. In this respect it resembles migraine, with which it is often associated. It is rare in young children, but not uncommon in elderly women.

Pain in the stomach of purely nervous origin is a common symptom in chlorosis, and in conditions of debility and malnutrition in general; it is thus often observed in persons convalescing from acute diseases, and in the subjects of nervous exhaustion from depressing emotions, anxiety, etc. It is also common in certain affections of the system in general, both of an infectious and of a non-infectious character. Thus in gouty subjects an attack of gastralgia sometimes precedes the articular inflammation, or occurs instead thereof. In a third class of cases the gastric pain follows the subsidence of the articular symptoms, and especially when these latter have been cut short by cold applications to the affected part. The gastralgia is then apt to be violent, and is a symptom of grave import.* Pain in the stomach is

* For a detailed account of the symptoms of this form of gastralgia, see the Author's work on "Gout and its Relations to Diseases of the Liver and Kidneys." 5th Edit., Chapter V.

sometimes, but far less often, experienced in the course of chronic rheumatism; it is not of uncommon occurrence in connection with malarious fevers. In such cases it comes on at regular intervals with the other symptoms, which may be of a less marked character, but which, with the pain, are cured or prevented by antiperiodics. Dr. Austin Flint has recorded a case in which gastralgia took the place of the cold stage of malarious fever, and was followed by the hot and sweating stages.

Severe pain in the stomach is a frequent symptom in hysteria and hypochondria, and is apt to be associated with other neuralgic troubles. It is also a symptom of grave lesions of the nervous system, such as spinal sclerosis, myelitis, and softening of the brain. It is a peculiar feature of locomotor ataxy, in which the attacks sometimes assume great intensity, and are attended by vomiting, faintness, and disturbed action of the heart. These symptoms are wont to recur from time to time, and closely resemble those of acute gouty disorder of the stomach. Dr. Buzzard, indeed, suggests that many cases of so-called "gout in the stomach" would be found, if examined by the light of our present knowledge, to be examples of tabes dorsalis, with gastric crises. It must be remembered that severe

gastric attacks are sometimes witnessed in persons who, although examples of tabes dorsalis, "show at the time no sign of inco-ordination of movement."

Attacks of gastralgia are not unfrequently of reflex origin, being induced by affections of various abdominal organs. Instances of such causation are often met with in women suffering from uterine or ovarian disorders; the pain generally comes on at the menstrual periods and subsides with the discharge. Pregnant women, too, sometimes suffer from gastralgia, and less frequently the pain is associated with affections of the kidneys, liver, pancreas, spleen, and intestines. Gastralgia is often associated with asthma, and sometimes one member of a family suffers from the former and others from the latter complaint.

In not a few cases of gastralgia no obvious cause is discoverable. A history of sexual and alcoholic excesses can sometimes be ascertained, and occasionally there is evidence of disordered renal secretion. The urine should always be examined; the gastric disorder may be the first indication of mischief. The lungs, too, should not be passed over, for gastralgia is sometimes severe in the earliest stage of pulmonary phthisis.

An attack of gastralgia may come on suddenly and

without warning, or it may be preceded by such premonitory symptoms as a feeling of distension in the stomach, nausea and eructations, vomiting, depression of spirits, etc. The pain, once set in, soon becomes extremely severe, and is described by the patients as boring, burning, pricking, smarting, or cramp-like; it is felt principally in the cardiac and epigastric regions, but is apt to extend to the back and up between the scapulæ and to the umbilical and hypochondriac regions. Sometimes the attacks resemble those of angina; the pain shoots down the left arm, and the pulse falls to forty or even thirty beats per minute. I have seen several patients of both sexes in whom the gastralgia was attended by pains shooting down the left arm and up into the left shoulder joint. The patients find that firm pressure will relieve the pain, and they accordingly apply their hands to the epigastrium and over the heart, or press the abdomen against some firm substance; others feel better when lying on the back, and others, again, when sitting in a chair with the body bent forwards as much as possible. The deep-seated pain may be accompanied by superficial hyperæsthesia. When the pain is at its height the feeling of prostration becomes intense; the face is pale and the skin cold; the pulse is small and

irregular, and either more or less frequent than natural; perspiration breaks out on the face, neck, and hands; sometimes there are muscular twitchings, amounting, it may be, to convulsions. Dyspnœa and cough are not unfrequent, especially in hysterical subjects. The termination of the attack is often preceded by fluid eructations, yawning and vomiting, and ineffectual attempts and retching may remain for some time after the pain has subsided.

On examining the patient during the continuance of the pain the abdomen is generally found to be drawn in; its walls are hard and firm, and the pulsations of the aorta are freely visible. In other instances the abdomen is distended and the stomach is felt as a globular swelling at the upper part; occasionally spasmodic movements of the stomach and bowels may be observed. Constipation is often present, and the colon can sometimes be detected on percussion. The urine is for the most part scanty and high-coloured, except in hysterical subjects, in whom, after the subsidence of the attack, abundant discharge of watery urine is a frequent symptom. A temporary condition of albuminuria, with hyaline casts, and lasting for a few days, has been noticed in some cases. The appearance is due to the

diminution of blood-pressure in the renal artery, which is caused by the pain.

Paroxysms of gastralgia vary much as regards their duration: sometimes the attacks are over in a few minutes, and, on the other hand, they may last for hours, with remissions and exacerbations. There is a corresponding difference as regards recurrences: daily attacks of greater or less severity are sometimes experienced, in other cases long intervals occur between the attacks. When the latter are associated with malarial influence, they are wont to recur at uniform intervals and at the same hour of the day. In women they are apt to become prominent shortly before and during the menstrual periods. In some attacks no obvious exciting cause is discoverable; in others there has been undue mental or bodily exertion. Sometimes the attacks are attributable to prolonged abstinence from food, and are relieved by eating, to recur when the stomach is again empty; not a few of these patients are from time to time conscious of feelings of intense hunger, while some of them exhibit signs of perversion of appetite and desire indigestible and extraordinary articles of food. In some patients the attacks are the result of taking particular articles, such as hot tea; and the suffering

after food may be so great as to lead to complete abstinence for many hours. Other neuralgic affections sometimes alternate with gastralgia, and of these migraine and intercostal neuralgia are the most common.

Attacks of gastralgia, of which the prominent features are spasmodic pain and contraction of the walls of the stomach, have been regarded as constituting a separate neurosis, but there is no just reason for regarding them otherwise than as a variety of the type already described. The symptoms are especially apt to be excited by indigestible or irritating articles of food or drink, such as cold water in excess, ices, etc., and gastric pain of this character is not uncommon in gouty subjects, and in some persons, as a result of severe mental emotion. The pain is described as intense, of a twisting, constrictive, griping kind, coming on suddenly and most marked near the pylorus; it may, however, extend across the epigastrium and even up the œsophagus. In severe cases the patients seek relief by lying on the abdomen, or rolling about. The symptoms of collapse, as described in a former paragraph, become very marked, and may actually end in death, as a result of failure of the heart's action.

The *diagnosis* of gastralgia is often a task of some difficulty. The points to be determined are, first, that the pain is really situated in the stomach, and secondly that it is not due to organic lesions of that viscus. The ailments other than gastric, for which it may be mistaken, are: intercostal neuralgia; myalgia of the abdominal muscles; colic; circumscribed peritonitis; pain due to the passage of gall-stones, and pain radiated from neighbouring organs. In intercostal neuralgia the pain can be traced along one or more intercostal spaces as far back as the vertebral column; tender spots are generally discoverable, and there is an absence of gastric symptoms other than the pain. In myalgia of the abdominal muscles, the pain is of a more continuous and less paroxysmal character; it is increased by pressure and movement; it changes its seat from time to time, and is relieved when the patient lies on his back so as to relax the abdominal muscles. In colic the pain is not confined to one spot, but moves from place to place, and is accompanied by flatulent distension of the abdomen. In circumscribed peritonitis, the affected part is excessively tender on pressure; the pain is continuous rather than paroxysmal, and is attended with febrile symptoms. The history of the case will also

guide the diagnosis. In cases of gall-stone colic, the pain is especially felt over the gall-bladder, at the outer border of the right rectus abdominis muscle, close to the margin of the thorax, its onset is frequently attended by rigors and vomiting; there are often signs of jaundice, and the gall-stones may be afterwards found in the stools. With regard to affections of other organs, in renal colic, in pericarditis, and in pleurisy, there may be more or less epigastric pain, but its true source will be discovered on careful examination and by observation of other symptoms.

Having determined that the stomach is the seat of the pain, the next point for investigation is whether any anatomical changes exist that would account for the suffering, or whether the latter is purely of nervous origin. Pain is a prominent symptom of gastric ulcer, but is then much aggravated by taking food and is not relieved but increased by pressure; it is, moreover, often associated with vomiting of blood. The pain is of a dull gnawing character, localized in the middle of the epigastrium. In cancer the pain is not so spasmodic and so severe as in some attacks of gastralgia; vomiting is a prominent symptom, and the ejected matters contain a much diminished proportion of hydrochloric

acid. Other points to be considered are: the age of the patient; the presence of cancerous cachexia; the rapid course of the symptoms; the presence of a tumour in the epigastrium, and sometimes of enlarged glands above the left clavicle. Inflammatory affections of the stomach are excluded by the absence of thirst, tenderness, and fever, and by the intermittent character of the pain.

The *prognosis* of gastralgia is favourable as regards life, but the complaint is often a very obstinate one. When dependent on an obvious and removable cause, the prospect of cure is much more favourable. In mild cases the attacks do not much influence the general condition of the patient; but a more serious result is witnessed when the attacks are severe and frequent, and the patient's appetite is much disturbed. This, however, is a somewhat rare consequence, as compared with the results of chronic gastric catarrh in which the digestive functions may be much disordered and the patient may lose flesh and strength.

Treatment. There are two principal objects to be fulfilled: the causes of the suffering should be inquired into and dealt with as far as possible, and means must be adopted for relieving the patient during the attacks.

Rest is an important item in the treatment, and when coupled with warmth and comfort will often do much towards effecting a cure.

Conditions of debility will require tonic treatment of all kinds, and particularly the preparations of iron. In most cases of gastralgia, laxatives adapted to the circumstances of the case will be found beneficial. When there is a history of exposure to malarious influences, quinine is, of course, indicated, and if it fail to relieve, arsenic may be given in doses of ♏ iij-v of the Liquor Arsenicalis three times a day after meals. The same drug is often very serviceable in ordinary cases. If ovarian or uterine disorder be present, appropriate treatment will generally cure the gastralgia. For attacks occurring in gouty subjects, we must in the intervals have recourse to alkalies and purgatives, and above all things regulate the diet in every particular. In cases of gastralgia, attended by nausea and vomiting, ipecacuanha is sometimes a useful remedy. My friend Dr. Gordon thus treated a case of this character, the patient being a young lady, aged twenty. The pain and vomiting had lasted for a month, and were relieved in two days by drop doses of ipecacuanha wine, taken every half-hour, until twenty drops were taken.

To relieve the pain during the paroxysms, warm fomentations may be applied over the stomach and gr. $\frac{1}{6}$-$\frac{1}{4}$ of morphine may be injected hypodermically. For symptoms of faintness or collapse we may give a few drops of æther or ammoniated tincture of valerian on a lump of sugar. The late Dr. Anstie recommended the hypodermic injection of strychnine gr. $\frac{1}{120}$ to relieve the pain. There is, he says, "no such remedy for gastralgia as this." Chloral hydrate, belladonna, and bismuth may be tried if these fail. Some German authorities recommend washing out the stomach with warm water holding carbonic acid in solution. Others assert that electricity is always serviceable in gastralgia, and that failure under the use of this remedy indicates some organic lesion. If the constant current be used, the positive pole is placed over the painful spot, while the negative is applied to the axilla or to the vertebral column. The rheophores should remain in position for from five to ten minutes, and a somewhat strong current is necessary. The faradic current has been found useful in some cases, and is most conveniently applied by placing both poles over the epigastrium. It has also been recommended that while one electrode is kept in this position, the other by means of an elastic

tube should be passed into the stomach, previously filled with warm water.

For attacks of gastralgia occurring in gouty subjects, morphine must be avoided, but there is no objection to the subcutaneous use of atropine. At the same time warm fomentations must be assiduously applied, and if the pain prove obstinate, we may have recourse to sinapisms, or to friction with chloroform liniment. The legs should also be placed in hot mustard and water. It must be remembered that the attacks in these subjects are often associated with undue acidity in the stomach, and it is therefore desirable to give 10 or 15 grains of bicarbonate of sodium at short intervals. After the attack has subsided a purgative will generally be desirable, and the treatment and regimen adapted to the uric acid diathesis should be carefully prescribed. Change of air will almost certainly do good, and gouty cases of this complaint, like most others, will be benefited by warmth, rest, comforts, and freedom from anxiety and worries.

CHAPTER V.

NERVOUS VOMITING AND ERUCTATIONS.

PHENOMENA OF VOMITING—NERVOUS VOMITING—REFLEX CAUSES—MENTAL IMPRESSIONS—ORGANIC NERVOUS LESIONS—PERIPHERAL IRRITATION—DISORDERS OF THE ABDOMINAL ORGANS—DISORDERS OF THE SEXUAL ORGANS—TOXIC CAUSES—SYMPTOMS OF NERVOUS VOMITING—DIAGNOSIS AND PROGNOSIS—TREATMENT, CAUSAL AND SYMPTOMATIC—ICE, ANODYNES, COCAINE, BROMIDE OF POTASSIUM, ETC.—NERVOUS ERUCTATIONS—SYMPTOMS—SOURCES OF THE GAS—CASE OF NERVOUS ERUCTATIONS—TREATMENT.

VOMITING is a common symptom of many affections of the stomach, the act, as a matter of course, being accomplished through the instrumentality of the nervous system. A lesion in the gastric tissues or the contents of the stomach cause irritation of the nerves; this is conveyed to the vomiting centre in the medulla oblongata, and thence to the diaphragm and to certain abdominal muscles, and to the stomach itself, the cardiac orifice of which is opened by the longitudinal muscular fibres. These results are often witnessed after improper food and excess in alcoholic drinks.

