The causes, symptoms and treatment of hysterical, hypochondriacal, epileptic and other nervous affections / by William John Anderson.

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James Parratt Esq^r M.D.

with the Authors Comp^ts

ECCENTRIC

NERVOUS AFFECTIONS.

THE CAUSES,

SYMPTOMS AND TREATMENT

OF

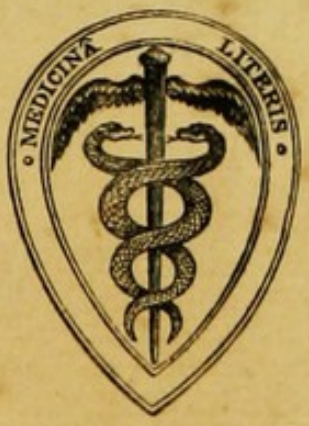
HYSTERICAL, HYPOCHONDRIACAL, EPILEPTIC

AND OTHER

NERVOUS AFFECTIONS.

BY

WILLIAM JOHN ANDERSON, F.R.C.S.



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TO

EDWARD JAMES SEYMOUR, ESQ., M.D., F.R.S.

LATE SENIOR PHYSICIAN TO ST. GEORGE'S HOSPITAL,

This Book is Dedicated,

IN GRATEFUL ACKNOWLEDGMENT OF THE KIND

AND VALUABLE INSTRUCTION RECEIVED FROM HIM,

BY HIS FORMER PUPIL,

THE AUTHOR.

PREFACE.

In the following pages, the author has endeavoured to set forth, briefly, the causes, symptoms, and treatment of Eccentric Nervous Affections; that is to say, of such complaints as originate in causes extraneous to the nervous centres, and are totally unconnected with any organic lesion of those parts.

In the first place is described the intimate connexion which exists between the nervous and circulating systems, as well as their mutual dependence the one upon the other. The processes of assimilation, both primary and secondary, are adverted to, in order to point out the manner in which the blood is formed, and from it the

various tissues of the body, and how, consequently, any derangement of these processes must affect the whole constitution. Secondly, the difference between centric and eccentric nervous affections is pointed out, and some experiments are related in order to show the difference between reflex action and the motions of irritability. Subsequently to this, the various eccentric nervous affections themselves are described; first, those which depend, for the most part, upon an improper quality of the blood; secondly, those which are of a more doubtful nature, and may depend either upon this last-mentioned cause, or upon direct irritation of the nervous system; thirdly, those which arise from a shock or direct irritation of the nervous system, and are not necessarily connected with any abnormal condition of the blood; and lastly, those which are produced by the introduction of some poison into the current of the circulation.

In all these cases, the causes both predisposing and exciting, have (as far as was in the author's power) been sought out and described, in order that a rational plan of treatment might be adopted,

for, without a perfect knowledge of the cause of a complaint, all treatment must be empirical.

The subject is illustrated with cases, which, it will be observed, have, with one exception, occurred in the public practice of a large hospital. The author has preferred giving such cases, because they have not only come under his own observation, but also under that of many others, who are, therefore, capable of bearing testimony as to their accuracy, if they should happen to fall under their notice.

Welbeck Street,
Cavendish Square.

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THE

CAUSES, SYMPTOMS, AND TREATMENT

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ECCENTRIC NERVOUS AFFECTIONS.

CHAPTER I.

Intimate connexion between the nervous and circulating systems—General description of the circulating system—Heart—Arteries—Veins—Capillaries—General description of the circulation—Action of the heart—Pulmonic and systemic circulation—Analysis of the blood—Properties of the blood during circulation, and after it is drawn from the body—Analysis of hæmatosine—Peculiarities of the red globules; their importance in respiration and in the production of animal heat; changes occurring in them during the conversion of arterial into venous blood, and *vice versâ*—Assimilation, primary and secondary—General description of the nervous system—Membranes—Grey and white matter; their separate functions—Nerves—Sympathetic system; its ganglia and nerves—Mode of communication between the sympathetic and spinal nerves—Reflex action—Mutual dependence of the nervous and circulating systems, the one upon the other.

THE connexion between the nervous and the circulating system is so intimate, that it is impossible for the one to be affected without the other suffering nearly at the same moment; of this we have almost daily examples, as for instance in concussion of the brain; the cerebrum is here first

affected by the blow, the heart's action is then immediately diminished in power, and syncope is the result; the same effect is produced by a blow on the pit of the stomach, from concussion of the solar plexus: and from either of these causes, if severe enough, the shock may be so great to the nervous system, that the heart is unable to regain its power from want of nervous influence, and the syncope is consequently fatal. These are striking illustrations, which cannot fail to attract the notice of the most casual observer; but it is not to such as these that I wish to allude so particularly at present, as to that connexion which exists between those parts of either system, the most remote from their great centres. Previously, however, to doing this, it will be necessary to give a brief description of each system, more especially adverting to those points by which the present subject may be illustrated.

The circulating system consists of a propelling organ, the heart, and two sets of vessels, viz., the arteries, to convey the nutrient fluid, and the veins, to return that fluid after it has served its purpose. The heart is the great central organ of circulation, and is situated in the centre of the chest, between the two lungs; its shape is conical, and its size variable, according to the sex, being a little larger in the male than the female. It is contained in a fibro-serous sac, called the pericardium, the external fibrous coat of which is con-

nected superiorly with the coats of the large vessels entering and arising from the heart, and invests them for a short space; inferiorly, it is organically attached to the central tendon of the diaphragm, so that it cannot be separated; this is lined by a serous membrane, which covers the whole of its internal surface, passes with it on to the commencement of the great vessels, and is thence reflected over the external surface of the heart itself, forming a closed sac, the cavity of which is moistened by halitus, and after death, in the normal state, contains from one to two drachms of fluid. The heart itself is placed transversely across the chest, the base directed upwards and backwards towards the right side, the apex downwards and forwards towards the left side, where it may be felt at each pulsation, between the fifth and sixth ribs, just below the nipple. Internally the organ consists of four cavities, two auricles, and two ventricles, one auricle superiorly and one ventricle inferiorly on the right side, separated from the same on the left side by means of a vertical plane, the septum cordis. Superiorly, there is a right and left auricle, which are separated by a transverse plane, the tendo-cordis, from a right and left ventricle inferiorly. This tendo-cordis is pierced by an opening on each side to allow the passage of the blood from the auricles into the ventricles, both of which openings are guarded by

valves, to prevent regurgitation. The heart consists of three coats; an external serous coat, which is derived from the pericardium, a middle muscular, and an internal serous. This latter is continuous, on the right side, with the lining membrane of the veins, on the left with that of the arteries, and forms various reduplications which, with the additional interposition of fibrous tissue placed between their folds, constitute the valves.

Opening into the right auricle, superiorly and posteriorly, is found the vena cava superior, separated by a slight projection, the tuberculum Loweri, from the vena cava inferior, situated inferiorly and posteriorly. In the septum, between the auricles, exists a relict of fœtal life, the fossa ovalis, surrounded by the annulus; the Eustachian valve extends from this to the vena cava inferior, and serves, in the fœtus, to direct the blood from that vein to the foramen, which then exists in the place of the fossa, thus enabling it to pass to the left auricle. Below the Eustachian valve is placed the opening of the coronary vein, in addition to which are numerous small openings, termed foramina Thebesii, which return the blood directly from the substance of the organ; and lastly, there is the auriculo-ventricular opening, with its three tricuspid valves. The cavity of the right ventricle is exceedingly irregular, and has opening into it on the left side the pulmonary artery, protected by three semilunar valves. Arising

from the sides, and continuous with the muscular fibres of the ventricle, are the columnæ carneæ, which terminate in the cordæ tendineæ—tendinous bands attached to the edges of the tricuspid valves, which they pull down when the ventricle contracts, and thus prevent regurgitation into the auricle. The left auricle has opening into it posteriorly the four pulmonary veins; it has also the foramina Thebesii in its parietes, and in the septum the valve which closes the foramen ovale. The left ventricle is much thicker and stronger than the right, but its cavity is smaller and less irregular; the aorta opens from it on the right side, protected by three semilunar valves; it has also columnæ carneæ and cardæ tendineæ attached to the mitral valve, which they pull down, and thus close the auriculo-ventricular opening.

There are two sets of vessels, the arteries and the veins, the lining membrane of each being continuous with that of the heart, the arteries with that of the left side, the veins with that of the right. Arteries originate in large trunks, which divide and subdivide, by degrees, into minute ramifications, whereas veins commence in small radicles, gradually coalescing to form larger trunks; arteries convey the blood from the heart to the lungs and the system, veins return it from the lungs and the system to the heart.

Between the ultimate ramifications of the arteries and the commencing radicles of the veins we

find the capillaries, an exceedingly minute set of vessels, in which, nevertheless, some of the most important functions of the animal economy are performed. The arteries terminate in, and the veins commence from them; but the arteries pass so insensibly into veins, that these vessels can scarcely be considered as a distinct set, though generally described as such; they, however, possess this peculiarity, that they maintain the same size throughout, and, consequently, the circulation in them is equable; they anastomose freely in every part of the body. Secretion, excretion, and assimilation take place in them, and in them animal heat is evolved; in the systemic set, the arterial blood becomes changed into venous, whereas, in the pulmonic, the venous blood is regenerated, and again converted into arterial.

The circulation, in the normal state, is conducted in the following manner: the two ventricles contract simultaneously, and at the same time that the two auricles dilate, and *vice versâ*. When the contraction of the ventricles takes place, the cordæ tendineæ are put on the stretch, and the tricuspid and mitral valves pulled down over the auriculo-ventricular openings, the venous blood in the right ventricle is propelled through the pulmonary artery to the lungs, and in the capillaries here situated the necessary changes take place by endosmosis and exosmosis; the carbonic acid is exhaled through their coats, and passes off in expiration,

the blood, at the same time receiving its supply of oxygen from the inspired air, is thus rendered fit for distribution to the system; it now passes through the ramifications of the pulmonary veins to their four main trunks, by which it is returned, as arterial blood, to the left auricle. This portion of the heart, then, *i. e.*, the right ventricle and left auricle, may be termed the pulmonic portion, being entirely connected with the pulmonary circulation, whereas the general circulation of the system is conducted by the left ventricle and right auricle, which may, therefore, be called the systemic portion. The arterialized blood, then, dilates the left auricle at the same time that the ventricle below is contracting; having done this, the auricle contracts, and causes it to pass through the auriculo-ventricular opening into the left ventricle, which it dilates, the same process going on simultaneously in the right side; the left ventricle again contracts, and sends the arterial blood along the aorta, and thence, by means of the various arterial ramifications, to the system at large; here, having served its purpose, it becomes, in the systemic capillaries, converted into venous blood, passes through the numerous veins to the superior and inferior venæ cavæ, by which it is conveyed to the right auricle; having dilated this cavity, it in its turn contracts, and propels the blood into the right ventricle, from whence it is passed to the lungs, to be again regenerated, as before described.