Vomiting due to gastric causes is easily intelligible;

but the process is a symptom of many affections of other parts of the body, the stomach itself in such cases being quite free from disease.

Thus nervous vomiting often occurs as a consequence of direct irritation of the vomiting centre, which is closely associated with the centre for respiration, as is shown by the fact that the latter is excited by emetics, that their action is usually preceded by increased respiratory movement, and that nausea may be overcome by rapid and deep respirations. Direct irritation of the vomiting centre may be caused by injuries to the head, tumours, hæmorrhage, etc. Nervous vomiting is, however, more often due to reflex causes, such as disorders of the brain and spinal cord. For the effect to be produced, it is by no means necessary that such disorder should be of an organic kind. In many persons, violent mental excitement and impressions made upon the nerves of special sense, whether by disagreeable odours, tastes or sights, and in some even the remembrance of such things, are apt to provoke nausea and vomiting. I have met with several persons in whom these symptoms were liable to occur as results of mental excitement. With regard to organic lesions of the central nervous system, it is sufficient to mention meningeal affections

of all kinds, inflammation, tumours, hæmorrhage, etc. In cerebral tumours, vomiting is a very common and obstinate symptom; it is also frequently associated with functional disorders as hemicrania and vertigo, and with such general neuroses as hysteria and neurasthenia. In affections of the spinal cord violent and obstinate vomiting is most often seen in connection with tabes, these so called "gastric crises" being a peculiar feature of this disease. Vomiting is far less common in myelitis, sclerosis, and other affections of the spinal cord.

Peripheral irritation of the most varied kind is a common cause of nervous vomiting, and some individuals are very susceptible in this respect. Nausea and vomiting are excited in some persons by irritating the external auditory meatus; in others, by tickling the feet or the axillæ. It is a very common experience for vomiting to be induced by tickling the fauces or the base of the tongue, and this knowledge is often turned to practical use. Tumours and other affections of the nasal mucous membrane, and bronchial disorders, *e.g.*, asthma and whooping cough, not unfrequently cause vomiting, and the same symptom is often troublesome in cases of heart-disease.

Disorders of the abdominal organs often induce

paroxysms of nervous vomiting. Irritation of the gall-ducts or of the pelvis of the kidney or ureters, caused by the passage of calculi, almost invariably causes vomiting; and the same result often follows contusions of the abdomen. The irritation may likewise proceed from the mucous coat of the intestines as in cases of worms and foreign bodies. Vomiting is also a constant symptom of intestinal strangulation, and it is not unfrequent in peritonitis, even when the serous membrane covering the stomach is not implicated.

Disorders of the sexual organs are frequent causes of vomiting. Thus the symptom is wont to occur in connection with various forms of dysmenorrhœa, with malpositions of the uterus and parametritis; in some women the normal discharge of the uterine functions, as during menstruation, is attended with nausea and vomiting, and the occurrence of the same symptoms during pregnancy is a matter of common experience. In male patients, injuries to the testicle, epididymitis, and orchitis are often attended by nausea and vomiting.

In another series of cases the symptom is due to toxic causes, examples of which are to be found in uræmia, jaundice, and in the early stages of some infectious fevers. The effects of several medicines in

producing vomiting is well known, and the symptom is one of the drawbacks which occasionally attends the administration of other medicines, notably the preparations of opium in some patients. The vomiting of drunkards belongs to this category.

There are, of course, no anatomical changes to be found in the stomach in cases of purely nervous origin; but in some cases lesions have been discovered in the nuclei of the vagus after death.

The *symptoms* of nervous vomiting present certain peculiarities. They are easily induced by causes acting upon the nervous system, and are not necessarily connected with the taking of food. Sometimes they occur when the stomach is empty; pregnant women, as is well known, are most often troubled in the early morning. The matters ejected are but little changed, and signs of fermentation are seldom discoverable. The attacks of nervous vomiting last for variable periods, and do not terminate when the stomach is empty; with the cessation of the symptoms the discomfort is at an end, but after violent attacks there may be some amount of collapse with pallor and coldness of skin and clammy perspiration. Certain varieties in the symptom have been described. Thus, in some cases the cardiac

orifice is principally affected, and vomiting soon follows the taking of food. In other cases the pylorus is the seat of the trouble, and food is retained in the stomach for some hours after being taken.

The general health of these patients not unfrequently remains unchanged: they may look fairly well, and not lose weight. An opposite condition of things is, however, sometimes witnessed, the patients losing flesh and strength, and eventually falling a prey to tubercle. The appetite varies, the patients generally complain of thirst. No particular changes are discoverable in the abdomen; only after violent attacks is there pain and tenderness in the epigastrium. In hysterical subjects the urine is often scanty before an attack, and is freely discharged afterwards; urea has been discovered in the matters vomited by these patients. As a matter of course, in all cases of nervous vomiting depending on a definite lesion, the symptoms of the latter will become prominent from time to time.

Diagnosis. This is liable to be very difficult, and especially when no obvious cause for the symptom can be detected. Vomiting may, however, be assigned to nervous causes rather than to any organic gastric mischief when the appetite is good, the tongue clean,

the general appearance that of fair health, and especially when evidences of disordered gastric digestion and of objective lesions are not discovered after careful examination. There is, however, one point on which too much stress can scarcely be laid, viz., the possibility that the symptom may be due to cerebral tumour or incipient Bright's disease. The ophthalmoscope should be used, and if a choked disc be discovered there will be little doubt as to the cause of the symptom, while the detection of albumen in the urine will yield a clue of great importance. All the organs of the body should be examined as carefully as possible. The prognosis, of course, depends upon the cause of the symptom.

In treating a case of nervous vomiting, the discovery of the cause is all-important, and if it can be dealt with satisfactorily the symptom may be expected to cease. Means may, however, be required to check the vomiting, and of these the administration of ice and of various anodynes is the most efficacious. The patient should be kept quiet in bed and should be allowed to suck small pieces of ice, and a little brandy or champagne may be at the same time administered. The morphine is best used hypodermically (about gr. $\frac{1}{3}$), and if it be known to disagree, a dose of chloral hydrate

internally may be substituted for it. Cocaine would be likely to relieve this kind of vomiting; it should be administered in doses of gr. $\frac{1}{4}$-$\frac{1}{2}$ and repeated according to circumstances. Hysterical patients will probably be relieved by a few drops of æther, or by the ammoniated tincture of valerian in doses of ℥xv-xxx on a lump of sugar. Bromide of potassium is sometimes serviceable; it may be combined with a little chloral. If collapse supervene as the result of an attack, æther may be injected subcutaneously, or beef-tea and brandy given as an enema. During the intervals between the attacks a course of bismuth with bicarbonate of sodium and hydrocyanic acid, in infusion of quassia or calumba, will tend to prevent recurrences. The patient should, of course, be careful as to diet; distension of the stomach should be avoided and the food should be of an easily digestible, nourishing character. Whenever flatulence is a prominent symptom, starchy articles of food must be forbidden. A little stimulant should be taken with meals, old whisky or brandy being the most suitable, and either of these may be advantageously diluted with seltzer or other alkaline effervescing water. For the vomiting of pregnancy oxalate of cerium in doses of gr. j-ij is often serviceable.

In connection with the subject of nervous vomiting, the occurrence of frequent eructations due presumably to nervous causes requires a brief notice. Such eructations are not unfrequent in the subjects of hysteria, neurasthenia, and hypochondriasis, and there are generally more or less marked indications of other nervous disorder, but sometimes the eructations are so frequent and troublesome as to constitute the principal cause of the patient's suffering. There is some risk lest they should be attributed to the presence of organic disease in the stomach, some forms of which are accompanied by eructations as a symptom.

In cases belonging to the category under discussion, the patient is worried by constant or frequent eructations of odourless, tasteless gas; the attacks come on spontaneously, but they are very liable to be induced by any form of excitement. In some patients slight pressure over the abdomen or on the spine is sufficient to cause eructations, and these under any circumstances may go on for some minutes or even for hours, with short intervals between them. A day or two may pass during which the patient is comparatively free, and these are followed by hours or days of almost continuous discomfort. The eructations are seldom attended by any decided pain,

but sometimes a feeling of constriction is mentioned; the stomach may appear to be distended, but this is by no means always the case even when the eructations are very troublesome. As to the source of the enormous quantities of gas which are discharged, possibly much of it is simply air that has been swallowed; the fermentation of food might account for some, and it is not improbable that gases may be secreted by the stomach, or at all events escape from the vessels in their atonic condition. Analyses have, however, shown that the gas consists mostly of atmospheric air.

A case presenting many of the features just described has been recently reported to me by a medical friend. The patient, a gentleman aged 76, had for many years been engaged in active religious controversy, which had left its mark upon him. He had a worn, tired look, was subject to fits of depression and of irritation, and although highly intelligent, was unable to take much interest in anything. Even reading excited him, and time hung heavily on his hands. He had a fair amount of bodily strength, and in ordinary weather could take sufficient exercise. For some two or three years before he came under my friend's care he had been troubled with frequent gaseous eructation, not connected with the

presence of food in the stomach, but always made worse by the least excitement. The attacks would sometimes go on for hours, and at night especially they were apt to be very troublesome, preventing sleep and causing great irritation. The appetite was good and the diet had always been carefully attended to; the bowels acted regularly; the urine was pale, normal in quantity, of somewhat low specific gravity, but contained neither albumen nor sugar. The patient was a tall, thin man, of decidedly nervous temperament. The tongue was clean and rather large and flabby; the stomach was sometimes distended, though never very prominent. After repeated examinations by my friend, aided by a distinguished London physician, nothing abnormal was discoverable in the abdomen or elsewhere. Various medicines and local applications gave only temporary relief; the patient grew thinner and more miserable, and finally went to another part of the country, where he died shortly afterwards.

The treatment of such a case as that above described is difficult and unsatisfactory. The patient was provided with a set of artificial teeth, which soon became quite comfortable to him. Some relief was obtained from nux vomica and small doses of rhubarb, and from

mustard plaisters over the stomach. Small doses of creasote and of carbolic acid were tried, combined with morphine and myrrh, and at first the discharge of gas was appreciably lessened, but the improvement was not permanent. Quinine, too, had a good effect for a time. Faradism was tried, one pole being placed over each extremity of the stomach, but little or no benefit resulted. The diet received the most careful attention; but the discomfort appeared to be unconnected with the food.

CHAPTER VI.

ENTERALGIA—COLIC—NEURALGIA MESENTERICA.

Colic, Definition and Causes—Irritating Articles of Food—Gaseous Distension of the Abdomen—Drastic Purgatives—Lead and Copper—Colic as a Symptom of Nervous Disorders, and in Connection with Gout and Rheumatism—Colic due to Cold—Symptoms of Colic—Diagnosis—Prognosis—Other Forms of Colic—Neuralgia of the Bowels—Nervous Diarrhœa—Treatment—Aromatics and Stimulants—Warmth Locally—Opiates—Ipecacuanha—Purgatives—Enemata—Morphine Hypodermically—Treatment of Gouty and Rheumatic Cases—Treatment of Neuralgia of the Bowels—Anodynes, Tonics, Improvement of General Health, etc.

Colic may be defined as pain in the intestines, unattended by obvious anatomical changes in any of the structures of the bowels. It may, therefore, be regarded as a purely nervous disorder, sometimes excited by the intestinal contents, or by changes which they have undergone, but sometimes occurring as an independent neurosis. In cases belonging to this latter category, either central or reflex peripheral irritation may be presumed to exist.

With regard to the intestinal contents, fæcal accumu-

lation is one of the most common and potent causes of colic. Such accumulation acts for the most part as a mechanical irritant upon the mucous membrane; the increasing hardness of the fæces adds to the effect of their volume, by which the bowel is abnormally distended. Less common causes of this nature are foreign bodies of various kinds, *e.g.*, masses of round worms, or of tape-worms, gall-stones, and foreign bodies, swallowed either by accident or intention. Severe attacks of colic are often caused by articles of food of an irritating nature, or having acquired such properties after having been swallowed. Imperfectly fermented liquor of all kinds, unripe fruit, sour milk, semi-decomposed fish or meat are well-known causes of this character. I have seen many cases of colic due to irritating ingesta and fæcal accumulation, and two instances in which the attacks were due to tapeworms. Even normal articles of food may serve as irritants, when taken in excessive quantities; the gastric and intestinal secretions are insufficient for their due preparation and digestion, and more or less decomposition is the result. In another class of cases, the attacks are induced by the physical peculiarities of the articles taken; the effect upon many persons of cold drinks and

ices may be quoted as an example, and other attacks are connected with personal idiosyncrasy. Thus in some subjects attacks of colic are apt to be induced by eating certain shell-fish, pork, fruits and vegetables of various kinds, all of which other persons take with complete immunity.

A very common form of colic is that which is due to gaseous distension of the abdomen, a frequent result of the fermentation of food. This form is very often seen in children, farinaceous food being especially liable to undergo fermentative changes. The abuse of drastic purgative medicines is another cause of colic; instances of this character are common among poor people. Cases of colic due to the influence of lead and copper form a distinct class; the manner in which these poisons produce their effects is very uncertain.

As a neurosis, in the strict sense of the term, colic is a somewhat common complaint among the subjects of hysteria, hypochondriasis, and neurasthenia, and it likewise occurs in connection with some organic disorders of the nervous system. Thus the gastric crises of locomotor ataxy are sometimes accompanied by like symptoms referable to the intestines. Such enteric crises may, however, occur independently; they take the

form of sudden attacks of diarrhœa, with or without pain, and they may continue for several days. As examples of colic due to reflex action may be mentioned the intestinal pain and diarrhœa which sometimes accompanies disorders of the liver, kidneys, uterus, and ovaries.

Both the gouty and the rheumatic diatheses occasionally contribute towards the production of an attack of colic. In gouty cases the symptom may precede the articular inflammation and subside on its development, or may replace it, little or no pain being felt in the joint. In colic connected with gout and rheumatism, there is often tenderness on pressure, and sometimes fever. Pain in the intestines of a neuralgic character and coming on at regular intervals, has been occasionally observed in cases of malarious fever. The only other important cause of colic which requires notice is exposure to cold and wet. Cases of this kind are somewhat frequent; contraction of the cutaneous vessels may be supposed to be followed by dilatation of the intestinal capillaries. Cold applied directly to the abdomen may produce an immediate effect on the muscular coat of the intestines.

The principal *symptom* in colic is the pain which

comes on suddenly without premonitory warnings, and is felt especially in and about the umbilicus, whence it extends to the region of the cæcum, ascending and transverse colon; but it often radiates to the loins, and downwards towards the thighs. The severest pain is sometimes confined to one spot; in other cases the pain changes its place and is then often accompanied by rumbling noises in the intestines, portions of which create protrusions from the abdominal wall. As a general rule the pain is at first slight, and gradually increases in intensity, but in some cases it is very severe from the first. Like other kinds of pain, the sensation is variously described by different patients; thus, it is sometimes said to be cutting, pricking, pinching, boring, or as though the bowel were being stretched or torn. The violence of the pain may be such that persons with considerable command over themselves are completely overcome by it, and are unable to check their cries and groans. As objective symptoms, the skin becomes cool and covered with perspiration; the face is pale, the pulse is generally slow and hard. The attacks vary considerably as regards duration and liability to recurrence; sometimes the pain ceases after a few minutes, and does not return; in other cases the attacks recur

again and again during several hours, and the patient is never entirely free from pain during that time.

The positions assumed by patients suffering from colic are often characteristic; the sufferer lies "doubled up," as it is termed, with the knees brought close to the abdomen, or he presses his hands against the painful part and sometimes he tries to get ease by adopting a prone position. On examining the abdomen, it is either hard and retracted, or prominent, tympanitic and distended. In a thin patient, the distended loops of intestine are often plainly visible, and the irregular peristaltic movements can be easily traced. Rumbling sounds—borborygmi—are often associated with the movements.

In most cases of colic, the pain is relieved by firm pressure over the abdomen, and the patient's experience teaches him to try this plan. In some cases, however, there is decided tenderness of the abdomen, and pressure causes so much pain as to give rise to the suspicion of peritonitis. Symptoms due to reflex action are frequently experienced in other organs; thus, attacks of colic are liable to be attended with nausea and vomiting, hiccough, dyspnœa, palpitation of the heart, precordial oppression, strangury, tenesmus, etc. In male subjects

the testicles are often drawn up and the levator ani is spasmodically contracted. Painful cramps in the legs, fainting, and other symptoms of collapse, muscular twitchings, and even convulsions have been noticed in some cases.

As a general rule, after lasting for a variable time, attacks of colic suddenly pass off, perhaps after vomiting, eructations, discharge of flatus or diarrhœa. Complete recovery is the rule, but death has been known to occur, as a result of rupture of the intestines from excessive gaseous distension; and in another case the fatal issue was due to convulsions.

The *diagnosis* of colic is for the most part easily made provided that the case be carefully investigated. The important point to determine is whether the symptoms are due to some organic lesion, inflammatory or otherwise, or whether this possibility can be excluded. Colic in hysterical subjects may be so severe as to resemble peritonitis, but it differs essentially from the latter in being unattended by fever, and as a general rule, by tenderness, either on gentle or firm pressure. Moreover, in peritonitis, the symptoms are continuous, and tend to become worse. It must, of course, be remembered that colicky pains are apt to occur in many

intestinal affections, and especially in dysentery, and in connection with catarrhal, tuberculous and carcinomatous ulceration. It would scarcely be possible, however, to mistake the symptoms of these diseases for an attack of colic, and the same remark applies to strangulated hernia, which cannot be overlooked on proper examination.

Rheumatism of the abdominal muscles may be mistaken for colic, but in the former the pain shifts its place, is apt to become chronic, and exhibits no decided exacerbations and remissions. The abdomen is tender to the touch, the pain is not deep-seated, but superficial, and can be excited by friction. In lumbo-abdominal neuralgia *points douloureux* can generally be detected towards the vertebral column. Hysterical subjects are liable to colic, and likewise to neuralgic pains in the abdominal muscles and skin, of a shifting character, and generally relieved by friction with anodyne liniments. As a matter of course, when a diagnosis of colic has been arrived at, the nature of the attack has yet to be determined, and for this purpose it would be necessary to take into consideration the various points discussed in the ætiology. The possibility of lead being the cause of colic must never be

forgotten; the gums should always be examined for any traces of a blue line. I have seen several cases of intractable colic due to lead speedily relieved after discovery of the cause, which had not been previously suspected.

The *prognosis* in cases of colic depends upon the cause of the symptom; in the great majority of cases the complaint yields readily to suitable treatment. When the pain is dependent upon obstruction in the bowels and persists in spite of remedies, the prognosis must be more guarded. Unless, however, the obstacle be insuperable, as in cases of malignant disease of the bowel, recovery may be expected to take place. Neglected attacks of colic may pass into actual inflammation, either of the peritoneal or of the mucous coat of the bowel.

Before proceeding to discuss the treatment, it will be well to refer to certain modifications sometimes noticeable in the symptoms of these painful affections of the bowels. Cases are met with from time to time in which the spasmodic element is either wanting altogether, or else very slightly marked, though the pain is very severe indeed. There is no inflammation and no attendant vascular excitement, and the pain,

though paroxysmal, is more steady for some time than in spasmodic colic. The paroxysms are wont to occur without obvious cause, though they are sometimes excited by the passage of food; some amount of tenderness often remains after their subsidence. These attacks, to which the term "neuralgia of the bowel" would appear to be applicable, are due to various causes, such as general debility, a rheumatic or gouty diathesis, spinal disorder, or some affection of the sympathetic ganglia. Dr. Clifford Allbutt thinks that gout and the strife of public life are potent factors in the production of enteralgia; he has given details of several cases in his lectures on "Visceral Neuroses;" my own experience coincides with this author's views. After severe attacks, the collapse and prostration are often very serious; periodicity is sometimes noticeable; and in some cases the enteralgia takes the place of another neurosis, *e.g.*, migraine. There is no marked constipation, flatulence or disordered alvine secretions, and the complaint is associated with various conditions of the general health.

Disordered innervation of the intestinal tract may produce disturbances not only of sensation, but also of motion and secretion, and according as the motor activity

is lessened or excited, symptoms either of nervous constipation or of nervous diarrhœa will be liable to occur. In many persons, attacks of the latter complaint are liable to be induced by anxiety or grief; in others, the subjects of idiosyncrasies, such attacks set in immediately after certain articles of food have been taken, and are to be explained by attributing them to increased peristaltic action the result of nerve-irritation. The intestines often participate in disordered action of the stomach; and symptoms referable to both these parts are frequent in cases of hysteria, hypochondriasis, and neurasthenia, and in women suffering from ovarian and uterine disorders. In the treatment of these nervous gastric and intestinal troubles it is of great importance to bear in mind the condition which underlies all the manifestations.

In treating a case of colic the cause of the attack is the first point to be attended to; relief of the pain and evacuation of the bowels are the main indications. For simple spasmodic colic, due to flatulence or exposure to cold, and of no great severity, relief may often be obtained by the exhibition of aromatics and stimulants, such as tincture of ginger, spirits of peppermint, compound tincture of lavender or cardamoms diluted with hot

water. To any of these a few drops of laudanum or half a drachm of compound tincture of camphor may be added to relieve pain, or tincture of chloroform and morphine ♏ x may be given for the same purpose. At the same time warm applications, *e.g.*, turpentine stupes, to the abdomen and placing the feet in warm water will aid in procuring relief. In hysterical cases some tincture of asafœtida or valerian may be combined with the aromatics. Severe pain must be checked by increased doses of opiates, and if symptoms of collapse set in, æther and other stimulants may be freely given.

When the attack of colic is obviously due to acrid and irritating ingesta, antispasmodics and opiates must be withheld until the source of the evil has been got rid of. If the attack commence soon after eating, it will be well to administer an emetic, and ipecacuanha will be the most suitable, inasmuch as it often produces free action of the bowels. When the stomach has been evacuated, five grains of calomel or a draught containing rhubarb, soda, and aromatic spirit of ammonia may be given if the bowels have not been sufficiently relieved. To hasten the action of the cathartics, and as substitutes for them when the transverse colon is the principal seat of pain, purgative enemata are of the

greatest service. Warm water, injected slowly with an O'Beirne's tube, may prove sufficient, but if not, a turpentine enema may be employed. In hysterical cases, and especially if there be much flatulence, a warm water enema containing a drachm of asafœtida will be preferable. If convulsions occur, chloroform inhalation (not pushed to complete anæsthesia) will check the movements, and likewise subdue the intestinal spasm. For the relief of the latter, and especially in dealing with children, a warm bath will prove very efficient.

In all these cases of colic, after the pain and spasm have subsided and the bowels have been thoroughly evacuated, the patient should be kept quiet and warm for some time. The diet should be carefully regulated; food of a light and easily digestible nature should be prescribed, and everything likely to engender flatulence must be rigorously interdicted. If necessary the bowels must be kept open by mild laxatives, and aromatics, with bitter tonics, may be given to prevent recurrences.

If the colic be suspected to be due to the presence of worms, or other foreign bodies, the treatment is obvious. For tapeworm, the oil of male fern or the oil

of turpentine should be given in suitable doses. When the attack is due to irritating articles of food, and has come on some hours after they have been taken, or to distension, the result of fermentation, we may give such purgatives as above described, or a dose of castor oil if tolerated by the stomach; and in any of these cases if the pain be very severe, we may at the same time endeavour to subdue it by administering opium in some form. The hypodermic injection of morphine gr. $\frac{1}{6}$ will be found very suitable, and its effects, as regards both pain and spasm, will be increased by adding gr. $\frac{1}{60}$ of atropine. Laudanum may also be added to the castor oil and to the rhubarb draught. When the attack is due to the abuse of purgative medicines, opium is especially indicated, and it may be advantageously combined with chalk and aromatics.

In attacks of colic of gouty or rheumatic origin it is generally desirable to evacuate the bowels, and for this purpose the draught containing rhubarb, soda, magnesia, and tincture of cardamoms will be found most serviceable. Local external remedies, and the use of the warm or hot bath, are desirable adjuvants. In gouty subjects, if the attack be due to metastasis, revulsion to the extremities is indicated, for which purpose hot and

stimulating foot-baths, with sinapisms to the feet and ankles may be employed. After the acute pain has subsided, a draught containing tinct. colchici, liquor. morphinæ hydrochlorat., āā ♏xv, may be given every four hours for a day or two, in order to diminish irritation. Under similar circumstances, in rheumatic cases, bromide of potassium with alkalies and some bitter tonic should be administered, the diet in all these cases being very carefully attended to.

In that form of colic which is attributable to neuralgia of the bowels, purgatives and other remedies of a lowering character are seldom indicated; on the other hand, anodynes and tonics constitute the best remedies for the symptoms. Morphine may be administered subcutaneously in combination with atropine; and if the former drug be ill borne, atropine alone or the extracts of belladonna, conium, or hyoscyamus may be given separately or in combination, and pushed so far as to produce a decided effect. Preparations of iron, especially the carbonate, are likely to prove serviceable, and if there be any evidence of periodicity, quinine should be administered in combination with hydrobromic acid. The diet requires careful attention; it should be of a nutritious character and abundant in quantity. In

extreme cases, the Weir-Mitchell system of treatment should be tried, or at least the patient should be kept in bed for two or three weeks; warmth is always beneficial. Change of air, rest, freedom from worry, and cheerful society will tend to cure the complaint, and to prevent recurrences. When pain in the stomach is associated with the abdominal symptoms, small doses of arsenic taken after meals will be found very efficacious. The treatment of nervous diarrhœa, due to disordered motor activity, will be discussed in a subsequent chapter.

CHAPTER VII.

CONSTIPATION.

Prevalence of Constipation—Causes, Age, Sex, Occupation, Want of Exercise, Neglect—Too little Fluid in Diet—Normal Action of Bowels—Contents of Fæces—Defæcation—Consequences of Constipation—Chlorosis—Other Causes of Constipation and Disorders with which Associated—Surgical Causes—Habitual Constipation, Influence of Drastic Purgatives—Insufficiency and Improper Quality of Food—Diagnosis—Treatment of Constipation—Of Occasional Attacks—Castor Oil, Salines, Rhubarb, Calomel and Senna—Enemata—Faradism—Treatment of Chronic Constipation—Attention to Habits—Necessity of Daily Visit to the Closet—Regulation of Diet—Fruits and Vegetables, Fluids—Laxatives, Aloes and Cascara—Castor Oil, Senna, and Bitter Tonics—Nux Vomica—Salines, Mineral Waters, Friedrichshall, Rubinat-Condal, Etc.—Carlsbad Salts—Hepatic Stimulants as Podophyllin, Iridin, Euonymin, and Leptandrin—Nitro-muriatic Acid—Belladonna—Enemata, their Drawbacks—Other Remedies—Caution as to Use of Laxatives.

Of the functional disorders of daily life, few are more common than constipation. It affects persons of all ages and both sexes, though women, and especially married women who have borne children, are particularly liable to be troubled. It is a common ailment of scrofulous, rachitic, and syphilitic children, and also of

infants brought up by hand. It likewise constitutes one of the difficulties connected with advanced age. Examples of the complaint are to be found in every class, but certain occupations and habits specially favour its development. Thus the effect of lead in the production of constipation is well known, and we find that persons who lead sedentary lives, *e.g.*, tailors, shoemakers, seamstresses, lawyers, and intellectual workers in general, form a large contingent of cases. On the other hand, labourers are seldom affected, for bodily exercise stimulates peristaltic action, increases respiration and circulation, and improves the quality of the blood, while the action of the diaphragm and abdominal muscles on the intestines produces an effect similar to that of massage.

Constipation is frequently experienced by those who lead luxurious and slothful lives, who eat, drink, and smoke too much, who are irregular at their meals and indulge in various enervating habits. The complaint is also common among persons in many respects just the opposite to those just described. Men actively employed in business, having apparently more to do than time will permit, often hurrying over their breakfasts to catch a train, are very apt to neglect the calls of nature.