From this brief view, we see that the pulmonic circulation is carried on simultaneously and in equal ratio with the systemic; the two ventricles contract together, the right propelling the venous blood to the lungs, the left the arterial blood to the system; at the same time that this is happening, the two auricles dilate, the right to receive the venous blood from the system, the left the regenerated arterial blood from the lungs; they, in their turn, contract together, while the ventricles dilate, and thus the equilibrium of the circulation is maintained.

Having thus briefly described the process of circulation, the next thing to be considered is the nature of the circulating fluid itself. The following is the analysis of blood, according to Lecanu:

Water...	780·145
Fibrine	2·100
Albumen	65·090
Colouring matter (globules)	133·000
Fatty crystallizable matter	2·430
Oily matter...	1·310
Extractive matter soluble in water and alcohol ...	1·790
Albumen combined with soda	1·265
Chloride of Sodium ... ... Chloride of Potassium ... ... Carbonates Phosphates } of Potass and Soda Sulphates	8·370
Carbonates of Lime and Magnesia Phosphates of Lime, Magnesia and Iron }	2·100
Peroxide of Iron	
Loss	2·400
	100·000

The blood, while circulating in the living body, is divided into two parts—a fluid portion, termed the liquor sanguinis, and a solid portion, consisting of the corpuscles. When drawn from the body, and allowed to stand for a certain time, it separates itself spontaneously into a solid portion, the clot or crassamentum, and a liquid part, the serum. The liquor sanguinis differs from the serum by containing fibrine in solution, which, on the removal of the blood from the body, contracts, and in so doing entangles the globules, by which means it separates them, together with itself, from the serum, and constitutes the clot. The red globules contain an animal principle, termed hæmatosine, which possesses, as one of its ingredients, an oxide of iron, which is a substance peculiar to itself, and not found elsewhere in the animal system. Hæmatosine cannot be entirely isolated and separated from the albumen which exists in the colouring matter, and, therefore, a perfectly correct analysis cannot be obtained: the following is one according to Mulder:

Carbon	66·49
Hydrogen	5·30
Nitrogen	10·50
Oxygen...	11·05
Iron	6·66
	100

According to Liebig, the globules themselves take no share in the process of *nutrition*, though

they play an important part in the process of respiration, as well as in the production of animal heat. They contain an oxydized compound of iron, which may be proved by obtaining oxide of iron from the dried clot, on carefully adding sulphuric acid; or the same result may be obtained on digesting the dried and pulverized clot with dilute hydrochloric acid, while peroxide of iron is produced by the addition of excess of chlorine to the solution thus obtained.

Now, compounds of protoxide of iron take up oxygen from other oxydized compounds, while oxygen is given up with the greatest facility by compounds of the peroxide. Hydrated peroxide of iron, in contact with organic matters destitute of sulphur, is converted into carbonate of the protoxide. Carbonate of the protoxide of iron, in contact with water and oxygen, is decomposed: the carbonic acid is given off, oxygen is absorbed, and it is converted into the hydrated peroxide, which may again be converted into a compound of the protoxide.

	Atoms.	Eq. Wt.	Per cent.
Iron	1	28	77·8
Oxygen	1	8	22·2
Protoxide of Iron	1	36	100·0
Iron	1	28	70
Oxygen	1½	12	30
Peroxide of Iron	1	40	100

	Atoms	Eq. Wt.	Per cent.
Protoxide of Iron	1	36	62
Carbonic Acid	1	22	38
Protocarbonate, or Carbonate of the Protoxide of Iron	1	58	100

Carbon	1	6	27·27
Oxygen	2	16	72·73
Carbonic Acid	1	22	100·00

The globules, then, of the arterial blood contain a compound of iron saturated with oxygen, which they lose in their passage through the capillaries. The compound, rich in oxygen, passes, by the loss of oxygen, into one far less charged with that element. One of the products of oxydation formed in this process is carbonic acid. The compound of iron in the venous blood possesses the property of combining with carbonic acid, and the globules of the arterial blood, after losing a portion of their oxygen, will also combine with that gas if they meet with it. On reaching the lungs, they again take up the oxygen they have lost, and again acquire the power of giving off that gas. The globules of the arterial blood, in their passage through the capillaries, afford oxygen to certain constituents of the body, they then, having lost their oxygen, combine with carbonic acid, and produce venous blood; on reaching the lungs, the compound of iron existing in the venous blood

recovers its oxygen, the carbonic acid is separated by this absorption of oxygen and expired.

Whenever a rare body becomes condensed, a diminution of capacity takes place, and heat is evolved; but, on the other hand, when a dense body becomes more rare, there is an increased capacity for heat, which is therefore absorbed, and becomes latent. The venous blood, on reaching the lungs, gives off its carbonic acid, and absorbs an equal volume of oxygen, by which means the blood is arterialized. The arterial blood is lighter, and contains more heat than the venous, because it contains a light gas, oxygen, instead of the denser one, carbonic acid. This arterial blood, having passed to the capillaries, loses its oxygen, absorbs carbonic acid, and becomes venous, animal heat at the same time being evolved. We see, then, that the globules of the blood, though they take no share in the process of nutrition, nevertheless perform several most important functions; by their instrumentality, that most essential element, oxygen, is absorbed from the atmosphere, and conveyed to the capillaries, there to play its all-important part in the animal economy; by their means (having yielded up their oxygen), carbonic acid is absorbed, conveyed to the lungs, and there exhaled, thus disposing of the effete principles of the body produced by the oxydation of its various tissues, during which process of oxydation animal heat is evolved.

The processes of assimilation are so intimately connected with the circulation, and will have so often to be referred to hereafter, that it will be as well to allude to them in this place; they have been divided by Prout into two classes, the primary and the secondary. The primary includes the whole process of digestion up to sanguification, or the conversion of the chyle into blood; the secondary includes all those stages which take place subsequently to this, the formation of the various tissues from the blood, and their final dissolution and removal from the system.

All alimentary substances may be divided into four classes —viz., aqueous, albuminous, oleaginous, and saccharine. Water performs a most important part in the animal economy, being essential to both processes of assimilation. It is necessary, for the process of digestion, that all alimentary substances should, in the first instance, be reduced to a liquid state—this is accomplished by their combination with water in the stomach, and is said to be brought about by the agency of the gastric juice. The water, having thus become combined with the alimentary substances—or rather with that part of them destined to serve the purpose of nutrition—is then, by degrees, removed, as the chyle passes through the lacteals, and approaches more nearly in its properties to those of the blood.

The albuminous aliments are principally derived from the animal kingdom, and are all of

them azotized substances—that is, they possess nitrogen as one of the elements entering into their composition.

The oleaginous alimentary bodies are sometimes solid as fat, or liquid as oil, and are insoluble previously to their entering into combination with the alkali of the bile.

The saccharine elements are principally derived from the vegetable kingdom, in contradistinction to the albuminous, and are, as well as the oleaginous, non-azotized substances, not possessing nitrogen as one of their elements.

The food, having been converted into chyme in the stomach, by the action of the gastric juice, passes through the pyloric orifice into the duodenum, as a grey pulp, with an acid reaction. In the duodenum, the chyme meets with the bile and the pancreatic juice, and is converted into an excrementitious and a nutritious portion, which latter is termed chyle. The soda contained in the bile neutralizes the acid of the chyme, and gives it an alkaline reaction, at the same time saponifying, and thus rendering soluble, the oily principles of the food; the biliary resin is set free, and acts as a stimulus to the muscular coat of the intestines. The nitrogenous principles of the bile, picromel, &c., according to Prout, impart animalization to those particles of the food which are capable of it, but deficient in nitrogen, and thus convert them into incipient albumen. The chyle thus formed ap-

pears on the surface of the mass, and is absorbed by the lacteals; it is thence conveyed between the layers of the mesentery, and passes through the vasa inferentia to the mesenteric glands, from which it is carried away by the vasa efferentia to the receptaculum chyli, on the body of the second lumbar vertebra. Having arrived at the receptaculum chyli, it receives the lymph from the lower extremities, then passes along the thoracic duct, and at the junction of the internal jugular, with the subclavian vein on the left side, it enters the circulation—the two currents from the subclavian and jugular veins ensuring its mixture with the blood. It now passes to the right side of the heart, and is sent from thence with the venous blood to the lungs; here it meets with atmospheric air, and undergoes its final change, becoming inseparably mixed with the circulating fluid.

The chyle is a white-coloured, alkaline fluid, when first taken up by the lacteals, and contains albumen in an incipient state, which does not, like the albumen of the blood, coagulate spontaneously, but will do so on the application of heat. There are several important points in which the chyle differs from the blood; when first formed, it does not coagulate spontaneously, possesses no fibrine, has no coloured corpuscles, and the albumen which it contains is in an incipient state. These are its qualities until it arrives at the mesenteric glands; after passing these, it contains some fibrine, coagu-

lates spontaneously, though imperfectly, and assumes a pinkish colour. Animalization of the chyle occurs then at three different stages—firstly, through the intervention of the nitrogenized principles of the bile, albumen is formed; secondly, fibrine is added in the mesenteric glands; and thirdly, nitrogen is absorbed from the atmospheric air in the lungs.

The secondary assimilation is divided into the formative and destructive; the former includes all those steps by which the principles of the blood are converted into the various tissues and secretions; the latter includes those processes by which the tissues thus formed become extinct, and converted either into new principles, for ulterior purposes, or into disorganized substances, which are eventually removed from the system.

The principal secondary assimilating processes of the formative kind consist of gelatification, or the conversion of a portion of the albumen contained in the blood into the solid gelatinous tissues; albumification, or the conversion of another portion of albumen of the blood into the solid albuminous tissues; and fibrification, or the conversion of the fibrine of the blood into solid muscular fibre. These changes take place in the capillaries simultaneously with the conversion of the arterial into venous blood; and during the conversion of albumen into gelatine, carbonic acid is given off, to be

absorbed, as before described, by the corpuscles of the blood, which have yielded up their oxygen.

This process of gelatification, though serving, as well as the two others, for the *nutrition* of the body, is concomitant and intimately connected with the evolution of animal heat, and the conversion of arterial into venous blood. Again, referring to that law by which the transition of a light into a denser body causes an evolution of heat, we may suppose that the solidification of these fluid principles of the blood is also a source of animal heat, and though the changes in the blood corpuscles perform a great, if not the most important part, still it must be borne in mind that the two processes are so intimately connected together, that the one cannot be carried on without the other.