Women, too, frequently suffer from similar neglect, and in their case another important factor often comes into play, viz., an insufficient amount of fluid in their diet. Water forms the principal constituent of the body, and the integrity of its various parts is closely connected with the amount of fluid contained therein. When an insufficient quantity of water is taken the excreta become inspissated and hard, and pass through the bowels with difficulty. As a result of their retention the sensitiveness of the rectal walls becomes deadened; the sigmoid flexure and the colon are abnormally distended, the muscular coat of the bowel is weakened, and the peristaltic power considerably reduced, and in this way a condition of chronic constipation is slowly but surely established.

For perfect health, as a general rule, it is necessary that the bowels should be relieved once in 24 hours. Owing to a variety of causes, some persons have an action of the bowels once in two or three days, or even at a longer interval, and yet enjoy good health; while others, again, are not comfortable unless the bowels act twice or three times a day. There are infinite differences with regard to frequency of action; Dr. Habershon relates the case of a woman, 60 years of age, who from

her youth up had had a passage only every six or eight days, and yet was always healthy. Variations are due to individual peculiarities and conditions, such as temperament, quantity and quality of the food; the rapidity and completeness of the digestive processes, whereby there is a smaller or larger residue; the activity or otherwise of the skin and the normal average peristaltic power of the intestine.

That a daily action of the bowels is most conducive to health is not only borne out by experience generally, but is also confirmed by the teachings of physiology. The contents of the large intestine are made up of the remains of food that has resisted the digestive processes in the passage from the stomach to the colon. These differ in consistence, colour, and odour, and in chemical and microscopical appearances from the contents of the small intestine. The average quantity in 24 hours is about 4½ozs., 73 per cent. of which is water. The odour is due to decomposition of the residue of the food; the colour to the bile pigment, the absence of which leaves the fæces light or clay-coloured, while their consistence is the result of the constant absorption of the liquid portions. About 10 per cent. of the solid residue consists of un-

digested matters, and the remainder of fæcal substances.

The undigested matters examined under the microscope are found to be composed of animal and vegetable structures that have not been acted upon by the digestive fluids; the fæcal substances are made up of disintegrated intestinal epithelium, mucus, and the solid remains of the secretions, none of which serve to nourish the body. As the fæces are moved along the large intestine by its peristaltic power, they become more solid and acid in reaction; fermentation is often set up and is accompanied by the development of several gases. Owing to the absorption which takes place in the colon, the fæces gradually become more solid, till the sigmoid flexure is reached. Here they rest upon the bladder and sacrum, but do not press upon the sphincter ani. When the column of fæces descends into the rectum, peristaltic action is excited in its walls, so that the mass is pressed against the sphincter; the lumbar centre which controls this muscle is now inhibited, the abdominal and accessory muscles come into play, the sphincter is relaxed, and the rectum is unloaded.

The maximum irritation of the rectal walls occurs,

as a rule, once in 24 hours; and when the habit has become regularly established, the desire to defæcate at a certain hour is quite independent of the will.

When we consider the mechanism of defæcation, the composition of the fæces, the effects of pressure upon the rectal and intestinal walls, and the local, as well as the general symptoms that are aroused by the retention of fæces, we must be convinced that it is of the greatest importance for the health of the body that the act should be regularly and thoroughly accomplished.

Apart altogether from the local disturbances that are set up by the presence of retained fæces, there is risk of a kind of blood-poisoning from the absorption by the colon of portions of the fermenting and decomposing mass. The results, as often witnessed, are paleness and loss of flesh, a dull and unhealthy complexion, and offensive exhalations from the skin and lungs; dulness and depression of spirits, irritability, drowsiness, vertigo, headache, palpitation, furred tongue, pains in the loins, gastric derangement, and various biliary and urinary disorders. Conditions of hypochondriasis and melancholia are often traceable to constipation.

A recent writer in the *Lancet* (Nov. 26, 1887) regards chlorosis as a consequence of auto-infection, a true poisoning, from the retention of fæculent matters in the intestine. The affection is generally preceded and accompanied by constipation: sometimes the poisoning takes place rapidly, putrid decomposition being promptly followed by absorption from the intestine. Febrile symptoms are another result of auto-infection. It may be doubted whether constipation is the sole cause of chlorosis, but it is probably an important factor in the production of the complaint.

There is often constipation, of a temporary kind, in acute and wasting diseases, such as acute rheumatism, phthisis, and various fevers. Under such circumstances the condition is due mainly to the dryness of the intestinal contents (inasmuch as more water escapes through the skin and lungs), to the diminution in their amount, and likewise to the change of habits necessitated by the disorder. Constipation is common in puerperal women, owing to the pressure of the uterus on the intestines, to the relaxation of the abdominal walls, and the withdrawal of fluid, resulting from the secretion of milk. The constipation that so often accompanies jaundice may be due to the absence of bile, which excites

peristaltic action, or to the accumulation of that secretion in the blood, whereby the intestinal movements are hindered, as is also the action of the heart. Constipation is always present in acute hydrocephalus, and is due to the irritation of the inhibitory nerves. The same condition likewise prevails in acute peritonitis, and is due to the extension of the inflammation to the muscular coat of the bowels. The walls become infiltrated with serum, and thus their tonicity and peristaltic power are much impaired.

It is not my object, however, in the present chapter to consider all the forms of constipation, acute and chronic, which are met with by the physician in daily practice, or to discuss minutely all the various causes that may produce the complaint. I propose rather to confine my remarks to the more common forms of habitual constipation due to deficient propelling power of the intestines, and not dependent upon mechanical obstruction in these organs or in the surrounding tissues. Causes belonging to the categories last mentioned must, however, be referred to in connection with diagnosis, and though little more than their enumeration can be attempted, yet in order to arrive at a correct estimate of the nature of the disorder in

any given case, they must be carefully borne in mind in the examination of the patient.

In general terms it may be stated that anything that retards or prevents the passage of the fæces through and out of the intestines will be a cause of constipation. Obstruction, slowly developed, may be due to pressure on the rectum by an ovarian or uterine tumour; to displacements of the uterus; enlarged prostate; polypoid growths in the rectum or colon; cancerous or other stricture of the rectum, or other portions of the intestines. Dysentery and syphilis are the most common causes of the latter character: their effects are slowly produced, and the condition always tends from bad to worse.

Constipation is also caused by internal strangulation and by bands formed in peritonitis. Internal obstruction may be caused by one portion of intestine entering another (invagination) or passing into one of the foramina connected with the abdomen; by twisting of the mesentery, or of this structure and a portion of intestine about a loop of the latter; and finally by rotation of the intestine upon its own axis. As a result of chronic diarrhœa, the lower end of the small intestine sometimes enters the colon, and prolapse of

portions of the latter into the rectum is not uncommon as a result of severe and chronic dysentery.

There are certain surgical disorders which produce constipation and require a brief notice. Chief among these is fissure or painful ulcer of the rectum; in this complaint defæcation is accompanied and followed by very severe pain. A similar condition is sometimes noticed in connection with hæmorrhoids, the mucous membrane covering them becoming ulcerated and exquisitely sore. In both these cases constipation is largely due to the efforts of the patient to restrain the bowels from acting; the retained fæces increase the ulceration and prevent healing. In elderly persons degeneration of the muscular tissue, especially of the rectum, sometimes induces constipation, and in male subjects enlargement of the prostate may impede defæcation and lead to the same result. After injuries of various kinds requiring confinement to bed, constipation is a common trouble, but unless other conditions be present it generally subsides. After injuries to the head and spine, and in many chronic nervous affections, the bowels are apt to become much confined, and the original disorder is thereby considerably aggravated.

Having thus glanced at some of the structural causes

that may give rise to constipation, I shall now discuss more particularly those cases of habitual disorder of this kind so often occurring in practice, and generally to be ascribed to sluggish peristaltic action of the bowel. Besides the causes already mentioned there are several others which must not be passed over. The peristaltic action of the bowel may be temporarily enfeebled by over-action and simple fatigue, induced by severe diarrhœa or the action of medicines; and it may be permanently weakened by repeated drastic purgatives. Many sufferers from habitual constipation aggravate their disorder by the frequent use of these medicines, and the effect of this practice is that a constantly increasing degree of irritation, obtained either by increasing the dose or by employing still more powerful drugs, is required to induce the peristaltic action of the bowels. The habitual use of pills, "liver-regulators" and so-called "vegetable aperients," in great demand by maid-servants, as well as that of the purgative mineral waters among the upper classes, is a fertile source of constipation. In the course of time the reflex activity of the bowel, whose natural stimulus is the intestinal contents, is never brought into play except by artificial aid. Besides increasing the constipation, the

habitual use of purgatives leads to chronic catarrh of the mucous membrane, tumefaction and hypertrophy of the muscular coat, diminished excitability, tonicity and reflex contractile power, distension of the bowels and various displacements, proctitis and follicular ulceration in the colon. Chronic peritonitis, with the formation of fibrous bands, is another consequence of constipation and of attempts to relieve it by injudicious methods. I have recently seen a case in a young lady in whom constipation was aggravated, if not induced, by tight lacing. Pressure on the ascending and descending colon as a result of the constriction and fæcal accumulation had set up ulceration about the appendix cæci, and this was followed by perforation and localized peritonitis.

Another cause of constipation is obstruction of the portal circulation, either directly, as in cirrhosis or by a tumour; or as a result of heart-disease interrupting the return of blood through the vena cava, and causing venous congestion and chronic intestinal catarrh.

Insufficiency of food is another cause of constipation, and cases of this kind are often seen among women whose food is inadequate in quantity to excite the peristaltic action of the bowels. The nature of the food is not without influence; if it consist mainly of

farinaceous articles, such as bread, potatoes, rice, and pastry, and especially if these be washed down by draughts of tea, constipation is very apt to be induced. Some kinds of tea are especially mischievous in these respects, owing to the large proportion of tannin they contain. The influence of this constituent upon salivary digestion has been already alluded to (see p. 485).

The *diagnosis* of constipation can never be difficult if a proper examination be made. Individual peculiarities with regard to the action of the bowels must, of course, be borne in mind; and it must never be forgotten that very decided constipation may exist, notwithstanding regular evacuations, if of an insufficient quantity. It not unfrequently happens that a portion of the fæces which ought to be discharged at each evacuation is retained, and an accumulation thus gradually takes place, eventually becoming very considerable. Under such circumstances fæces may be discharged from the rectum, and when they are accompanied by much mucus, the result of irritation, the patient may fancy that he is suffering from diarrhœa. A careful examination of the abdomen and rectum will detect the true state of things. A tumour

will often be detected in some part of the colon and the rectum will be found full of fæces.

It must be remembered that obstinate constipation is a symptom of many affections of the brain and spinal cord, of diseases of the liver, heart, and lungs, of mechanical impediments to the passage of fæces, and of disorders attended with copious elimination of water by the skin or kidneys.

The *treatment* of constipation may be considered under two heads: 1. The means of dealing with occasional attacks, and 2. The course to be adopted for cases in which the condition is habitual. For occasional attacks we may have recourse to purgatives or laxatives, proportionate in their activity to the circumstances of the case; and it is always well to give mild remedies at first. Of these, castor-oil is one of the best, and its nauseous taste, its only drawback, should be disguised by the addition of oil of almonds, or other flavouring material. Saline purgatives, of which the sulphates of sodium and magnesium and the phosphate of sodium may be taken as the type, are suitable for those cases in which constipation is accompanied by febrile movement, and for gouty and plethoric subjects. The alkaline carbonates may be

added with advantage, and if it be desired to produce a more decided effect the salts may be dissolved in infusion of senna, qualified by the addition of aromatics. A draught containing rhubarb, soda, magnesia, and aromatics is an old-fashioned remedy for constipation; it is suitable for cases in which the condition is temporary and due to an error in diet. The more active purgatives, such as jalap, colocynth, scammony, and gamboge, are seldom required for the cases under consideration. The pil. colocynth. et hyoscyami is, however, a good combination, and is suitable for occasional use. If it be wished to act decidedly on the liver, in cases in which torpidity of that organ is associated with the constipation, 3 or 4 grains of calomel or blue pill should be given, and followed in a few hours' time by the salts and senna draught. All the remedies just mentioned are suitable only for occasional use; they are not adapted for habitual constipation.

In the cases under discussion, should the purgative prove ineffectual, or should its use be unadvisable by reason of the irritability of the stomach, the employment of enemata becomes indispensable. The safest and most efficient substance for this purpose is simple

warm water injected into the bowel in large quantities, and repeated so as gradually to soften and wash away the fæculent matter. It may be necessary to aid the contractile power of the sphincter by twisting a towel round the tube of the enema-syringe, and pressing it against the perinæum. It is sometimes advantageous, and indeed necessary, to introduce the water directly into the colon through a suitable tube passed high up into the bowel. If warm water fail to produce any effect, recourse may be had to enemata containing turpentine, sulphate of magnesium, or aloes. In cases of impaction of fæces in the rectum, the employment of a scoop or some similar instrument becomes necessary in order to break up the solid mass. By way of aiding the effect of injections, we may have recourse to friction over the abdomen and loins, or allow a stream of cold water to fall upon their surface. The application of cloths wetted with cold water sometimes proves effectual, and if all these measures fail, faradism should be tried. For this purpose, the rectum having been emptied, one pole constructed for the purpose is introduced within the bowel, while the other is moved gently over the abdomen, especially over the position of the colon from right to left. The application should be

continued for ten or fifteen minutes; the results are sometimes very satisfactory.

The chronic forms of constipation require treatment, differing in many respects from that just laid down. In the first place, attention must be paid to the removal of the cause, which will often be discoverable on inquiry. The patient should be instructed to endeavour to acquire the habit of regular evacuations by daily visits to the closet; but straining should be avoided as likely to cause prolapsus ani and hæmorrhoids. When opposite conditions have apparently contributed to produce the constipation, regular habits of life, moderate exercise, and relaxation from intense mental toil, with change of air and scene, often prove valuable auxiliaries to the measures about to be discussed. Cold or tepid baths, according to the state of the patient, should never be omitted; they often aid greatly in restoring tone to the bowels.