The formation of bone, horn, hair, &c., is principally connected with gelatification, while the various fluid secretions, as the saliva, the gastric juice, semen, &c., are derived from the albuminous and oleaginous principles.

Examples of the secondary assimilating process of the destructive kind may be taken in urea and lactic acid, formed from the effete parts of the gelatinous tissues, as well as lithic acid, formed from the albuminous principles.

With regard to the changes which the oleaginous matters undergo, there is a difference of opinion between Prout and Liebig; the former says—"That

the oleaginous principles may be converted into most, if not all the matters necessary for the existence of animal bodies, seems to be proved by the well-known fact, that the life of an animal may be prolonged by the appropriation of the oleaginous and other matters contained within its own body." Again, in speaking of the secondary assimilating process of the destructive kind, he says—"Of the ulterior changes of the oleaginous principles, we know still less, perhaps, than of either of the other staminal principles. The large proportion of oleaginous matter which enters into the composition of the nervous mass, shows the important part which oleaginous matters perform in the animal economy; and the disappearance of fat during the process of hybernation, and under many other circumstances, indicates that this principle is most extensively appropriated during the secondary destructive assimilating process."

Liebig, on the other hand, supposes that the oleaginous and saccharine principles are never animalized, but that, having entered the circulation, a portion of them combines with the oxygen of the arterial blood in the capillaries, and produces carbonic acid, to be absorbed by the corpuscles, and conveyed by them to the lungs, thus serving a most important part in the production of animal heat. The superfluous part which remains is then stored up, in the shape of fat, in the various tissues, and

there retained until required for consumption in a similar manner.

Which of these theories is correct, I will not pretend to decide; the life of an animal may be prolonged by the appropriation of the oleaginous and other matters contained within its own body; but the question is, whether the oleaginous principles are really appropriated—that is, become animalized and converted into albuminous matters during the secondary assimilating process of the formative kind, or whether they be consumed during the destructive form of the same process, which is synonymous with the oxydation of the tissues mentioned by Liebig.* It is, however, an indisputable fact, proved by experiment, that the life of an animal cannot be maintained by oleaginous matters alone.

These assimilating processes may be deranged in various ways, and from various causes; they may, however, under these circumstances, be divided into the same classes as in a state of

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* Mr. Cæsar Hawkins has most justly made the following remarks in the Hunterian oration for 1849:—"There is no doubt that the oxydation of the tissues, in the words of the illustrious German chemist, is altogether included in the secondary assimilation of Dr. Prout; that the latter most fully pointed out the physiological processes subsequent to sanguification, 'the formative and destructive changes' in the solids and fluids of the animal economy, with the greater part of what is yet understood of their important bearings on pathology, in reference to the several gelatinous, or oleaginous materials of the body."

health—viz., primary mal-assimilation and secondary mal-assimilation.

Primary mal-assimilation consists in some derangement of the assimilating process previous to sanguification; this may occur, first, in the stomach; an indigestible substance having been received into that viscus, produces more or less disturbance, indicated by gastralgia, flatulence, palpitation of the heart, and shortness of breath, caused by the diaphragm being pushed up. These symptoms are induced by an undue quantity of acid secreted by the stomach in consequence of the irritation, and if the irritating matter is not ejected by vomiting, it passes into the duodenum, extending the irritation throughout the whole alimentary canal.

Secondly, we may have the primary mal-assimilation occurring in the duodenum, though this is generally the result of stomachic derangement; the irritating substance passes into the duodenum from the stomach, together with the superabundant quantity of acid there generated; this not meeting with a sufficient quantity of alkali to neutralize it, a portion is probably absorbed by the lacteals with the chyle, while the remainder passes on, producing considerable disturbance in its course.

Thirdly, the primary mal-assimilation may occur in the lacteal system, in the manner just described, or a certain amount of superfluous alimentary matter may go through the necessary preliminary

changes, be taken up by the lacteals, become partially vitalized, and pass into the circulation; it is then ejected through the kidneys as lithate of ammonia.

Secondary mal-assimilation may occur as the result of long continued primary mal-assimilation, or from original weakness.

The process of gelatification may be deranged, both in the formative and destructive assimilation; during the former, sugar, oxalic acid, &c., may be produced; while during the latter, in addition to these, numerous complementary matters of a much more baneful nature may be produced.

The process of albumification may be deranged from the same causes, and in the same manner as that of gelatification; during its secondary formative assimilation, we may have derangements giving rise to the production of scrofulous tubercle and the chalk stone of gout; whereas, in the secondary destructive assimilation we may have various compounds of cyanogen instead of lithate of ammonia.

It follows, then, from this, that any derangement of the assimilating process, either primary or secondary, must affect the whole system; for upon the primary depends the formation of the blood, and upon the secondary the formation of the various tissues of the body, as well as the removal of those which have become effete; moreover, if from this cause the blood be affected, the nervous

system, as will hereafter be shown, must suffer secondarily.

The nervous system consists of the cerebro-spinal axis as a centre, with its nerves, presiding over the functions of animal life; and the sympathetic system, with its ganglia, governing those of organic life. The cerebro-spinal axis is formed by the cerebrum, cerebellum, medulla oblongata, and medulla spinalis, from whence arise various nerves. These parts are enclosed in membranes, which are three in number; externally there is the dura mater, a fibro-serous membrane which lines the internal surface of the skull, and serves as an internal pericranium; it constitutes the outer walls of the sinuses, forms processes which separate and support the various parts of the brain; it adheres to the margin of the foramen magnum and other foramina, and passing through them, invests the spinal cord and all the nerves. The dura mater is lined on its internal surface by the arachnoid, a serous membrane which passes down with it through the foramen magnum into the vertebral canal, but does not pass out through the other foramina with the nerves; it is reflected on them, within the skull and vertebral canal, to the surface of the brain and spinal cord, and invests these organs completely, but does not dip down between the convolutions. It thus constitutes a shut sac, and between it and the pia mater is

situated the sub-arachnoid cellular tissue, which contains a fluid for the purpose of equalizing pressure. The next membrane is the pia mater, delicate in structure where it invests the brain, and is composed of cellular membrane in which the cerebral vessels ramify previously to their entering and subsequently to their emerging from the substance of the brain; it dips down between all the convolutions, and passes through all the foramina to invest both the cerebral and spinal nerves, not only on their external surface, but enters between the fibrils, and thus by means of the vessels which it supports, supplies nutrition to the nerve. The pia mater, in common with the other membranes, passes through the foramen magnum and invests the spinal cord, in which situation it is not nearly so vascular as within the cranium, but becomes much more dense and fibrous in texture. These membranes are principally supplied with nerves from the sympathetic.

The brain and spinal cord consist of two kinds of structure, the white or medullary matter, and the grey or cineritious. The white matter is composed of very minute tubes, which are made up of an interlacement of excessively delicate fibres; it constitutes a large portion of the nervous centres themselves, and inclosed in the neurilema forms almost the whole of the nervous trunks.

The grey matter is composed principally of a

plexus of vessels, with a number of indefinitely arranged nucleated globules; the white fibres may be traced into it, but it does not itself enter into the composition of the nervous trunks. Within the cranium the grey matter is disposed externally, enveloping the whole of the cerebrum and cerebellum; we find it also in certain parts internally, where it enters into the formation of ganglia, as the thalami optici, corpora striata, &c. In the spinal cord it is placed internally, being covered in by the white matter, which position is reversed in the cerebrum and cerebellum.

The function of the grey matter appears to be the reception of impressions conveyed to it by the white fibres, and the production of nervous power again conveyed by the white fibres to the part on which it is destined to operate. The grey matter, then, is the generator of nervous power, the white matter is the conductor.

Connected with the cerebro-spinal centre, we have the various nervous trunks made up of several fasciculi of fibres, and each fasciculus composed of several bundles of ultimate fibres, the fasciculi intermixing and exchanging fibres with one another to form plexuses. Each fibre runs an uninterrupted course between the nervous centre and a peripheral organ, either on the surface or in the substance of the body, those going to the surface principally organizing the papillæ of the skin.

The nervous trunks subdivide into fasciculi, at their peripheral extremities forming plexuses; the primitive fibres then separate, and each rejoins either the same or an adjoining plexus to return from thence to the nervous centres. The fibres terminate in loops; these loops of sensory nerves having entered a papilla, are surrounded by a plexus of blood-vessels, including globules very nearly similar to those of the ganglionic centres. In muscular tissue the motor nerves form a network, sending off fibres, which return either to themselves or other trunks, and thus form loops.

According to this view, nerves have the same general mode of distribution as blood-vessels, both forming circles; there are two sets of fibres, one conveying external impressions to the nervous centres, termed afferent fibres, and another set denominated efferent fibres, conveying the nervous influence from the centres to the peripheral organs.

More recent investigations have, however, proved that this mode of termination at the peripheral extremities of nerves is not invariably present, and that loops are not formed in all cases. The Pacinian corpuscles are an exception to this rule; these are found principally in the hands and feet, as also in other parts, though less numerously, and are placed upon the peripheral extremities of sensitive nerves; they are also met with in the

mesentery, where fibres of the sympathetic terminate in them, and in neither case do the fibres return to form loops. In some other cases, the terminal fibres appear to be gradually lost in the surrounding tissues, and cannot be seen to form loops by which they may return to the main trunk.

The nerves are arbitrarily divided into cerebral and spinal, though, with the exception of the first pair, or olfactory, they may all be traced either to the medulla oblongata or medulla spinalis, the sensory cranial nerves being continuous with the posterior columns of the cord, the motor ones with the anterior columns.

The spinal nerves possess two roots, an anterior motor root, and a posterior sensory one, each connected with its respective segment of the cord, the posterior root having a ganglion situated on it. The fibres of both these roots within the cord divide into two sets; one of these, continuous with the external fibrous portion, serves to keep up a communication with the brain; the other passes into the grey matter, and constitutes the reflex system of Marshall Hall, the fibres of the sensory nerves becoming here continuous with those of the motor.

The sympathetic system consists of a chain of ganglia situated on each side of the vertebral column, these communicate above on the anterior

communicating artery, by means of the ganglion of Ribes; below on the coccyx, by the ganglion impar. Superiorly they are connected with several ganglia, scattered in and about the skull. Within the carotid canal, and surrounding the artery, is situated the carotid plexus, which constitutes a centre of communication between the cranial ganglia and the first cervical. Connected with this by a filament on either side is the single ganglion of Ribes, lying on the anterior communicating artery. The otic ganglion, placed near the foramen ovale, communicates with the sympathetic by a filament from the plexus on the middle meningeal artery. A filament, accompanying the sixth pair of nerves through the cavernous sinus, connects the lenticular ganglion with the carotid plexus. The vidian nerve is given off by the spheno-palatine ganglion, and connects it also with the carotid plexus. Lastly, the submaxillary ganglion communicates with the chorda tympani, and gives off branches to the facial artery, which communicate with the nervi molles, thus being in direct connexion with the first cervical ganglion.