The regulation of the diet is all-important, and in some cases will prove sufficient to induce a proper action of the bowels. The food should be sufficient in quantity, taken at regular intervals, and of a digestible character, containing a due amount of vegetables and fruits. Certain articles of diet possess laxative pro-

perties, and these are generally suitable unless they irritate the stomach. One of the best of these is bread made from "whole meal;" only the silicious envelope is removed from the wheat, the *whole* grain being then ground into moderately fine flour. Some patients can eat with advantage the so-called "brown bread," which contains a considerable quantity of bran, very coarsely ground. Either kind should be taken whenever bread is eaten; except among ignorant persons, the prejudice in favour of white bread is soon got over. Porridge may also be recommended for the same purpose; some persons find that it acts admirably as a regulator of the bowels. When the stomach is free from irritation, fresh and dried fruits are often very serviceable in cases of constipation; patients find this out for themselves, they are often free from their discomfort when ripe fruits are procurable. The most suitable of these are gooseberries, currants, and strawberries, ripe pears and apples; the latter should generally be cooked. In winter, and when other fruits are not procurable, oranges, figs, and prunes may be used instead. Ringer recommends an orange or two to be taken before breakfast as a pleasant and often effectual way of overcoming habitual constipation. Among various articles of diet

which have a beneficial effect in these cases may be mentioned honey, treacle, buttermilk, and bacon. Milk should be rather sparingly used by these patients, and especially by children who are subject to constipation. With regard to fluids, care should be taken that the daily quantity is not too small; tea should be avoided on account of the tannin it contains, but coffee is less harmful; in some cases, indeed, it appears to exhibit laxative properties. Water constitutes the best drink, and it should be taken freely with meals; some patients find that a glass of cold water taken while dressing has a satisfactory effect. Stimulants should be avoided as much as possible; if their use has become a necessity a little sound bitter beer, or a glass or two of hock may be allowed; claret should be avoided, as it is more or less astringent in its action.

In most of the cases of constipation that come under the notice of the physician, laxative medicines of some kind are indispensable. The patients have usually had recourse to first one and then another aperient drug; indeed, the number of those advertised is a measure of the extent to which the disorder prevails. It is necessary to emphasize one point in starting, viz., the injury which these persons inflict upon themselves by taking

doses of strong purgatives. Relief may be gained for the time, but at the cost of aggravating the original disorder. The restoration of the natural action of the bowels is the indication to be fulfilled.

In the choice of laxatives the physician has to determine whether salines or drugs belonging to the vegetable kingdom are likely to prove the more suitable, and perhaps for the majority of cases remedies belonging to the latter class will best answer the purpose. In dealing with a case of habitual constipation complicated probably with dyspepsia, we may, after regulating the diet and mode of life as far as practicable, prescribe some such combination as the following :—℞. Extract. Aloes Socot. gr. j-iss.; Extract. Belladonnæ gr. $\frac{1}{8}$; Quininæ Sulphat. gr. j.; Extract. Hyoscyam. gr. j. ft. pil. j. A dozen of these pills should be given to the patient with the instructions that he should take one daily before dinner, and after a few days try whether one every other day will answer the requirements. Purging is, of course, to be avoided, and if improvement result it will be well gradually to diminish the dose. For some patients the sulphate of iron may be substituted for the quinine, but the combination as given above will be found a very useful one. Another drug, recently introduced, the cascara sagrada,

is of great value in many of these cases, and, like aloes, it possesses tonic as well as aperient properties. It is best administered in the form of the liquid extract of the pharmacopœia, the dose being ♏ xv-xx twice or three times a day, and gradually diminished as soon as a satisfactory effect results. Various palatable preparations of the drug are to be found at the chemists, and of these Messrs. Squire's "elixir" is one that can safely be recommended. Some patients find by experience that castor-oil relieves habitual constipation, and that the dose may be gradually lessened until a teaspoonful proves sufficient. Senna is another purgative often employed, and it may be conveniently administered in the form of the compound liquorice powder of the pharmacopœia. The bulk and sweet taste of this powder are somewhat objectionable. Senna may also be given in the form of confection, to which a similar preparation of sulphur and black pepper may be added with advantage, especially for patients with a tendency to hæmorrhoids. Rhubarb is not suitable for chronic constipation. Its employment tends to perpetuate the condition, and the same remark applies to the stronger purgatives, such as colocynth, jalap, and scammony. Bitter tonics will often aid the effect of laxatives, and a

course of such medicines as quassia, gentian, calumba, or cascarilla, with alkalies or acids according to circumstances, will often prove advantageous. The nux vomica is perhaps the most valuable remedy of this class, and it suffices in some cases to relieve habitual constipation. For this purpose ♏ viii-x of the tincture should be taken every morning. It is especially indicated whenever there is pronounced atony of the bowels, and much gastric or intestinal flatulence. For these latter cases gr. $\frac{1}{6}$ of the extract will advantageously replace the quinine in the pills mentioned in a preceding paragraph, and when the intestinal secretions are deficient, gr. $\frac{1}{2}$ of ipecacuanha may be added to each pill.

In plethoric subjects, and whenever there are evidences of functional derangement of the liver, saline aperients are generally indicated. These act promptly, and besides removing the contents of the bowels, they cause a decided drain from the intestinal vessels, and relieve congestion of the portal system. It would appear that they prevent the absorption of the intestinal secretions which are taken up by the veins and lymphatics. The salts best adapted for the purpose are the sulphates of sodium and magnesium, the phosphate of sodium and the tartarated soda. These

may be given in the ordinary manner, but a very convenient way of exhibiting them is in the form of some one or other of such mineral waters as Friedrichshall, Püllna, Kissingen, Æsculap, or Hunyadi Janos. The Rubinat-Condal, a Spanish mineral water, contains a large percentage of sodium sulphate, and a small proportion of magnesium; it is free from the bitter taste so objectionable in many of these waters, and does not depress the system. The dose of any of these varies according to circumstances; from two to six fluid ounces may be required. It is generally advisable to add an equal quantity of hot water; and the medicine should be taken about half-an-hour before breakfast. The quantity should be so regulated as to produce one, or at most two evacuations, without griping or discomfort. It is often advantageous to combine tonics with salines; thus the sulphate of quinine with a little sulphuric acid may be added to the sulphates of magnesium and sodium.

When the constipation is associated with symptoms of gastric catarrh, fermentation and acidity, Carlsbad water is preferable. The principal salts contained in the Sprudel spring are the sulphate, carbonate, and chloride of sodium. These salts may be obtained in

the dry state, and when dissolved in water are very efficacious. About a teaspoonful should be added to half-a-pint of boiling water, and when the solution has cooled down to 120°, two or three ounces should be taken every five minutes. The salts may be thus taken every morning or every other morning according to circumstances, and the dose may be increased, if necessary, or one of the aloes pills may be taken before dinner.

In cases of constipation dependent upon, or associated with functional disorder of the liver, certain vegetable drugs may be used with advantage, the chief among them being podophyllin, iridin, euonymin, and leptandrin. All these rank as cholagogues and aperients. The resin of podophyllum in doses of gr. $\frac{1}{4}$-$\frac{1}{2}$ may be conveniently combined with aloes, capsicum, and belladonna in the form of a pill; the dose of iridin is from one to five grains, and of euonymin about the same quantity; leptandrin is given in doses of two grains. The three last-named drugs are less irritating to the intestines than podophyllum. As a tonic for the cases under discussion, the most suitable is the nitro-muriatic acid, with the tinctures of nux vomica and hyoscyamus in infusion of chiretta.

For habitual constipation in general, Trousseau recommends belladonna in doses of gr. $\frac{1}{6}$-$\frac{1}{4}$ of the extract either night or morning, increased if required, and diminished or discontinued when the constipation is removed. It should be tried for a fortnight or three weeks. Dr. Nunneley, cited by Ringer, "finds this treatment useful in all forms of constipation, especially when coexisting with dyspepsia, characterized by a thinly-furred tongue, with prominent red papillæ at the tip, epigastric tenderness, pain after food, and often more or less headache."

Many persons employ enemata as substitutes for cathartics by the mouth, administering them daily or every other day. The practice is liable to several objections; if used warm, enemata are apt to cause a torpid condition of the intestines; moreover, they apply to one part of the bowels the irritation which laxatives spread more or less over the whole tract, and they do not empty the upper part of the canal. Their frequent use also washes away the mucus intended to lubricate the surface of the bowel. In cases in which there is a tendency to hæmorrhoids or prolapsus ani, it is well to inject two or three ounces of cold water after the bowels have been moved.

Among the remedies for the relief of chronic constipation it is only necessary to mention faradism, already referred to; frictions to the abdomen, with coarse flannel, or the flesh brush, and tepid or cold douches. Some persons find that smoking after breakfast produces the desired effect. One caution must be borne in mind with regard to laxative medicines. They are to be regarded only as adjuvants to more rational methods; the dose should be no larger than absolutely necessary, and the drugs should be discontinued when they are no longer absolutely required.

CHAPTER VIII.

DIARRHŒA.

Diarrhœa, Conditions for its Production—Causes, Food, Cold, Mental Excitement, Summer Diarrhœa—Diarrhœa Accompanying Intestinal Lesions and Various Morbid Conditions—Persons most Subject to Attacks—Anatomical Appearances—Symptoms in Adults—Influence on General Condition—Severe Attacks—Diagnosis—Treatment, Question as to Arresting Discharges—Sometimes Desirable to Facilitate them—Castor Oil, Sulphate of Sodium, Rhubarb, and Calomel—For Checking Diarrhœa, Opium, Aromatics and Astringents, Camphor, Warmth, Stimulants — Chronic Diarrhœa—Diet and Regimen—Rest—Diarrhœa in Children—Causes of Frequency—Disorders of Digestion—Complications—Treatment, Cautions as to use of Opiates—Warm Baths, Stimulants, Flannel to Surface—Diet—Enemata of Warm Water—Calomel—Cautions as to Excessive Feeding—Chronic Diarrhœa—Diet, Flannel and Warmth—Grey Powder, Vegetable Astringents, Chalk, Bismuth, Perchloride of Mercury, Arsenic, Iron.

Diarrhœa, owing to its frequency, occupies a prominent place among the functional disorders of the abdomen; it is also a common symptom of many organic lesions of the abdominal viscera. The term is used to signify discharges from the bowel more fluid and usually more abundant than those of health. Three

conditions are necessary for the production of diarrhœa: (1) increased peristaltic action, (2) free communication between the upper portions of the intestines and the lower end of the bowel, and (3) the presence of contents capable of being propelled along the canal.

The following are the principal causes of diarrhœa:—

1. The passage of substances from the stomach into the intestines, capable of accelerating the peristaltic movements of the latter, either with or without the production of inflammation. Articles of diet of this character have been already described in the chapter on Indigestion, and the fact must be borne in mind that peristaltic movements of the stomach thus induced may be propagated thence to the intestines, and cause movements of a similar character along the entire tract. Thus it is that in some persons a little cold water taken fasting in the early morning, is sufficient to produce free action of the bowels. Under pathological conditions, in which the excitability of the parts is increased, such propagation of movement is often witnessed under the operation of comparatively slight stimuli. Cases in which the irritation proceeds from the stomach must be distinguished from those in which the intestines form

the starting-point; but it often happens that both parts are implicated. A distinction must also be drawn between such materials as cause inflammation as well as diarrhœa and those which do not induce the former; in this last category may be placed many articles of food; fluids, especially water, and laxative medicines of a non-irritating kind.

2. Another common cause of diarrhœa is exposure to cold, and particularly when the abdomen itself is thus acted upon. The manner in which the effect is produced is by no means certain, but the sequence of the two events is often beyond doubt. Many persons are liable to diarrhœa after exposure to cold, and especially if damp be combined with the cold. In such cases it is generally said that the alimentary canal is a *locus minoris resistentiæ*. It may be that the diarrhœa is the result of transudation into the intestines, taking place as a consequence of paralysis of the vaso-motor nerves. Cold often acts very energetically after previous exposure to heat, and especially when the body is perspiring freely.

3. In a less numerous class, diarrhœa is apt to set in suddenly as a result of nervous excitement, *e.g.*, terror or anxiety, the stomach being sometimes affected at the

same time, as shown by eructations and vomiting. This form is not uncommon in hysterical patients.

4. Another category embraces those forms of summer and autumnal diarrhœa, the cause of which is doubtful, but is probably of an infectious nature: the stomach is often disordered at the same time.

Diarrhœa induced by any of the above-mentioned causes is rapidly developed and of an acute character. Under proper treatment it may quickly subside, and such is the general rule in subjects otherwise healthy. It may, however, become a chronic disorder, liable to exacerbations. Diarrhœa of this latter type frequently occurs in association with disorders of nutrition and various pathological lesions or other circumstances which prevent the restoration of a healthy action. Intestinal lesions and disorders are by no means always attended by diarrhœa, and therefore must be regarded as only a predisposing cause thereof. As a matter of fact they produce the result in question by setting up a condition of catarrh in the intestines; if they fail in this respect, severe disorders, such as extensive ulceration, may exist without diarrhœa. The latter invariably accompanies catarrhal

inflammation of the colon, and is apt to become very marked as the complaint continues.

The intestinal lesions and various conditions often accompanied by diarrhœa are as follows:—

1. Ulceration occurring in the course of specific infectious disorders, such as typhoid fever, dysentery, and intestinal tuberculosis.

2. Disordered movement of the blood in the intestines, such as results from obstruction to the flow in the vena portæ. This condition exists in those diseases of the liver which produce compression of the capillary system of the organ, and in cases in which the intestines are agglutinated together as a consequence of chronic peritonitis. Congestion of the intestinal veins is also liable to occur in those cardiac and pulmonary disorders in which the flow of blood from the inferior cava is impeded. Fæcal obstruction is another obstacle of a mechanical kind to the flow of blood, and it may produce symptoms of diarrhœa by causing intestinal catarrh.

3. Attacks of diarrhœa are common symptoms of such constitutional disorders as rickets and scrofula.

There is one condition of the bowels, viz., amyloid

degeneration, of which diarrhœa is a marked symptom. Once set up, it is apt to be almost uncontrollable, and continues until death.