A connected chain of ganglia runs on each side of the spinal column; these ganglia are named according to the regions in which they are situated, viz., three cervical, twelve thoracic, five lumbar, and four or five sacral, which communicate by the

ganglion impar. The first cervical ganglion gives off, first, ascending branches to communicate with the carotid plexus, thus connecting the cranial with the vertebral ganglia: secondly, descending branches to the middle cervical ganglion: thirdly, filaments communicating with the glosso-pharyngeal, pneumogastric, and hypoglossal nerves: fourthly, pharyngeal filaments, which, by communicating with others from the glosso-pharyngeal, the pneumogastric and the inferior laryngeal, constitute the pharyngeal plexus to supply the pharynx: fifthly, laryngeal filaments, accompanying the laryngeal nerve with its branches, go to the larynx: and, lastly, the first cardiac nerve, which, together with a branch from each of the two other cervical ganglia, unites with filaments from the par vagum to form the cardiac plexus. The second cervical ganglion is not invariably present, but when it is, it gives off ascending and descending branches to the ganglia above and below it, the middle cardiac nerve and filaments which form the inferior thyroid plexus, and branches to communicate with the third, fourth, and fifth cervical nerves. The third cervical ganglion, in addition to ascending and descending branches and the third cardiac nerve, gives off filaments, which, together with others from the first dorsal ganglia, constitute the vertebral plexus, giving off-sets to

accompany the branches of the vertebral artery; and lastly, branches which communicate with the sixth, seventh, and eighth cervical and first dorsal nerve.

The thoracic ganglia have all of them ascending and descending branches, as well as others, to communicate with the roots of the neighbouring spinal nerves. The five upper ganglia send off branches to communicate with others from the pneumogastric nerve, and constitute the pulmonic plexus. Filaments from the tenth, eleventh, and twelfth ganglia unite to form the lesser splanchnic nerve; this descends into the abdomen, and principally forms the renal plexus, which, receiving filaments from the solar plexus, gives off the spermatic plexus communicating with the lumbar and hypogastric plexus. The great splanchnic nerve is formed by branches from the sixth, seventh, eighth, ninth, and tenth ganglia; this nerve terminates in the semilunar ganglion, which communicates with its fellow of the opposite side, and forms the solar plexus, receiving some branches from the right phrenic and right pneumogastric nerves, and part of the lesser splanchnic nerve. Various other plexuses are derived from the solar; the gastric, accompanying the gastric artery; the hepatic, splenic, and phrenic, accompanying the arteries which bear the same name; and the

superior and inferior mesenteric, following their respective arteries with their branches, and supplying the same parts of the intestines.

The lumbar ganglia, besides the ascending and descending branches and those which communicate with the spinal nerves, give off branches to unite with filaments from the solar and superior mesenteric plexuses, thus forming the lumbar aortic plexus; this terminates in the hypogastric plexus, having previously given off filaments to the inferior mesenteric plexus. The hypogastric plexus is formed by branches from the lower lumbar ganglia and the termination of the aortic plexus; it supplies all the pelvic viscera, and communicates with the fourth and fifth sacral nerves.

The sacral ganglia give off ascending and descending branches, others to communicate with the sacral nerves, and some which, communicating with the hypogastric plexus, supply the pelvic viscera. The two last pair of ganglia give off filaments which terminate in the ganglion impar on the coccyx, thus uniting the two chains inferiorly.

From this brief sketch we see that the sympathetic system consists of two chains of ganglia, communicating above by means of a single ganglion, and terminating below in a similar manner, and connected superiorly with a number of scattered ganglia, situated in and about the

skull. The whole of these ganglia are connected one with the other, by means of communicating filaments, and are united with the spinal nerves in a similar manner. A communication, therefore, is not only kept up between all the parts of the sympathetic system itself, but a most intimate connexion is established between it and the cerebro-spinal system, thus uniting them, and causing the two, conjointly, to form one general system.

The sympathetic communicates with the anterior roots of the spinal nerves by filaments, which pass to them from its ganglia; these filaments then divide into two sets, one passing inwards towards the root of the nerve, the other outwards, towards its periphery; in addition to this, the spinal nerves themselves give off fibres from their roots which may be traced into the sympathetic.

That the spinal cord is in itself destitute of sensation is an established fact, having been proved both by experiments on animals, and by careful attention to the symptoms occurring in the human subject, when the cord has been divided by accident or disease; the communication with the brain is cut off, and consequently an impression received below the seat of injury cannot be conveyed to it, the course of the fibres serving that purpose being interrupted. Thus sensation, or at least the consciousness of it, is lost. Neither, on

the other hand, can the nervous influence be conveyed from the brain along the cord below the injured part; and therefore beneath this, voluntary motion ceases. The impression, however, received at the peripheral extremity of the nerve is conveyed to the spinal cord, and being unable to pass to the brain, the proper independent functions of the medulla are called into play. Within the gray matter of the cord, fibres of the sensory nerves become continuous with those of the motor ones—the impression received by the former passes through the medulla to the latter, and involuntary motion is the result. This constitutes reflex action, which cannot be better described than in the words of Marshall Hall himself: "Its seat is in the medulla generally; it ceases when the medulla is removed, leaving the irritability entire; it is not excited immediately, like the movements of irritability, but mediately, in a reflex course, through the medulla —from the part stimulated to the part moved."

The nervous system, thus shown to be so intimately connected in all its parts, is entirely dependent upon, and is therefore liable to be affected by, any change which may occur in the vascular system. The vascular system, equally connected in all its parts, is in like manner dependent upon, and liable to be affected by, any change which may occur in the nervous system. A proper supply of healthy blood is necessary for the maintenance of

nervous action, and a due supply of nervous influence is also requisite for the maintenance of the circulation of the blood.

All changes in the nervous system occur at the points where the fibres come into relation with the vascular plexus, the loops of the sensory nerves are surrounded at their peripheral extremities by a plexus of blood-vessels, and the white fibres may be traced into the grey matter of the nervous centres. These changes, then, are greatly dependent upon the state of the circulation, both at the peripheries and at the centres. They are diminished in power, or suspended, when the circulation is retarded or obstructed; they are exalted in action when the activity of the circulation is increased; and they may be affected in various other ways through the same medium—as, for instance, by the introduction into it of certain poisons.

CHAPTER II.

Nervous affections divided into centric and eccentric—Difference between the two—Cases—Centric affections may be either cerebral or spinal, and dependent either upon organic lesion of the nervous centres, or upon some temporary cause — Eccentric nervous affections, their nature and causes—Effect of mental emotion—Case—Poisons may be received from extraneous sources, or generated in the system itself; both affect the nervous system secondarily—Cases—Experiments illustrating the difference between reflex action and the motions of irritability.

It has been most justly observed by Dr. Marshall Hall, that "diseases of the nervous system may be divided into those which have their origin at the nervous centres, and those which originate at a distance from those centres, into those of centric and those of eccentric origin. It is highly probable that diseases of the latter class are far more numerous than they may be at first supposed to be. Chorea, hysteria, tremor, and convulsions have doubtless sometimes a centric, sometimes an eccentric origin. In the latter case, the nervous centres may become morbidly affected in the course of the disease, and the appearances after death

may mislead the medical inquirer as to the original seat and cause of the disease."

Eccentric nervous affections are extremely numerous, but not the less worthy of attention because they originate at a distance from the nervous centres; they frequently constitute some of the most formidable and intractable diseases, rapidly running their course, giving rise to the most frightfully violent symptoms of nervous irritation, and terminating fatally in spite of any known remedy that can be administered. In well-marked cases, the diagnosis between centric and eccentric nervous affections is easy, but there are many intermediate degrees, and a few cases may be occasionally met with, in which it may be somewhat difficult to draw the line.

The difference between these two kinds of affections is well illustrated in the two following cases.

Robert Weeks, aged 50, King's Ward, admitted 4th March, 1846, under Dr. Seymour, with hemi plegia of left side, said to be recent; says he has no pain; tongue rather loaded; passes his urine and fæces involuntarily. Beef tea and arrowroot. Emp. lyttæ int. scap.

5th.—Hirudines, vi. ad temp. dext.

℞ Haust. sennæ ad sedes.

6th.—Enema terebinthinæ.

9th.—Hirudines vi. temp. dext.

10th.—Enema terebinthinæ. Emp. lyttæ pone aur. Has had two fits of an epileptic character this morning. Complains of no pain, but frequently places his hand on the right side of his head.

11th.—Has had another fit; at present is very drowsy, continually sleeping, but can be roused. Countenance sunk. Pulse slow and weak. Enema terebinth.

13th.—

℞ Hydrargyri chloridi, gr. iij.
Haust. sennæ, c. m.

15th.—Died.

SECTIO CADAVERIS.

Cranium.—Bones of the skull very thick and solid. Convolutions of brain flattened, membranes perfectly transparent; no fluid in the sub-arachnoid cellular tissue. At about the central part of the upper surface of the right hemisphere was a darkish spot, which was firmer than the neighbouring parts. This spot, after a slice had been removed from this hemisphere, proved to be a portion of a fungoid tumour, enveloped in the substance of the brain, and about the size of a pullet's egg; it was firmer in structure than the substance of the brain, of a mottled colour, and presented well-marked characters of this disease. The surrounding white substance of the brain was of a

canary colour, even to some distance, and much softer than the substance of the opposite hemisphere; this softness was well demonstrated by allowing a gentle stream of water to run on this part, which immediately broke up in various places. The ventricle of this hemisphere was much compressed, and pushed over to the left side, compressing the left hemisphere, and reducing it much in size; whereas the right hemisphere appeared much larger than natural, especially the white part, the cineritious substance being in several of the convolutions thinner than natural. The right ventricle contained no fluid, but the left contained a somewhat larger quantity than usual. The other parts of the brain were all healthy.

Thorax.—Anteriorly both lungs were slightly emphysematous, and posteriorly they were both very much congested, and easily lacerated. Heart healthy; specks of atheroma about the root of the aorta. Abdominal viscera healthy, with the exception of being congested.

Henry Lovedy, aged 38; servant. Fuller Ward. Admitted 5th March, 1846, under Dr. Seymour. Reported to have been ill for six weeks, with cough and expectoration, but was not confined to the house; at present he is quite silent, and cannot be made to understand any questions. Tongue ex-

ceedingly dry; pulse 110, small; skin not hot; has attempted to strike and bite the nurse; chest cannot be examined, on account of his violence. Emp. canth. pect.