Besides the infectious disorders above mentioned which are localized in the bowels, and are always attended by diarrhœa, there are other infectious complaints which are often similarly accompanied. Thus, various septic processes, such as occur in puerperal fever and disorders of a different character, viz., scarlet fever and uræmia, are not unfrequently attended with discharges from the bowels. It is probable that a portion of the virus acts upon the intestinal mucous membrane, and is thus got rid of; evacuations of this character may sometimes be regarded as favourable. In fatal cases, however, various lesions are discoverable in the intestines, such as indications of catarrh, extravasations of blood in the mucous and submucous coats, and even ulcers as a result of necrosis. In non-fatal cases the diarrhœa may be regarded as of a functional character.

Persons of all ages are liable to suffer from diarrhœa, but the complaint is especially frequent among infants under two years old. This frequency is due in part, though not altogether, to bad feeding. There are great

differences among individuals with regard to liability to attack. The same cause which affects one person will be harmless to others. As a general rule weakly subjects are prone to suffer, and the complaint in such subjects, once set up, is apt to be violent and obstinate.

The anatomical changes in cases of diarrhœa can be disposed of in a few words. In many cases little or nothing is discoverable, for signs of congestion often subside after death. In other cases there is more or less catarrh, with production of much mucus and detachment of epithelium; infiltration of the connective tissue with fluid and cells. In chronic cases atrophy of the mucous membrane is often observed. When the diarrhœa has been associated with specific disorders the changes peculiar to these latter will, of course, be noticeable.

In describing the symptoms and treatment of diarrhœa it is well to make a distinction between the complaint as it occurs in adults and those forms of it which are common in children. Important differences exist in several particulars.

In adult cases an attack of acute diarrhœa usually begins with a feeling of uneasiness in the abdomen, which soon amounts to pain of a griping character.

Rumbling sounds are caused in the abdomen, which becomes somewhat distended. A desire to defæcate is then experienced, and is soon felt to be uncontrollable. Evacuation takes place with some force; fluid and gaseous matters are discharged with the more solid fæces, and the stool is often frothy. After the motion the abdominal pain and uneasiness are relieved, and perhaps quite subside, but there is often a feeling of insecurity, warranted by a speedy return of the colicky pains and discharge of fæces. When the lower part of the large intestine is especially implicated, tenesmus is a common symptom. Passage of the motions does not bring relief, the patient is worried by the feeling that something remains in the rectum, and he makes straining efforts to get rid of it. He may even feel that he scarcely dares to leave the closet or night-chair; his efforts sometimes cause more or less prolapsus of the rectum, with aggravation of his troubles. The matters discharged are at first pulpy, with the appearance and odour of fæces. Gradually they become more liquid, and eventually non-fæculent, consisting of fluid matters containing much mucus, and more or less coloured with bile. In some cases diarrhœa sets in with two or three loose watery motions in rapid succession, the disturb-

ance then subsiding and stools of natural consistence making their appearance.

Diarrhœal discharges are sometimes unattended by pain, but as a general rule they are preceded by the sensations above described. Sometimes painful and painless discharges alternate in the same patient. The presence or absence of pain is no indication of the special form of disorder present. When the attack is due to irritating ingesta, pain of a griping character is seldom absent. In ulceration of the bowel it is also a common symptom, and is accompanied by tenderness on pressure.

Unless of a very slight character an attack of diarrhœa is seldom without influence on the general condition of the patient. Thirst is often experienced as a result of the withdrawal of fluid from the system. The urinary secretion is lessened, its colour becomes deeper, its specific gravity is increased, and a sediment composed of urates is apt to be deposited when the urine gets cold. More or less weakness and depression are experienced by the patient, and his appearance is altered for the worse. There is generally some loss of appetite, even when the stomach is not involved in the attack.

After very frequent stools and copious discharges, resulting in the abstraction of much fluid from the tissues, the patient's appearance may closely resemble that which is seen in cases of cholera: the prostration is intense; the features are sunken so that even a young patient looks aged; the skin is cold; the pulse small and frequent; there are muscular twitchings, suppression of urine and diminution of temperature. In children general convulsions are sometimes caused by diarrhœa; adults often become listless and apathetic. After serious attacks, recovery is a tedious process; and in aged and weakly subjects death is not uncommon. Chronic diarrhœa invariably leads to more or less serious disorder of nutrition, as shown by the loss of flesh and anæmia which steadily progress while the abdominal symptoms are liable to variations. Diarrhœa much aggravates the effects of other exhausting diseases.

The *diagnosis* of diarrhœa can never present any difficulty, and the discovery of the cause, which is all-important as regards treatment, is generally easy. The first question for the physician to decide is whether it is desirable to check the peristaltic action upon which the diarrhœa depends, and the decision must be guided

by the conditions present in any given case. If the patient's life is in jeopardy by reason of the number and profuseness of the evacuations, there can be no doubt as to the course to be pursued; but in the absence of such danger, the question will arise whether the removal of irritating matters from the intestine will not be the most rational way of curing the diarrhœa. Such a question may have to be solved not only when dealing with cases of diarrhœa due to irritating ingesta, but also with those in which the discharges aid in removing from the body the infectious materials of such disorders as typhoid fever, septicæmia, and the like. In these latter cases the course to be pursued depends upon the condition of the patient, and the frequency and amount of the discharges. When irritating ingesta are present their removal is always desirable, and this is best effected by the use of castor oil, a mild, non-irritating purgative. The sulphate of sodium is another suitable remedy for this purpose; it should be given in half-ounce doses, dissolved in half-a-pint of warm water. It should not, however, be given to weakly subjects, nor to cases in which the discharges have been very profuse and fluid in character. Rhubarb is another excellent remedy for these cases; the dose is about

gr. x, and it may be advantageously combined with soda, magnesia, and carminatives.

When the stomach is in an irritable condition, and would reject either castor oil or rhubarb, a full dose of calomel (gr. v-x for adults) will prove the best remedy. It quickly removes all offending materials, without causing much depression, and it likewise tends to check vomiting.

When it is deemed desirable to check the peristaltic action of the bowels and thus arrest diarrhœa, opium is the best remedy at our command. The drug may be given either in the solid form or in that of the tincture, and small doses are to be preferred to large ones. It is most conveniently administered by the mouth; but for severe cases the most efficacious way of using opium is the introduction of suppositories containing about a grain of the extract. One of these may be employed after each relaxed motion, and two or three are usually sufficient. An enema containing laudanum is less efficacious; even a small quantity of fluid is apt to irritate the rectum. When uneasiness of the stomach is coupled with that of the intestines, a few drops of laudanum combined with such aromatics as Tinct. Card. Co., or Tinct. Lavandulæ, or Pulv. Cretæ

Aromat., will be found efficacious. In so-called "summer diarrhœa" it is well to combine some bitter astringent with the opium, and tincture of cinchona is very suitable for this purpose.

The same combination (using tinct. opii, ♏ iij-v) may be continued during convalescence; given before meals, it serves to lessen the irritability of the stomach and to check abnormal peristaltic action.

Astringents of various kinds, *e.g.*, catechu, kino, gallic acid, acetate of lead, dilute sulphuric acid, chalk, and sulphate of copper are often employed in cases of diarrhœa; they are suitable mainly for the chronic forms. Those which contain tannin should not be given in combination with opium, inasmuch as its alkaloids are thereby rendered almost insoluble. If opium be contraindicated for any reason, the vegetable astringents may be substituted and given either with or without chalk. A new remedy, coto bark in the form of a tincture, is useful for catarrhal diarrhœa. For summer diarrhœa, and for cases in which the symptoms continue after expulsion of the exciting irritant, spirits of camphor, in doses of four or five drops every ten minutes till the symptoms abate, is often very efficacious, and a little brandy may be added

with advantage. The same drug is also useful in diarrhœa the result of exposure to cold.

Besides the remedies above mentioned, rest in bed and warm applications to the abdomen will do much to check diarrhœa and to relieve pain and tenderness, and should never be omitted. A warm bath once or twice daily is very grateful to the patient, and is especially serviceable when the attack has been due to cold; it should be followed by a warm bed. The diet in acute attacks should be restricted to small quantities of bread and milk, arrowroot or sago, taken lukewarm. If stimulants are necessary, a little warm brandy and water, or claret and water, may be administered. During convalescence, the greatest care is necessary with regard to diet; the rules laid down in the chapter on Dyspepsia must be put in force.

In dealing with cases of chronic diarrhœa, the habits of life and diet of the patient require minute attention. Every attempt should be made to discover the cause of the complaint, and any errors which tend to perpetuate it. The dietetic rules applicable to dyspepsia, subject to such modifications as may be required, should be clearly prescribed; as a general rule such articles of diet should be chosen as are of a nutritious character,

but leave a small amount of fæcal residue. Warm clothing with flannel next the skin should always be worn, and an extra piece of thin flannel or of silk round the abdomen is generally to be recommended. In severe cases, and during exacerbations the patient should be kept in bed, but under more favourable circumstances suitable exercise should not be neglected.

Diarrhœa dependent on hepatic derangement will be described in the succeeding chapter of this work.

It is now desirable to consider the subject of diarrhœa in connection with children, among whom the complaint is extremely prevalent. The younger the child, the greater the liability to disorder of the digestive organs, and the attacks usually involve the entire intestinal tract, and are accompanied with diarrhœa. The normal physiological conditions are very favourable to the development of disorders of digestion in children; the organs charged with providing the necessary secretions are insufficiently developed in early life, and it is only by slow degrees that they become equal to the tasks laid upon them. Moreover, the child cannot at first distinguish between the sensations of hunger and thirst, and for some time is unable to express its wants otherwise than by crying. While still at the breast its

food is such as to satisfy both hunger and thirst, but the case is very different after weaning. A child conscious of thirst is only too apt to get such food as relieves hunger; the alimentary canal is overloaded with materials in greater quantity than can be dealt with by the secretions: decomposition of the food follows, with gastric and intestinal irritation or inflammation as an inevitable consequence.

The influences of disorders of digestion upon young children are only too clearly manifest; their slight power of resistance to injurious influences is exhibited by the mortality; a large proportion of children die during the first year from disorders of the digestive organs. The symptoms of these complaints are liable to be complicated by certain others which are never seen in older and stronger subjects, and their appearance is due to the small power of resistance possessed by the child's tissues. Among the more serious of these secondary phenomena are the formation of abscesses and the spread of suppuration with the development of much unhealthy pus: hæmorrhages into the skin and mucous membranes, sloughing in the mouth and other parts, destructive inflammation of the eyes, etc. It not unfrequently happens that the violence of the attack itself

produces fatal collapse, and epidemics of this character are very liable to occur in crowded cities during hot weather. Even milder forms of diarrhœa, if continued for any length of time, may produce serious emaciation with a fatal result. The child's organism suffers from the withdrawal of nutritive materials much more rapidly and seriously than the system of the adult; on the other hand, owing to its greater powers of assimilation, a child under favourable circumstances often makes a very speedy recovery.

The *treatment* of diarrhœa in children is the more difficult inasmuch as opium is a dangerous remedy in very young subjects who are particularly sensitive to its action. Many a child has been sent out of the world by a dose or two of "soothing syrup" or some such nostrum of which opium is the active constituent. The drug is, however, often indispensable, and it may be given to very young children provided that due care be taken. For a child under six months the maximum dose is half a drop of laudanum repeated in three hours if necessary. Between six and twelve months, one drop is the dose, and for every year a drop may be added, six or seven being regarded as the maximum. In violent attacks all food should be withheld for five

or six hours ; a few drops of claret or a drop or two of brandy may be given every quarter of an hour, and the child should be placed in a warm bath and kept there for ten or fifteen minutes, while friction is applied to the surface. The warmth often acts admirably by relieving the venous congestion in the abdomen. It may be applied in another way, viz., by enveloping the body in folds of linen rung out of hot water, and covered with india-rubber sheeting over which flannel is rolled : this plan may also be adopted as a supplement to the bath. The child is then placed in a warmed bed, and if its lower extremities are cold they should be wrapped in flannel. After four hours have elapsed, the bath may be repeated, and a longer interval may be allowed if there are signs of increased power of the circulation, such as moisture appearing about the skin of the face. After a period varying from six to twelve hours, supposing the patient to be an infant, attempts may be made to administer the mother's milk ; but if this be not tolerated, the wine should be given every ten or fifteen minutes. For the treatment of attacks in children brought up by hand, a wet nurse is generally indispensable. When there are indications of tenesmus, it is well to administer an enema of warm water with a

little salt dissolved in it. Great gentleness should be used in injecting the fluid which serves to wash away irritating matters from the bowels. Should the tenesmus continue, a little mucilage of starch containing a drop or two of laudanum should be injected. Small doses of calomel (gr. $\frac{1}{12}$) every three or four hours are often useful in sub-acute cases; the mercurial acts as a local disinfectant. One caution is necessary in dealing with infants suffering or recovering from diarrhœa, viz., to prevent them from distending their stomachs with the breast-milk; the child is thirsty, but its powers of digestion are in abeyance and any excess of food becomes decomposed and acts as a poison. Intervals of from four to six hours between suckling should be allowed; the number and condition of the evacuations are the best guide for regulating the frequency of feeding.

In dealing with chronic diarrhœa in children, the regulation of the diet is the main point to be attended to. If the child be yet unweaned, proper intervals, say of three or four hours, should be suffered to elapse between suckling and especially if the mother or nurse has much milk. When artificial food is given, it should be well diluted; thus cows' milk should be mixed with twice its volume of water, boiled and allowed to cool down, before being

administered. The child's bottle and the articles in which the food is kept must be scrupulously cleansed, and plenty of fresh air is very necessary for these cases. Flannel should be worn next the skin and the feet should be kept warm. In older children rice-flour, arrowroot, or baked flour may be added to the milk with advantage, and milk and lime-water is sometimes useful. When the stools are offensive as well as frequent, a little grey powder, with rhubarb and carbonate of sodium, is a good remedy. Sour-smelling frequent stools will require chalk, or bismuth in doses of one or two grains. The vegetable astringents are useful to check frequency; a drop or two of laudanum will heighten their action. For very slimy stools, especially if mixed with blood and accompanied by pain and straining, the perchloride of mercury in doses of gr. $\frac{1}{60}$ every two or three hours will be found very efficacious; a little Dover's powder may also be given at bedtime. When the stools contain lumps of half-digested food the liquor arsenicalis, in doses of one or two drops, should be given before each meal. During convalescence from diarrhœa, a course of the liquor ferri pernitrat. will often prove very serviceable.