℞ Hydrarg. chloridi, gr. v. statim.
Haust. sennæ, ℥iss. p. h. 6 ad sedes.
Haust. salin. efferv. 6tis horis.

6th.—Has had a fit; at present he is delirious. Pulse exceedingly weak, skin cold. Vini rubri, ℥iij. ex aquâ. Catap. sinapis.

℞ Camphoræ, gr. ij.
Opii, gr. ½ in pulv. 4tis horis.

7th.—Was very violent during the night; is now more sensible, but still very violent. Bowels open yesterday; tongue very dry; mouth covered with sordes. To leave off the wine. Porter, two pints. Rep. pulv. 4tis horis.

9th.—Had much sleep in the afternoon of Sunday; pulse 100, very weak; tongue still very dry and brown; skin moist and perspiring; at present quite collected. Bowels open last evening. No subsultus; no delirium. Haust sennæ, h. n.

11th.—Tongue very dry; mouth covered with sordes; at present he is quite collected; urine very abundant; bowels not open.

℞ Olei ricini, f℥ss ex aq. menth. pip. c. m.

13th.—Tongue very dry; pulse very quick;

no sleep; bowels open; motions very watery; skin very warm.

℞ Hydrarg. c. cretâ, gr. v.·
Pulv. Doveri, gr. iij. ter die.
Olei ricini, ℥ss. c. m.

14th.—Sank gradually, and died at half-past eleven P. M.

SECTIO CADAVERIS.

Cranium.—A small quantity of clear fluid was found in the subarachnoid cellular tissue, and the large veins at the upper surface of the hemispheres were more congested than usual. The brain was wet, but it was firm in texture, and natural in colour. The ventricles did not contain more fluid than usual, and the arteries were healthy.

Thorax.—A large quantity of turbid serum, mixed with recently effused lymph, was found in the cavity of the right pleura, the free surfaces of which were, in several places, covered with a puriform secretion. Several tubercles and vomicæ were found in various places in the left lung, and the intervening structure was very much congested. Several patches of tubercular deposit were also found in various places in the right lung, and the structure of the lower lobe of this organ was much congested and remarkably œdematous, and so soft that it broke down when slightly pressed by the finger. The heart was somewhat dilated, and its muscular structure was flaccid and atrophied; the

valves were healthy, but the lining membrane was, throughout, deeply blood-stained, and the blood contained in the cavities of this organ was small in quantity, and, for the greater part, fluid.

Abdomen.—Liver somewhat congested, of its natural size, and presenting, when cut into, the appearance described as nutmeg. Kidneys much congested and blood-stained, but otherwise healthy. Other viscera healthy.

In the first of these cases, the malignant tumour pressing on the cerebrum gave rise to the paralysis as well as to the extreme state of somnolency under which the man laboured, and was, therefore, of a centric origin, the brain being itself the organ primarily affected. In the second case, the nervous irritation was purely the secondary result of general constitutional disturbance; the attack of fever and thoracic disease being amply sufficient to account for all the symptoms which presented themselves.

Affections of a centric origin may be either encephalic or spinal, and may arise either from disease or accident. Sanguineous apoplexy gives rise to pressure on the brain, from effusion of blood within the substance of the cerebrum; total insensibility follows, which, if recovered from, is in a large majority of cases succeeded by paralysis. External injury of the cranium will produce ex-

actly similar results; fracture, with a depressed portion of bone, will give rise temporarily to the same symptoms, which are also frequently caused by effusion of blood on the surface of the brain, arising from rupture of a vessel, the result of external violence. The same remarks hold good with regard to the medulla spinalis; fracture of a vertebra, causing pressure on the medulla, will produce paralysis and loss of voluntary motion below the seat of injury, which will also take place where the body of a vertebra is destroyed by caries, or where the medulla itself is affected by disease, independent of any affection of the bony cavity in which it is contained.

Between these extreme cases of centric diseases of the nervous system and those having an eccentric origin, there is every shade of variety; they gradually become more and more trivial in their nature and symptoms, and more and more amenable to appropriate remedies.

Centric affections may again be divided into those connected with organic lesion, such as the ones already mentioned, and those depending upon some temporary cause, the symptoms arising from which gradually pass off, leaving no trace of their presence behind them. Concussion of the brain and spinal cord are of this latter kind; the former of these is not unfrequently severe enough to

destroy life, and a post-mortem examination exhibits no visible change of structure, though such might very reasonably be expected; in slighter cases, the functions of the brain are temporarily suspended, the symptoms varying in intensity and duration, according to the nature of the accident which has given rise to them; in favourable cases, they pass off, leaving no subsequent bad effects behind them. In concussion of the spinal cord, the symptoms likewise pass off in a similar manner, no trace of their presence remaining afterwards.

Besides these we have other intermediate varieties; thus paraplegia may occur spontaneously in a young person, no previous fit having occurred, and no known cause existing to which it may be attributed. The paralysis occurs rather suddenly in such cases, affecting the lower extremities, while sensation and the power of voluntary motion remain perfect in the upper extremities. These symptoms are greatly relieved by assuming the recumbent position, but return in full force on rising to the perpendicular. There is no headache either previously or subsequently to the occurrence of the fit, and the general health is not materially deranged; the age of the patient militates against the idea that the arteries of the brain have become ossified, neither is there any positive symptom of previous disease of the spinal cord.

This condition depends upon an effusion of serum beneath the membranes of the brain, which slips down through the foramen magnum into the theca vertebralis; it here gravitates to the bottom, and produces pressure on the lower part of the cord; but as the fluid merely assumes this position in obedience to the laws of gravity, the symptoms, as before mentioned, are much alleviated in the recumbent position. This condition is unconnected with any organic disease of the brain, which may be proved by the fact of its removal under the use of appropriate remedies.

Numerous other examples might be adduced, but the scope of the present work merely admits of a cursory glance at centric affections of the nervous system, its object being to treat of those which depend upon eccentric causes.

Eccentric nervous affections are exceedingly numerous, depending upon a multitude of different causes, and varying in degree of intensity, from trifling transitory symptoms, up to the most formidable and inevitably fatal diseases to which the human frame is liable. They depend upon causes remote from the nervous centres, and may be induced by direct irritation, either of the peripheral extremities of nerves or of the nervous trunks themselves connected with the cerebro-spinal system. The sympathetic system also is liable to be affected in a similar manner.

Derangement of the circulation will predispose to, if not produce, the same effect; blood which is insufficient in quantity, and of an improper quality, as in anæmia, together with the opposite state of plethora, in which the blood is of too stimulating a nature, will both hereafter be shown to act powerfully in this manner.

Poisons of various kinds, whether generated in the system itself, or received into the circulation from extraneous sources, give rise to them; and last, though not least, the mind itself, acting through the medium of our corporeal senses, will produce some of the most alarming and dangerous of them all.

The *modus operandi* of reflex action has been already described, as well as the connexion which exists between the cerebro-spinal and sympathetic systems. Referring to these facts, it is easy to conceive how irritation of the cerebro-spinal system of nerves should call this reflex action into play, and how, also, irritation of the sympathetic will produce exactly the same effect, on account of the connexion which has just been alluded to.

Again, the intimate relation and mutual dependence of the nervous and circulating systems, the one upon the other, has also been set forth, and taking this into consideration, we can at once see how any affection of the circulation must almost instantaneously affect the nervous system.

Not only do the functions of the body suffer by these means, but the intellectual faculties are also frequently affected in a similar manner; we have before seen that the cerebro-spinal system presides over the functions of animal life and the sympathetic over those of organic life; the spinal cord is the seat of reflex action, which is capable of being called into play independently, and, under such circumstances, gives rise to involuntary motion; but for the production of voluntary motion, and the perception of either pleasurable or painful sensations, the co-operation of the brain is necessary. All this is easy to comprehend, so far as our bodily sensations are concerned, but when we reflect that the brain is the organ through which the mind acts, through which our ideas are formed, our thoughts of daily life and our schemes for the future originate, that it is, in fact, the connecting link between the material and the immaterial being, we are lost in admiration and wonder. That the mind re-acts powerfully upon the system through which it operates, is clearly demonstrated by the most indisputable facts. How often do those melancholy cases occur in which the light of reason is extinguished in a moment by some violent emotion of the mind!

The entire continuity of the nervous system, throughout all its parts, will show at once how the cerebral functions can become secondarily

affected from primary causes of an eccentric nature; irritation is propagated from the nerves to the medulla, and is thence conveyed to the cerebrum, which thus, in certain cases, also becomes implicated.

The following case shows the powerful effect of strong mental emotion: the shock has here been primarily received through the nervous system; this has then acted secondarily upon the circulation, the great central organ of which, having taken on violent reaction, has suddenly propelled more blood to the smaller vessels than they could bear, and hæmorrhage within the cerebral substance has been the result.

Mary Boyer, aged 18; single. Queen's Ward. Admitted 10th December, 1845, under Dr. Seymour, with hemiplegia of the right side, of six months' duration, occurring after an apoplectic fit; is reported not to have been bled; urine and fæces passed involuntarily. Face much flushed; pulse 100, not weak.

The patient was on the eve of marriage, and received a sudden account of some misconduct on the part of her intended husband, which broke off the match; the shock was immediately followed by the fit. V. S. ad. ℥xij.

13th.—Face still flushed; had a slight fit while she was being bled.

15th.—Relieved greatly; complains of pain in the region of the stomach. Fotus papav.

17th.—Better; can be roused, and speaks indistinctly; hemiplegia still the same. Hirudines vj. temp. sinist.

℞ Haust. sennæ statim.

19th.—Has partly recovered from the paralysis; speaks more distinctly. Rep. hirudines.

22nd.—Much improved. Rep. hirudines.

24th.—Still improving.

27th.—Is able to move her leg, but not her arm. Face still drawn to one side.

January 8th.—Rep. hirudines, temp. sinist. vespere.

12th.—Had a fit of an epileptic character on the 10th. Rep. hirudines, h. n.

19th.—Rep. hirudines, h. n. Ordinary diet, without beer.

30th.—Rep. hirudines.

February 9th.—Emp. canth. parv. nuchæ.

10th.—Greatly improved; can use the word "Sir," which she *could* not do before, as well as several other words.

13th.—Much better.

19th.—Hirudines vi., pone aur. sinist.

March 2nd.—Very greatly improved; has

entirely recovered the power of speech, and can walk without assistance. Rep. hirudines.

5th.—To have a splint for the hand.

9th.—Rep. hirudines.