CHAPTER IX.

FUNCTIONAL DISORDERS OF THE LIVER.

FUNCTIONS OF LIVER—SECRETION OF BILE, FORMATION OF GLYCOGEN AND METABOLIC PROCESSES — FUNCTIONAL DISORDERS — HEPATALGIA — CIRCULATORY DISORDER — HYPERÆMIA, CAUSES AND SYMPTOMS—TREATMENT—BILIOUSNESS AND A BILIOUS ATTACK—CAUSES AND TREATMENT—DISORDERS OF THE SECRETORY FUNCTION—THE SALIVA AS A TEST—EXCESSIVE SECRETION OF BILE—SYMPTOMS AND TREATMENT—DIMINISHED SECRETION OF BILE—SYMPTOMS AND TREATMENT—VITIATED SECRETION OF BILE—SYMPTOMS AND TREATMENT—DISORDERS OF THE METABOLIC PROCESSES—EVIDENCE THAT UREA IS FORMED IN THE LIVER—LITHÆMIA AS A RESULT OF FUNCTIONAL HEPATIC DISORDER—SYMPTOMS, CAUSES, AND TREATMENT—ALBUMINURIA IN THESE CASES — ITS CAUSES, IMPORT, AND TREATMENT — CUTANEOUS AFFECTIONS IN LITHÆMIA AND THEIR TREATMENT.

THE liver discharges at least three functions, one of which is perfectly obvious, while the other two are less apparent, but not less real. In the first place the gland secretes bile, which, formed by its cells, passes into the bile-ducts and thence into the duodenum. (2). The hepatic cells also form glycogen, which does not escape by the ducts, but in a diffusible form passes into the blood-vessels, and leaves the liver by the hepatic veins. (3). The liver is largely concerned in the destruction

of albuminous matters derived from the blood and tissues, and the formation of urea and uric acid. The organ is one of the chief places in which red blood-corpuscles become disintegrated; the hæmo-globin is the source of bile-pigments, and the blood of the hepatic vein contains fewer red corpuscles than the blood of the vena portæ (Landois).

In the present chapter I propose to consider disorders of the liver, of a functional character, and exhibiting the forms of perversions of the nervous, circulatory, secretory, and metabolic processes.

I. **Nervous disorder of the liver.** Pain of a neuralgic character is the only recognized affection of the liver coming under this head. Pains are felt in the right hypochondrium and epigastrium, not connected with any appreciable change in the volume or position of the liver. They occur in paroxysms; are sometimes of a dull character, sometimes acute and lancinating; and they vary extremely as regards their duration and times of recurrence. They may come on daily, or at longer regular or irregular intervals; they may last only a few minutes, or may continue to be troublesome for days or weeks. They are probably connected with a gouty or rheumatic habit, and especially with the former, in the

development of which functional hepatic disorder plays a very important part. They are distinguishable from the pain attendant upon inflammation of the liver by their fugitive character and by the absence of all the other signs of that affection, and notably by the absence of tenderness on pressure. Firm pressure, indeed, will rather relieve the pain of hepatalgia. There is neither febrile disturbance nor jaundice; but there may be constipation and some loss of appetite, and the attacks are usually attended with much depression of spirits.

The *treatment* of hepatalgia consists in the administration of purgatives and alkalies; a few doses of blue pill at bedtime, followed in the morning by a teaspoonful or more of Carlsbad salts dissolved in six ounces of hot water, will generally prove efficacious. If there be decided gouty manifestations a little extract of colchicum may be added to the blue pill. Iodide of potassium will probably relieve the pain in rheumatic subjects, and quinine should be given during the intervals.

II. **Circulatory disorder of the liver.** Hyperæmia of the liver is a common condition, and is met with under a variety of circumstances. The fluxionary form occurs during the digestion of food, some of the constituents of which are absorbed by the radicles of the portal vein

and conveyed to the liver. The physiological process resembles that of disease, and fails to subside when an excessive amount of nourishment is habitually taken, especially when at the same time little or no bodily exercise is practised. The condition is, therefore, very common among those who eat and drink to excess and lead idle or sedentary lives. It is also liable to be provoked by the ingestion of stimulating condiments and by the use of spirituous liquors. As a chronic morbid condition, passive congestion of the liver is a frequent accompaniment of circulatory and respiratory disorders, of tumours in the mediastinum compressing the inferior vena cava, and of disorders of the hepatic veins. Chronic hyperæmia of the liver is often the result of malarial poisoning, and the organ is frequently congested in cases of typhus and typhoid fevers, and as a consequence of exposure to heat, as during a residence in the tropics. Attacks of congestion of the liver also not unfrequently result from chills, especially after the body has been over-heated.

The *symptoms* of hyperæmia of the liver vary according to the causation and the state of fulness of the vessels. There is generally a feeling of weight, tension, or oppression in the right hypochondrium, diminution or loss of

appetite, furred tongue, nausea, either constipation or some amount of diarrhœa, perhaps a bitter taste in the mouth, and a yellowish tinge of the eyes, skin, and urine. None of these symptoms are constant, but whenever they exist signs of mental disturbance are often superadded. The patient is apt to be low-spirited, languid, or drowsy; things in general seem to be going wrong, the feeling of despondency may perhaps amount to melancholia, or the symptoms may be those of hypochondriasis. Sometimes there is shortness of breath, and the patient from time to time takes deep inspirations, so as to relieve the congestion by pressure on the diaphragm. In some cases there is severe pain, shooting to the back of the right shoulder, and down the right arm. Some patients find that lying on either side causes severe pain. On examining the hypochondrium the volume of the liver is found to be more or less increased, and there is considerable tenderness on pressure. In some instances the symptoms are quickly developed, and as quickly disappear; but in others, and especially when the causes remain in operation, they assume a chronic character. Hæmorrhoids are not unfrequent accompaniments of hyperæmia of the liver. Sometimes the condition is relieved by an

attack of diarrhœa or by a discharge of blood from the rectum.

The *treatment* of hyperæmia of the liver depends upon the causation. If due to excessive indulgence in food and stimulants, the latter should be entirely interdicted and the diet considerably reduced, animal food being either withdrawn for a time or allowed in very small quantities. Exercise should be likewise enjoined, and warm baths will relieve the condition of the liver. Saline purgatives with alkalies are generally suitable, and a little blue pill may be given occasionally at bed-time. Cold compresses may be applied with benefit to the region of the liver, and in obstinate cases superficial blistering is likely to be of great service. When the symptoms become chronic we may have recourse to nitro-muriatic acid and nux vomica, paying due attention to the diet, exercise, and state of the skin, and keeping the bowels regular by means of aloes or cascara. Exposure to cold should be avoided by these patients, and when the symptoms have passed off it is well to recommend the wearing of a silk or flannel belt over the hepatic region. Such prophylactic measures for preventing recurrences as exercise and proper abstinence should never be neglected. For hepatic congestion due

to malaria quinine and nitro-muriatic acid are the best remedies. The treatment of cases due to organic disease must, of course, be guided by the nature of the latter.

Before discussing in detail the various disorders of the secretory function of the liver, it seems desirable to say a few words upon the condition known as "biliousness," and its acme, a "bilious attack." There are perhaps few words more freely or more indefinitely used by the public at large for describing ailments than these two expressions. "Biliousness" is generally used to designate a form or state of indigestion, attended by a bitter or otherwise nasty taste in the mouth and perhaps nausea. A "bilious attack" implies a more or less severe explosion of gastric derangement with headache and vomiting. Biliousness is in truth often due to torpor of the liver resulting in lessened or vitiated secretion of bile, and the symptoms will be described under those headings.

A "bilious attack" is generally the result of gastric and duodenal catarrh caused by errors in diet, frequent indulgence in rich and highly seasoned dishes, and alcoholic stimulants. In some persons one such repast is followed by a "bilious attack," the symptoms of which may ensue at once, or not until several hours

have elapsed. Perhaps the patient goes to bed soon after a meal of the above character, passes a restless or feverish night, and is altogether unrefreshed when morning comes. He is conscious of a disagreeable taste in the mouth, and the tongue is foul and coated. Thirst is troublesome, and is but slightly relieved by fluids. Black spots float before the eyes; eructations, the flavour of which resembles the odour of a rotten egg, cause the patient much annoyance. There is more or less headache, chiefly felt in the forehead and increased by moving, and especially by stooping. Nausea is soon succeeded by retching and vomiting, the ejected matters consisting of undigested articles of food, much frothy and foul-smelling fluid and finally bile. The efforts at retching are apt to continue long after the stomach has been emptied, but they subside after a variable interval; the headache also passes off, and except, perhaps, for some amount of depression the patient feels much as usual. Some persons get quite accustomed to these attacks, and instead of striving to prevent them, they regard a blue pill and a black draught as the appropriate antidote. They confess themselves to be bilious, and attribute their attacks to ill-behaviour on the part of the liver. As a matter-of-fact, the stomach is the offended

organ; there is no hindrance to the flow of bile and no disorder of the liver other than that of a temporary character due to the errors in diet. It is, however, very difficult to persuade patients that such is the actual state of the case; "biliousness" seems a far easier explanation, and is the more welcome inasmuch as scores of "antibilious" remedies are easily procurable.

In thus referring to a bilious attack, it is necessary to remember that not a few persons believe that migraine, instead of being essentially a nervous malady, is the result of "bilious" disorder. This idea is supported by the fact that vomiting and sometimes the ejection of biliary matters are apt to occur during an attack of migraine. The causes of the latter affection have been fully described in a previous chapter, and while it is true that an error in diet is sometimes the exciting cause of an attack, it is quite certain that migraine has no necessary causal connection with the state of the stomach. In not a few cases there are no signs of gastric disorder; in others the latter supervene some hours perhaps after the first symptoms in the head, and are the result of the nervous disorder. Again, when the attacks occur at regular intervals, and a paroxysm is nearly due, it may be sometimes brought on by an error

in diet, whereas the same error repeated a day or two afterwards is followed by no such effect. The differences between migraine and an ordinary bilious attack due to improper food are so marked that no observant person can fail to distinguish between the two conditions.

With regard to the symptoms of disorders of the secretory functions of the liver a minute account will be given in succeeding paragraphs, but there is one test for these disorders lately insisted on by Dr. S. Fenwick and well deserving of consideration. He believes that the sulphocyanide of potassium "in the saliva is increased in quantity whenever an unusual demand is made upon the nutritive organs by the necessities of the system, and these organs are capable of answering to the call; but that on the contrary the amount of the salt is diminished whenever the nutritive organs are unable to meet its requirements." The presence of the sulphocyanide in the saliva depends upon a decomposition of the biliary salts, and inasmuch as chronic congestion of the liver lessens its functional activity, the salt is always below the normal amount when this condition exists. Dr. Fenwick's researches show that any circumstance preventing the digestion or absorption of the food is accompanied by a diminution in the amount

of the salivary salt, and that the quantity of this latter can be accepted as a measure of the activity of the liver, duodenum, and salivary glands, but mainly of the first alone. For the methods of testing the saliva the reader is referred to Dr. Fenwick's essay.*

III. **Disorder of the secretory function of the liver.** The secretion of the liver is liable to three forms of disorder; it may be excessive, deficient, or vitiated in quality. In all these cases, other symptoms, *e.g.*, diarrhœa, jaundice, or constipation, are liable to result, but evidences of the hepatic disorder of secretion, as shown by the state of the alvine evacuations, may be for some time the only manifestation.

(1). *Excessive secretion of bile* is a common symptom in hot climates; it may also be caused by undue use of stimulants, alcoholic and otherwise, and by gastric and intestinal irritation. In hot climates the liver seems to act vicariously for the lungs in carrying off excess of carbonaceous matter. The exaltation of function under such circumstances is not of long duration, and is generally confined to the earlier years of residence. Afterwards an opposite condition is apt to set in,

* "The Saliva as a Test for Functional Disorders of the Liver," by Samuel Fenwick, M.D. 1887.

and a deficiency of the biliary secretion becomes evident. Much, however, depends upon the habits of life of the individual, and especially upon the diet and the amount of exercise taken.

The *symptoms* of excessive secretion are more or less pain and tenderness in the right hypochondrium, loss of appetite, nausea, and perhaps vomiting, but especially diarrhœa, with a deep bilious colour of the evacuations. The latter are sometimes green from the action of acid in the bowels, are generally rather frequent, and attended with abdominal pain and a burning sensation in the rectum; more or less fever is generally present, and the patient likewise complains of headache and thirst.

The *treatment* in the early stage consists in the removal of the cause, rest, cool drinks, and a low diet. Before diarrhœa has set in we may administer a mild laxative, such as sulphate of sodium with an alkali, or a little rhubarb and magnesia. If diarrhœa has already occurred it may be allowed to continue unless it become excessive, in which case a pill containing a quarter of a grain of calomel, with one-eighth of a grain of opium, may be given every hour or two up to eight doses if necessary. If the purging should continue and the

evacuations become pale a few doses of chalk mixture with aromatics will serve to check it.

(2). *Diminished secretion of bile* is a common occurrence, and sometimes the function seems to be for a time altogether in abeyance. Such a condition may result from excessive stimulation, followed by torpor and exhaustion of the organ. It may also depend upon an insufficient quantity in the blood of the materials out of which bile is produced. Other causes are direct or indirect sedative agents, such as insufficient food, mental anxiety, want of exercise, various anæmic conditions, and the diversion of nervous energy to other organs. The state of the liver is shown by the colour of the evacuations, which gradually become lighter and lighter, until at last they resemble clay, or are almost white. Constipation is generally present, but in some cases of suppression of the biliary secretion diarrhœa is the prevailing condition, the evacuations being usually opaque and sometimes almost milky. The discharges are probably the result of congestion of the intestinal mucous membrane, consequent upon obstructed circulation within the liver; the congestion is relieved by the escape of fluid from the distended vessels. Suppression of bile and the attendant diarrhœa are usually accom-

panied by abdominal pain or uneasiness, with gastric derangement, furred tongue, a foul taste in the mouth, and depression of spirits. Jaundice is not uncommon, especially in cases in which there is duodenal catarrh.