31st.—To be an out-patient.

The absorption of various poisons into the circulation, by contaminating the fluid into which they have found their way, acts secondarily upon the nervous system in different manners, according to the nature of each particular poison. These may be generated in the system itself, and are, under such circumstances, capable of producing the most violent nervous irritation. The following interesting case occurred while I was attending, as a pupil, the few cases of midwifery required by the regulations of the College of Surgeons.

Mrs. Henderson, 3, Queen's-terrace, Chelsea, aged 23; first labour, 23rd December, 1844. Chelsea, Brompton, and Belgrave Dispensary.

I was sent for at three, A.M. and found that the pains had first commenced at nine o'clock on the previous evening. On examination, the os uteri was found to be fully dilated, the membranes unruptured, and the head presenting, but not as yet descended into the cavity of the pelvis. The pains were short, and at long intervals, until six A.M., when the membranes gave way; the

pains now seemed to go off for a time, and it was eight o'clock before any further progress was made; the pains then, though short in duration, occurred in more rapid succession, and the head began to descend; at half-past eight it began to press upon the perinæum, which was soft and dilatable, but receded after every pain; at a quarter past nine the perinæum was put permanently on the stretch, and at half-past the head was expelled; the body immediately followed. The child, a fine healthy-looking female, cried and struggled, I divided the cord, and handed it to the nurse. The binder was now put on, and in twenty minutes the placenta was expelled.

℞ Liq. opii sed., ♏xv.

Saw her in the afternoon, and found her doing very well: no pain, discharge continued properly; pulse 80; had not made water, but had had no desire to do so.

24th.—Saw her in the morning; pulse 75, tongue clean; discharge continues; complains of no pain, but has been unable to make water yet: about a pint and a half of urine was drawn off, which seemed to give great relief.

℞ Spirit ætheris nit. ♏xxxv.
Tinct. hyoscyami, f℥ss.
Mist. camphoræ, f℥iss, 4tis horis.

Child's bowels have not acted properly.

℞ Olei ricini, ℥j.

Vespere.—Can now make water freely.

25th.—Pulse 75, tongue clean; can make water freely; discharge continues; has milk. Bowels confined.

℞ Olei ricini, ℥ss. statim et rep. si opus sit.

26th.—Discharge continues; has plenty of milk; pulse 75; bowels open; has no pain.

27th. — Half past four P.M. — Complains of headache; has plenty of milk; and says again and again that the discharge continues properly. At ten A.M. had a rigor, which lasted about three minutes, followed by profuse perspiration. Pulse 130, exceedingly weak; tongue white; says she has no pain or tenderness of abdomen, but could not bear the weight of my hand when placed there, especially over the uterus.

Quarter to ten P.M.—Saw her with Mr. Leggatt; there is great tenderness of the whole abdomen, peritonæum seems generally affected; has been slightly delirious since I saw her; tongue white and loaded; pulse 130, very much weaker—far too weak to admit of venesection;—complains of headache, and sense of lightness of head. On questioning particularly, found that the discharge had stopped, but there is still plenty of milk. Had no sleep last night. Hirudines, xiv. abd.; bran poultice.

℞ Morphiæ hydrochlor. gr. j.
Hydrargyri chloridi, gr. v. statim.

℞ Hydrargyri chloridi, gr. iij.
Pulv. opii, gr. ss. 4tis horis.

28th.—Nine A.M.—Pulse 130, weak and fluttering, tongue white; head light and aching; leeches took well; feels much relieved by them, and can bear pressure on the abdomen; slept well nearly all night; no discharge; makes water freely; bowels confined.

℞ Haust. sennæ, ℥ij. statim.

Two P.M.—Saw her with Mr. Leggatt; pulse 130, weak; has plenty of milk, but no discharge; tongue white; bowels have not yet acted; has no pain in abdomen. Gums beginning to be slightly vascular at edges.

Rep. haust. sennæ si opus sit.
Rep. pil. 6tis horis.

Half-past nine P.M.—Very restless; occasionally delirious; had a rigor on her when I arrived, which lasted nearly five minutes, and was followed by perspiration; pulse 130, a little stronger, but still very weak; tongue white and loaded, head light and aching; great tenderness of abdomen, cannot bear the weight of the hand; medicine has acted once; motion very offensive; was very sick at three P.M. Rep. hirudines xiv. Bran poultice.

29th.—Nine A.M.—Pulse 130, very weak; has had no sleep; bowels have acted once more; no tenderness of abdomen; milk diminished in quantity; is now quite delirious, continually talking

nonsense, and very restless. Complains very much of her head; tongue foul.

Two P.M.—Saw her with Mr. Leggatt. She has been much more quiet since the morning, talks but little; has no pain excepting in the head, which is not so severe; abdomen tympanitic, but not tender; pulse 100, and more quiet, but very weak; tongue white; has milk, but in diminished quantity; has a very slight lochial discharge now, of a green colour; mouth sore. To take the pills twice or thrice daily, according to the state of the mouth. To have a cup of beef tea.

Five P.M.—Was sent for, and found that she had been furiously delirious; would not take any nourishment, and still continued in this state; there was no tenderness of abdomen; the tongue she would not show; neither would she hold her hand still long enough to allow me to count the pulse, which was rapid and very weak.

℞ Morphiæ hydrochlor. gr. j.
Hydrarg. chloridi, gr. iij. in pulv. statim.

30th.—Eight A.M.—Slept about an hour and a half last night, and was quiet till two A.M., when she became furiously delirious; is now more quiet, but still delirious; bowels acted well last night; tongue moist, and not so much loaded, but of a brownish colour; pulse 105, very weak; no tenderness of abdomen.

Eleven A.M.—Was unable to see her with Mr. Leggatt, who, finding her still delirious, ordered

℞ Hydrargyri c. cretâ, gr. iij.
Morphiæ hydrochlor. gr. ½, 4tis horis.
Lotio frigid. capiti.

Half-past five P.M.—Pulse 105, very weak; has taken a little bread-and-butter, and one cup of beef tea; is still delirious, and refuses to show her tongue; there is no tenderness of abdomen.

31st.—Half-past five A.M.—Was sent for, and found that she had been furiously delirious, but was more quiet by the time I arrived; pulse 105; tongue not so much loaded; there is no milk whatever in the breasts; has only taken one powder and part of another; there is no great heat of scalp, no tenderness of abdomen, and very little flatulence; refuses to take nourishment. Urine and fæces voided involuntarily.

Quarter past one P.M.—Saw her with Mr. Leggatt; pulse 120, very weak; is still delirious, and seems very much debilitated; has diarrhœa; motions black and fœtid; there is very slight tenderness of the abdomen.

Half-past five P.M.—Raving continually; pulse 110, a little stronger, but still very weak; has taken half a cup of beef tea; has no tenderness of abdomen; diarrhœa continues.

℞ Morphiæ hydrochlor. gr. ¾.
Pulv. cretæ c. gr. x. 2ndis horis.

January 1st, 1845.—Eight A.M.—Has had no sleep; has been very violent, screaming frequently. Morphia seems rather to excite than calm her. Diarrhœa has stopped; has slight lochial discharge, but no milk; abdomen not tender; pulse very weak and rapid.

Half-past eleven A.M.—Saw her with Mr. Leggatt; is now slightly under the influence of mercury; has no diarrhœa, no tenderness of abdomen, no flatulence; is exceedingly violent, and cannot be kept in bed; there is no great heat of scalp; pulse 130, very weak; seems likely to sink; strait waistcoat to be put on, and the hair cut off. To have some egg and brandy, and some strong beef tea.

℞ Hydrargyri c. cretâ, gr. v. 3tis horis.

Intermit. morphia.

Quarter-past nine P.M.—Much calmer, but very weak; will take the brandy and beef tea; has eaten some bread-and-butter; pulse a very little stronger; pupils contracted.

2nd.—Half-past nine A.M.—Has been tolerably quiet during the night; pulse very feeble, though she has taken some nourishment; has taken the powders regularly, and has had one very fœtid black motion.

Half-past twelve P.M.—Saw her with Mr. Leggatt; has diarrhœa; motions black and fœtid; pulse weak and rapid; has some tenderness of

abdomen; countenance wild and anxious; eyes staring and extremely bright, but seems, on the whole, more quiet. To have some porter occasionally, and continue the brandy and strong beef tea. Head to be shaved, and blister applied.

℞ Hydrarg. c. cretâ, gr. iij.
Pulv. cretæ, c. gr. x. 4tis horis.

Eight P.M.—Head shaved, and blister applied; eyes staring, countenance wild and anxious, cheeks sunk; diarrhœa has ceased; has not been again violent; has some discharge, but no milk.

3rd.—Eleven A.M.—Countenance wild; pulse very feeble, scarcely perceptible; has constant vomiting of bilious matter; can keep nothing on her stomach; bowels have not acted since last night, and there is a good deal of tenderness of the abdomen; there is now a considerable foul, black discharge from the vagina. Emp. lytta abd.

℞ Spirit. ammoniæ aromat., ʒj. 3tis horis.
Hydrarg. c. cretâ, gr. v. 4tis horis.

To continue the brandy and beef tea as often as possible. There is now a slough as large as the top of a tea-cup on the nates. Ceratum calaminæ.

Five P.M.—Much the same; vomiting continues; cannot swallow anything; is sick as soon as she attempts it, bringing up bilious matter; bowels have not acted. To have an injection of warm water, and continue the brandy and egg.

She continued much in the same state, vomiting

continually, and unable to swallow, and was furiously delirious several times; at last she vomited matter of a jet black colour, and at a quarter to four A. M., on the fourth of January, died in dreadful agony, continuing delirious to the last.

SECTIO CADAVERIS—*thirty hours after death.*

Body in tolerably good condition; face sunk, with an evident expression of pain on the countenance; brows contracted. A large slough the size of the palm of the hand on the left side of the nates.

Thorax.—Lungs perfectly healthy, heart and coagula contained in it the same.

Abdomen.—Liver, spleen, and kidneys healthy. A considerable quantity of hardened fæces was contained in the cæcum, but the intestines appeared perfectly healthy. The gall bladder was of a dark colour, and, on opening it, was found to be gorged with a thick viscid matter of a jet black colour. The uterus was removed, and on examining it the next day with Dr. Lee, all the large veins on the right side were found gorged with pus, as well as those contained in the cellular membrane on the same side; the ovaries were healthy and free from any morbid action, as well as the left side of the uterus. The placenta had adhered to the anterior part of the uterus.

In this case the pus generated in the inflamed

uterine veins being unconfined by adhesive inflammation, has found its way into the general current of the circulation, and produced all those terrible symptoms of nervous irritation which eventually terminated in death.

Jane Gardner, aged 15, Roseberry Ward. Admitted 9th May, 1845, under Dr. Wilson, in a half comatose state, with urgent dyspnœa, and a muco-purulent expectoration. Countenance inky, skin moist, bowels costive; catamenia have never appeared. Chest resonant on percussion; gurgling rhonchus.

Her aunt states, that at the age of five she had an attack of croup, from which she never perfectly recovered; from this time up to the present, she has had cough and frequent hæmoptysis, the cough having increased much during the last month. Vini rubri, ℥ ss. 2dis horis.

℞ Decoct. cetrar. ℥j.
Syrup. aurantii, ʒj.
Tinct. camph. c. ♏xij. 6tis horis.

10th.—Very restless during the night, cough and dyspnœa increased, hæmoptysis continues, countenance inky.

℞ Spir. æther. s. c. ♏xx.
Tinct. camph. c. fʒss.
Mist. camph. fʒvij. 4tis horis.

11th.—Symptoms much increased.

Quarter past eleven, A.M., died.

SECTIO CADAVERIS.

Body well formed and in very good condition. Left lung larger than natural, and when the chest was opened it did not collapse. Some slender but firm adhesions existed at the back of the chest. The whole of this lung was emphysematous, and at the back part was loaded with red frothy serum, but the tissue was still firm. The bronchial tubes, even to the minute ramifications, were filled with a thick puriform fluid, and their mucous membrane was of a dark livid colour, and thickened. The right lung was much smaller than the left, and united by extensive and firm adhesions to the walls of the chest. Many of the bronchial tubes of the left lung were very much dilated, especially those which belong to the lower lobe, where several of these tubes were as large, or even larger, than the primary divisions, and passing down, as large as quills, even to the lowest part of the lower lobe, close to its margin, where they terminated in culs-de-sac. The tissue of the lung in the immediate neighbourhood of these dilated tubes was condensed and thickened by red hepatization of a darker colour than usual. The intermediate structure of the lung was pretty healthy, except at the back part, where it was loaded with red frothy serum, and soft in texture. The mucous membrane of the bronchial tubes of this left lung

was of a dark livid colour, thickened, softened, and covered in the principal ramifications, even to the third and fourth divisions, with a thick layer of lymph, presenting a corrugated appearance, which could easily be removed with the back of the knife. Similar appearances existed, though not in so marked a degree, in the right lung, and extended up the main divisions of the bronchi, where the effusion became less in quantity, and gradually disappeared, so that there was but little of it in the trachea, and that only in the neighbourhood of the bronchi. The mucous membrane of the trachea was of a dark red colour, and slightly thickened. The larynx was healthy. The secretion found in the various bronchial tubes, especially the dilated ones, was extremely fœtid.

Pericardium and heart healthy. The subperitonæal cellular tissue of the right lobe of the liver was extensively thickened, and of a white colour. The liver itself was healthy. Spleen slightly adhered to the adjacent parts, but its structure healthy. The remaining viscera healthy.

We have here another example of poison being generated in the system; the mode in which the blood is oxygenated in the lungs, and carbonic acid generated from the effete parts of the system, has been mentioned in the last chapter. Now, if the blood does not receive its due supply of oxygen, we shall have an excess of carbonic acid circulating

through the body and producing all its poisonous effects. In the above-mentioned case this has taken place; the effect of the carbonic acid was marked during life by the colour of the countenance, and the half-comatose condition under which the patient laboured, and the appearances after death clearly showed the cause, in the state of the lungs.

In cyanosis, a similar effect is produced, though not exactly from the same cause; the foramen ovale remains open between the two auricles of the heart, and allows the venous blood to pass from the right one into the left, which thus mixes with the arterial blood, passes into the left ventricle, and is propelled through the system, giving rise to all the symptoms attendant upon this condition.

Again, poisons are also received into the circulation from extraneous sources, and it is astonishing to see what violent nervous symptoms are induced by the minutest portions of some of them. A treatise might be written upon the operation of poisons, but it is not my intention to enter more fully into it, as many valuable works already exist upon this subject.

Before entering into a detailed account of the different varieties of eccentric nervous affections, it may not be amiss to introduce some experiments, made with the intention of clearly pointing out the nature of reflex action, and showing the differ-

ence which exists between it and the motions of irritability.

On removing the head of a frog, the body remained stationary where it was placed on the table. When one of the hind toes was pinched, reflex action was induced, and the creature jumped, but again remained stationary, and never moved, unless irritated in a similar manner. The complete independent function of the medulla spinalis had been insured, in this case, by the removal of the head, which precluded the possibility of voluntary motion, or any sensation of pain. The sensitive nerves supplying the part stimulated, conveyed back the stimulation to the medulla, acting through which, it called into play the various motor nerves supplying the parts in which the reflex action was induced; thus, this action was induced "mediately, in a reflex course, through the medulla, from the part stimulated to the part moved."

The medulla was now destroyed, by passing a probe down the vertebral canal; violent spasms were induced in the respective parts as the probe passed; these were particularly strong in the upper and lower extremities, and continued, for a very short time, on moving the probe round; they then ceased, and were not renewed on repeating the operation. Complete paralysis ensued, and all signs of reflex action were lost. The thorax and abdomen were opened, and all the viscera removed;

the nerves leading to the right lower extremity were then pinched, and vigorous contractions of the limbs were the result; on irritating a single nerve, the respective muscles supplied by it contracted. On dividing these nerves, they appeared to lose their irritability when pinched, but regained it on the application of galvanism, and produced the same vigorous contractions as before. The same phenomena were repeated in all the other extremities, and also in one on its removal from the body, irritability being lost on pinching the nerves, but regained on the application of galvanism.

The movements induced in the various parts, on passing the probe down the vertebral canal, were not dependent upon reflex action; they were the movements of irritability, being excited immediately in a direct course from the irritated part of the medulla to the part moved. After the destruction of the medulla, all possibility of exciting reflex action of course ceased, and consequently whatever movements were produced were necessarily those of irritability.

The head of another frog was removed, and reflex action was easily induced, as in the other case; the viscera having then been removed, the spinal column was divided, so as to separate the portion of the medulla belonging to the upper extremities

from that belonging to the lower; the blade of a pair of forceps was introduced between these two portions, and on completing the galvanic circle from the cervical extremity of the medulla to the forceps, contractions and spasms of both upper and lower extremities occurred. The upper portion of the cord was now destroyed, by passing a probe down the vertebral canal, and violent spasms of the upper extremities were induced, followed by complete paralysis. The motions of irritability remained entire in this upper part of the body, and could be produced on pinching the nerves, or on the application of galvanism; reflex action was here lost, but remained perfect in the lower part beyond the forceps; spasms and convulsions of the lower extremities occurred on reaching the blade of the forceps with the point of the silver probe. The remaining portion of the cord was destroyed, and exactly the same phenomena presented themselves.

From these experiments we learn, not only the exact difference between reflex action and the motions of irritability, but we also see the distinction between centric and eccentric nervous affections. Where the reflex action was induced by pinching a toe, we have a good illustration of what a nervous affection of an eccentric nature really is; the medulla is irritated, but not directly;

the irritation is conveyed to it by the sensitive nerves supplying the part stimulated, and various motor nerves are then called into play. The motions of irritability induced by passing the probe down the vertebral canal, and destroying the medulla, illustrate the affections of a centric origin; the irritation is applied directly to the cord itself, and the motions produced are literally of a centric origin.

CHAPTER III.

Hysteria—Its symptoms—Difference between plethora and anæmia —Their effect upon the nervous system—Causes of hysteria both predisposing and exciting—Effect of hysteria upon the mind—Chorea—Difference between it and hysteria—Symptoms —Exciting causes twofold: local irritation and mental emotion—Case—Causes, both predisposing and exciting—True seat of chorea—Hypochondriasis, its symptoms—Causes, both predisposing and exciting—Prognosis of hysteria, chorea, and hypochondriasis—Treatment of hysteria, constitutional and local—Cases—Necessity of moral treatment—Treatment of chorea—Case—Treatment of hypochondriasis, constitutional and moral.

Of all the maladies to which the human frame is liable, there is probably none which is more distressing to the patients and their friends, or more annoying to medical men, than hysteria.

The disease is harmless as far as life is concerned, but the fits which accompany it, and the strange freaks and fancies which the patients have, are sources of the greatest alarm and anxiety to their friends, and of extreme perplexity to members of our profession, since the treatment is

generally very unsatisfactory and the cure often but imperfect.

The subjects of this complaint in its true form are females, probably on account of their being more delicately constituted than men, their spirits being raised or depressed by much slighter causes, —in fact, to use a common expression, they are of a much more excitable temperament than the other sex. Now, with regard to the symptoms: the most striking of these, and that which most alarms the patient's friends, is probably the hysterical fit; this, for the most part, commences with a wild expression of countenance; the eyes roll, the teeth are tightly clenched and ground together; the whole frame becomes convulsed; the patient struggles violently, tears her hair and clothes; the breathing is deep and difficult, and there is palpitation of the heart; the face is flushed and generally thrown back with the throat projecting; this state soon passes off, and the patient lies quiet and exhausted for a short time, until the paroxysm suddenly returns and is again succeeded by a calm.

In this manner these paroxysms and periods of rest alternate with one another for a time, varying considerably in different cases, until the whole generally terminates in a violent fit of tears, sobs, and laughter. If this fit was the only symptom we had to deal with, the disease would be much more manageable than it is; unfortunately, this is

not the case; the symptoms are almost innumerable, aping almost every known disease, and often with such exactitude that men of the greatest skill have been misled by them. There are, however, in almost all cases, certain premonitory symptoms; there is the clavus hystericus, a severe pain in the head, fixed to one point, often over the eyebrow; frequently there is acute pain, sometimes in the right, at others in the left, hypochondriac region. There is, however, no heat of skin; the tongue is generally clean and moist; the papillæ may be a little elongated; the pulse is quiet, but weak and languid. We then have the globus hystericus, and the urine is voided in considerable quantities, but perfectly clear, and exceedingly pale in colour. The patient has always an inclination to make the worst of her maladies, present as well as past, often complaining of acute pain, and crying out almost before she is touched; though, if her attention be drawn off, the part complained of may not only be squeezed, but pretty roughly handled, without causing any inconvenience; in fact, we always find in these cases, that lightly touching the skin causes pain, whereas actual pressure does not. There is generally palpitation of the heart—the heart's action being greatly increased on going up stairs—as well as pain between the shoulders, shortness of breath, and cough. The pain in the hypochondria, which

is often complained of, arises from an accumulation of flatus, and consequent distention of the intestines there situated; the stomach also, becoming loaded with flatus, presses up the diaphragm, and causes considerable uneasiness, from impeding its proper action, together with that of the heart, which is based upon it. The cough which is often present in these cases is very peculiar; it is not like the cough in phthisis pulmonalis—it is not like the cough in common catarrh; it is a cough *sui generis*, a short, dry, harsh-sounding affair, more like a bark than a cough.