The *treatment* of inactivity of the secretory function of the liver is often attended with difficulties, and in chronic cases the complaint is apt to prove obstinate. The diet requires careful attention; it should be easily digestible and non-stimulating. Rich dishes, fat, and pastry of all sorts must be interdicted; a little claret, hock, or whisky may generally be allowed with meals; they should be well diluted by some alkaline effervescing water. The patient should be kept warm, wear flannel next the skin, and avoid chills; a few warm or tepid baths are likely to be serviceable. With regard to medicines, if constipation be present this should be corrected by means of mild laxatives, such as small doses of aloes with a little ipecacuanha and nux vomica; the various saline purgative waters are also suitable. For cases in which the condition is the result of over-stimulation, as in persons returned from the tropics, a course of nitro-muriatic acid with nux vomica and a little henbane often yields most satisfactory results; the medicine should be continued for a month or six

weeks, all other precautions being observed at the same time. The same remedy is often suitable for other cases; if it fail we may have recourse to one or more of the lately introduced hepatic stimulants, viz., podophyllin, iridin, euonymin, and leptandrin. The first of these should be given in small doses, gr. $\frac{1}{16}$-$\frac{1}{8}$, night and morning; if constipation exist, it may be combined with aloes. Iridin is another hepatic stimulant; it is said to be more reliable than podophyllin when a slight cholagogue is wanted for a lengthened period; the dose is gr. j-ij night and morning. Euonymin and leptandrin possess like properties, and may be given in the same doses. All these drugs are more or less aperient in their action. Other less used remedies of the same character are hydrastin, juglandin, and sanguinarin.

Mercury is said to diminish the secretion of bile, and yet cases are not rare in which small doses of this drug seem to produce an opposite effect. Certainly in children with clay-coloured, loose, offensive stools a small dose of grey powder often repeated, or minute doses of the perchloride will yield very excellent results, checking the diarrhœa and restoring the colour to the stools. The same remedy does good in adults presenting the symptoms of rapidly-developed suppression

of bile, as a result of excitement or after exposure to cold; half-a-grain of grey powder every three hours will often restore the secretion.

(3). *Vitiated secretion of bile.* This condition, unless very marked, is less easily detected than either increase or deficiency of the secretion. In extreme cases the colour of the bile is much altered, varying between a deep bottle-green and jet black. When vomited in this condition it is very acrid and bitter to the taste; when it passes off through the bowels it causes diarrhœa and severe colicky pains and burning sensations in the rectum. Similar disorder of a less severe character gives rise to irregular action of the bowels, with stools of various colours and fœtid odour; nausea, especially in the mornings, unpleasant taste in the mouth, and a yellowish fur about the tongue; high-coloured urine, with perhaps vesical irritation; and a yellowish tinge in the eyes and skin. The appetite is generally impaired; there is headache, general languor of body and mind, perhaps irritability and depression of spirits, and disturbed sleep. Pains in the back and loins, uneasiness under the shoulder-blades, fulness and pain in the right hypochondrium, particularly on taking a full inspiration, are often complained of.

Symptoms such as those above described are of common occurrence in tropical climates and during hot weather in this country. They are generally caused by exposure to the heat of the sun, indulgence in alcoholic liquors, and rich and stimulating diet. If diarrhœa occur the symptoms will probably soon pass off, but repeated attacks pave the way for serious derangement of the liver, especially in hot climates.

The *treatment* of cases of vitiated biliary secretion depends upon the cause of the symptom. If it be due to heat, the patient should be kept quiet and as cool as possible. A mild purgative, such as rhubarb, with soda and magnesia, will generally be serviceable, and effervescing salines may be afterwards prescribed. If there be irritability of the stomach, with nausea and vomiting, an emetic dose of ipecacuanha will constitute the best treatment. The same remedy will be suitable for cases due to errors in diet, and after the vomiting has ceased four or five grains of calomel may be given to clear out the bowels. To prevent recurrences, temperance and non-stimulating diet, rest, and avoidance of exposure to heat are the main points to be attended to. When the symptoms have become chronic, after attention to the diet, we may prescribe with advantage the

nitro-muriatic acid and warm baths. Moderate exercise is always serviceable, and horse-exercise is often the best form.

IV. **Disorders of the metabolic processes** of which the liver is the seat still remain to be described, and it is somewhat remarkable that the views now held as to the processes in question were entertained, though, of course, somewhat crudely, in very early times, and were subsequently forgotten or neglected. Only within the last few decades has due recognition been accorded to one most important function of the liver, viz., the conversion of albuminous matters derived from the food and tissues and the formation of urea and uric acid. It is the disorders of this function that I propose now to consider, and in doing so I cannot fail to allude to the writings of the late Dr. Murchison,* to whom the profession is much indebted for a clear exposition of the present state of knowledge on this subject and the inferences to be drawn therefrom. His observations show that the liver is largely concerned in the formation of urea and uric acid. For evidence in support of this view the reader is referred to my work on Gout and particu-

* "Functional Derangements of the Liver," 2nd edition, 1879.

larly to the chapter dealing with the causes of the complaint. It is, however, necessary to allude to the main points and facts brought forward as evidence.

In acute yellow atrophy of the liver, the secreting tissue is destroyed to a greater or less extent. The organ may be reduced to half or even one-third its normal bulk; all traces of lobules and vessels are almost or completely obliterated. A very important symptom is connected with the urine, which may be normal in quantity and acid, but contains a much reduced amount of urea, the place of which appears to be taken by leucin and tyrosin. Again, Dr. Parkes has shown that in cases of hepatitis and hepatic abscess, with excessive suppuration, the urea is lessened in a degree proportionate to the extent to which the secreting structure is destroyed by the abscess. When the liver is not suppurating, but actively congested and enlarged, the amount of urea and uric acid seems to be increased. In chronic congestion and in the various forms of cirrhosis, in simple jaundice, and in cases of obstruction from gall-stones, there is a considerable diminution in the quantity of urea.

The interpretation of these pathological facts is supported by some experiments recently made by Dr. Noel

Paton on the relationship of the formation of urea and uric acid to the secretion of bile. He has shown that stimulation of the flow of bile by means of drugs is accompanied by an increased production of urea, and not merely by an increased elimination.

When the transformation of albuminous matters is imperfectly performed, the condition known as *lithæmia* is a frequent consequence. The ordinary cause of such imperfect transformation is an excess of supply, combined as it often is with deficient action of the assimilating organs. An occasional deposit of urates in the urine is a common result of errors in diet, and over-indulgence at the table, and is of no serious import. If, however, such a deposit be constantly or even frequently noticed, it ought to attract attention, for it indicates that oxidation is less perfect than it ought to be, and that functional disorder is becoming chronic. Persons are only too apt to think that the kidneys are "out of order," but as a matter of fact it is not these organs, but the liver, which is generally at fault, and the distinction as influencing the treatment is, of course, very important.

When a condition of lithæmia has become developed, certain symptoms, perhaps occasionally noticed before,

are apt to become prominent. There is more or less dyspepsia, as shown by flatulence, distension, feelings of uneasiness or even severe pain in the stomach and duodenum. The right hypochondrium is tender on pressure, and the patient is conscious of a feeling of weight and tension. Nausea and acid eructations are common symptoms, and there is often a bitter taste in the mouth; the tongue is furred, large, and indented at the edges, the bowels are irregular and generally constipated, and the skin has sometimes a slightly jaundiced tinge. Palpitation of the heart and shortness of breath, aggravated by exertion, are often complained of, and a short dry cough, attended with excessive secretion of viscid mucus in the fauces and at the back of the nose, is sometimes very troublesome. Hæmorrhoids in various stages are not unfrequent, and when present are indicative of congestion of the liver.

As might be expected, symptoms of derangement of the nervous system are almost invariably superadded to those above described, and in different patients take the forms of irritability, depression, restlessness, lassitude, drowsiness after meals, headache, and inability for mental exertion. Sleep is broken and unrefreshing, and often disturbed by dreams; noises in the ears,

dimness of sight, and vertigo are sometimes very troublesome and alarming. Such patients are apt to become hypochondriacal, feeling as they do more or less discomfort in every part of the body. Aching pains in the back and limbs, attacks of migraine and of facial or other forms of neuralgia tend still further to depress the patient. As time goes on decided symptoms of gout are wont to be experienced; the small joints are painful and tender, the eyes are hot and irritable, and sensations of burning and tingling in the hands and feet cause much annoyance. It not unfrequently happens that after many of the symptoms above described have existed for some time, an acute attack of gout supervenes, and the patient becomes relieved from his general troubles. But before such a culmination takes place the patient notices that the symptoms are liable to frequent exacerbations, and that they are always aggravated by errors in diet and excess in alcohol, or even by indulgence in a glass or two of champagne or beer.

There are two other symptoms of common occurrence among these patients; the first of these is the appearance of a small quantity of albumen in the urine, while the second is an eruption of eczema. Further allusion

will be made to these symptoms in subsequent paragraphs.

The *causes* of lithæmia require a brief notice; they are for the most part connected with errors in diet. Hereditary tendency is also a potent factor in their development, and its influence is often greatly promoted by the patient's habits. Excess in albuminous food is, moreover, frequently accompanied by deficiency of exercise, and the disproportion between the absorbed albuminates and the absorbed oxygen must result in imperfect oxidation and its consequences, notably the retention in the system of refuse materials and irritation of the eliminating organs. The nature and digestibility of the food is an important element in the consideration. Malt liquors of all kinds and the stronger and imperfectly fermented wines play a conspicuous part in the causation of lithæmia, and their effects are often superadded to those of improper food. The acidity so often complained of is the result partly of the fermentation of the food, and partly of increased secretion of gastric juice. The sugars and starches are apt to undergo lactic fermentation in the stomach, the gastric mucus acting as a ferment. The albuminous and fatty substances are subject to butyric fermentation,

and other acids, such as the acetic, succinic, etc., are often developed.

The *treatment* of lithæmia may be described in a few words. The causes must be avoided; the diet must be reduced and suitably modified; and a due amount of exercise must be taken. The patient should be provided with diet-rules, as described in previous pages, and every attempt should be made to restore the normal functions of the liver. Purgatives are generally indicated, and of these the salines are the most suitable. They may be conveniently administered in the form of such mineral waters as Friedrichshall, Hunyadi Janos, or Rubinat-Condal, and when much acidity and fermentation exist the Carlsbad water or salts are preferable. The various hepatic alteratives, alluded to in previous paragraphs, will often be suitable for these cases, and when the urine contains much free acid, a course of alkalies is generally indicated. The state of the skin always requires attention; tepid or warm baths are always beneficial. For young and plethoric subjects an occasional Turkish bath will improve the condition of the skin and promote its eliminative action. A course of treatment at such places as Bath, Buxton, Harrogate, Teplitz, or Vichy will almost always benefit chronic cases.

Disorder of the metabolic function of the liver may result not only in lithæmia, but likewise in a form of albuminuria, which has attracted much notice during the last few years. I have now observed this symptom in many cases, the patients being for the most part men in middle life, of active literary habits, but somewhat free livers. The cases exhibit the ordinary symptoms of lithæmia and gouty dyspepsia, but no severe attacks of articular inflammation. The albumen generally occurs in very minute quantities; but it may vary from one-tenth to three per cent. No casts are discoverable, and the albumen disappears in the course of a few weeks under the use of appropriate diet and treatment.

Albuminuria is often a very grave symptom, as it generally indicates organic mischief in the kidneys; but in the cases now alluded to I believe that the appearance of albumen in the urine is due to defective metabolism of nutritive materials by the liver. There is abundant evidence forthcoming to show that this substance is often temporarily present in the urine under a great variety of circumstances, *e.g.*, after excessive consumption of albuminous food, notably eggs; exposure to cold and wet; during pregnancy; after hard mental toil, and nervous excitement, and as the result

of a gouty inheritance. It is, doubtless, the "albuminuria of digestion" which is present in the cases now before us; some of the albuminous constituents of the food not being converted into urea, and passing out of the system in an unchanged state.

In addition to the suspicion likely to be excited, this excretion of albumen, if of frequent occurrence, is very liable to cause irritation of the kidneys. In his treatise on albuminuria, Dr. Senator points out that when egg-albumen, as such, finds its way into the blood, it is excreted by the kidneys; "but frequently this is not all that happens, for more albumen is excreted than is introduced; as a matter of course, not more egg-albumen, but a form which possesses the properties of the ordinary albuminous substances of the serum (serum-albumin and globulin)." Doubtless the same result follows the frequent passage through the kidneys of other albuminous matters imperfectly metamorphosed, and hence it is that functional disorder of the liver may give rise to organic renal disease.

The *treatment* of albuminuria, occurring under the conditions above described, is practically the same as that of lithæmia; the diet especially will demand very careful attention. If there be evidences of renal con-

gestion, such as pain in the loins, frequent micturition and highly concentrated urine, in addition to saline purgatives and alkalies, we should prescribe warm baths, warm fomentations, or mustard plaisters to the loins, and besides these remedies I can strongly recommend dry cupping over the loins, repeated from time to time if necessary. The albumen rapidly diminishes under this treatment, but its presence must never be disregarded, for if neglected it may cause serious lesions of the kidney.

The eczema, which is often a troublesome symptom in connection with lithæmia, would appear to be due to the accumulation in the blood of certain excrementitious materials, of which uric acid is the one most easily demonstrable. When the quantity of these products existing in the blood is greater than can be removed by the kidneys, the work is thrown upon other organs, and especially upon the skin, and the result in many cases is an outbreak of eczema or psoriasis.

For the *treatment* of these cutaneous affections constitutional remedies are always required, and those which stimulate the hepatic functions are generally serviceable. The diet will demand very careful attention, and purgatives, alkalies, and tonics must be given

according to circumstances. Warm baths are generally serviceable, and arsenic or antimony may be tried for obstinate cases. The itching is best relieved by an ointment of boric acid, but it must always be remembered that relief is often temporary, and that the complaint is very apt to recur.

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