To enumerate all the various forms which this disease assumes would be almost impossible: thus we find hysterical affections of the joints, so ably described by Sir Benjamin Brodie; affections of the spine, peritonitis, tetanus; in fact, it may assume the symptoms of almost any disease to which the human frame is liable. Now hysteria, though classed as a disease, might almost, with more propriety, be considered as a symptom indicative of some other affection, for we can almost invariably trace out a previous cause, giving rise to the hysteria as a secondary result. We very frequently find some derangement of the uterine organs as the cause—thus we meet with hysteria in cases of leucorrhœa, amenorrhœa, dysmenorrhœa, and menorrhagia; and by removing the exciting cause, together with attention to the general health, we may remove the

complaint. That the whole system sympathizes with the uterine organs is an indisputable fact, and well known to every careful observer; and I think there is no fact which illustrates this better than the morning sickness which occurs in the first months of pregnancy.

If, then, the stomach thus sympathizes with the uterus, when it is performing a perfectly natural function, how much more may we expect the whole system to be affected, when some morbid action is going on in this important part? I will not say that hysteria always depends upon a morbid condition of the uterine organs; such an assertion would be absurd, for there are many cases in which we can trace no connexion whatever.

Now there are two conditions of the circulating system diametrically opposed the one to the other —viz., plethora and anæmia. In plethora there is an excess of the red globules, giving rise to a state of system in which there is a tendency to local congestion; and inflammatory action, when it occurs, is of a sthenic character, requiring active antiphlogistic treatment for its removal. Loss of blood is known to produce a diminution in the number of the globules, and is therefore an essential part of that treatment.

In anæmia there is a marked diminution in the number of the globules, there is not so great a tendency to local congestion, and inflammation,

when present, is of an asthenic form, in which, as a general rule, loss of blood is prejudicial.

Andral has noticed a diminution in the proportion of the globules in many cachectic states resulting from the influence of various depressing causes on the nutritive powers, in diabetes mellitus, in dilatation of the heart, inducing dropsy, and in several cases of cachexia saturnina; in fact, any long-continued depressing cause or drain upon the system will produce this state of anæmia.

As shown before, the red globules contain a compound of iron, having a strong affinity for oxygen, which gas is absorbed by them from the atmosphere in the lungs, passes to the heart, and is thence distributed to the whole body. In the systemic capillaries, the globules part with their oxygen, and acquire the power of combining with carbonic acid, during which process animal heat is evolved.

The amount, then, of animal heat developed in the system will be very much regulated, under ordinary circumstances, by the quantity of the red globules contained in the blood; if these be few in number, it will be diminished; but if they be in excess, it will be augmented.

Now, as all changes in the nervous system occur where the fibres come into relation with the vascular plexus, it follows that this system must be more or less affected by an abnormal increase or

diminution in the quantity of the red globules. Where a diminution occurs, as in anæmia, the force of the circulation is lessened, the heart does not receive blood containing a sufficient amount of oxygen to stimulate it to its proper healthy action, and the nervous system receiving a supply of blood insufficient in quantity and of impure quality, has its power materially diminished, and in this way affects the whole circulating system secondarily, being incapable of affording that due amount of nervous influence which is requisite for the maintenance of the healthy circulation.

In this case, then, there are three causes tending to keep up the weakened condition of the circulation; first, the improper quality of the blood from the deficiency in the amount of red globules; secondly, the enfeebled force of the heart's action; and thirdly, the diminished power of the nervous system.

Where an abnormal increase in the number of the red globules occurs, as in plethora, the force of the circulation is augmented; the heart's action is increased by receiving blood too stimulating in its character on account of the excess of oxygen which it contains, and the nervous system being thus supplied with blood superabundant in quantity and of improper quality, is affected in exactly the contrary manner to the last case; its power is greatly augmented, and acting in this state

secondarily upon the whole circulating system, it supplies a morbidly increased amount of nervous influence, and thus keeps up the excited state of the circulation.

Here, then, as in the last case, are three causes tending to keep up the morbid action; first, the improper quality of the blood, from an excess in the amount of the red globules; secondly, the increased force of the heart's action; and, thirdly, the augmented power of the nervous system.

By far the greater number of hysterical cases are connected with an anæmic state of system, in which the circulating and the nervous systems are weakened in the manner just described; less than the natural amount of animal heat is evolved, particularly in the integuments, and those parts furthest removed from the centre of circulation, as the hands and feet. Connected with this state there is a peculiar tendency on the part of the heart to become excited; any exertion, as going up stairs, a stimulant, fright, and many other causes, will produce this effect; the deficiency of power is made up by rapidity of action, and an increased quantity of blood is sent through the capillaries to the peripheral extremities of the nerves: this state passes off, and they are again left in *statu quo* until some fresh exciting cause produces the same effect. This continually alternating state of rest and excitement, acting upon

the already weakened nerves, renders them morbidly alive to any impression which may act upon them, and produces throughout the whole nervous system a kind of erethism which only requires an exciting cause to bring it into action. If, during this state, any local source of irritation arises, hysteria is the result: by far the most common cause is some derangement of the genital organs, though not invariably so; for any other cause, as, for example, the cutting of a wisdom tooth, is liable to produce the same effect.

The state of the general system and the local source of irritation produce hysteria; but this condition having once been set up, there exists in the patient a state of mind which causes her to cherish the complaint, to form, as it were, a sort of affection for it; it becomes a kind of habit; and, to use the homely expression, habit becomes a second nature; so that, after all causes have been removed, the hysterical symptoms continue, and will continue, in spite of everything, if the mind cannot be excited to rouse itself, and cast off the complaint.

The transition from hysteria to chorea is easy; in fact, in the milder forms of the latter, we often meet with a complication of the two, or the hysterical symptoms may pass insensibly into those of chorea, and *vice versâ;* the chorea having been the first symptom to declare itself, subsides, and gives place to hysteria. These two complaints are

extremely analogous the one to the other, occurring in the same states of constitution, and being called into action by similar exciting causes; they differ, nevertheless, in several very important points.

Hysteria, in its genuine form, is a complaint peculiar to women; for though we often meet with very analogous symptoms in men, yet they never correspond exactly, and may, with far greater propriety, be classed under the head of hypochondriasis. Chorea, on the contrary, does most undoubtedly occur in the male, though not so frequently as in the female. In hysteria there are remissions; in chorea, the symptoms about to be described are always present, never ceasing except during sleep. Hysteria generally occurs in young females about the age of puberty, and is, for the most part, connected with some derangement of the uterine system; chorea frequently occurs in children before the age of puberty, and is often totally unconnected with any disorder of the genital organs.

The symptoms consist of a deranged action of the voluntary muscles, giving rise to motions which are involuntary, and completely beyond the control of the patient, continuing incessantly while the patient is awake, but ceasing, generally, during sleep. These involuntary motions vary in different cases, both in situation and degree of intensity; in some they may be slight and partial, confined

to one set of muscles, sometimes to one entire side of the body; in others they may be severe and general, the whole set of voluntary muscles being affected. In severe cases, the countenance assumes a peculiar expression, the eyes appear dim, and there is a vacant look of imbecility which is exceedingly striking.

The complaint may be divided into two general kinds, on account of the difference between the exciting causes; first, that which depends upon some local source of irritation; secondly, that which arises from some mental emotion, giving a severe shock to the whole constitution. The first form we often meet with in children, arising from bad food and air, intestinal worms, second dentition, &c., or it may be the result of irritation, the abdominal functions being, at the same time, greatly deranged. In cases of this kind, whether arising in children or adults, the complaint is amenable to remedies, and is seldom fatal; attention to the state of the bowels, tonics, and removal of the exciting cause, will generally effect a cure. These cases, for the most part, commence with slight involuntary motions of some particular set of muscles, those of the face being most frequently first affected; other sets subsequently take on the same action, and the intensity of the symptoms will depend upon the amount of irritation which exists as the exciting cause, as well as upon the

time which the complaint has been allowed to progress unchecked in its course by proper remedies. The other form of the disease, arising from mental emotion, though analogous in its general symptoms, is very different as to its result. This may, of course vary, like the other, on account of the nature and intensity of the emotion acting as an exciting cause, but where this is at all severe, the complaint is exceedingly intractable, to say the least of it, and where it arises from sudden fright, it constitutes a most formidable, and very frequently fatal, disease. This form of chorea is extremely well illustrated by the following case, which occurred in St. George's Hospital.

Anne Morgan, aged 16, Queen's Ward. Admitted October 15th, 1845, under Dr. Seymour. Severe attack of chorea, attributed to fright and exposure to cold. Muscles of the face and tongue less affected than usual; can put out her tongue without biting it. Involuntary movements very severe. Catamenia absent for six months. Pulse weak; tongue clean; bowels much loaded; motions coloured by steel; sounds of heart and respiration natural. She is reported to have commenced menstruating at fourteen, and enjoyed tolerable health until April last. She was then sleeping in a damp kitchen, separated from a coal cellar by

a wooden partition, which, in the night, gave way, allowing the coals to fall into the kitchen with a tremendous crash. The fright occasioned by this deprived her of the power of speech and motion for upwards of ten minutes, and upon recovering herself the symptoms of chorea appeared, and have increased steadily up to the present time. For the last week she has been much worse, and is now unable to feed or dress herself.

℞ Mist. ferri c., f℥j. bis die.
Hydrargyri chloridi, gr. iij.
Ext. colocynth c., gr. vj. h. n.

16th.—Cold water to be poured over her head every morning. Ordinary diet; porter, one pint.

℞ Pil. Galbani c., gr. iij.
Ext. colocynth. c., gr. vij. alt. noct.

18th.—Much better; involuntary movements much less severe; bowels open; tongue clean. Vini rubri, ℥iv.

℞ Pil. Galbani c., gr. v.
Ext. conii, gr. ij.
Quinæ disulph., gr. j. ter. die.

20th.—Not so well, hands are cold, involuntary movements have much increased; unable to sleep. Bowels confined.

℞ Hydrargyri chloridi, gr. iij.
Opii, gr. j. statim; et rep. h. n.
Olei ricini, f℥ss. c. m.

22nd.—Involuntary motions very violent, with shuddering of the lower extremities; muscles of

the tongue and larynx much excited. Pulse weak.

℞ Haust. morphiæ statim.

23rd.—No worse.

℞ Quinæ disulph, gr. ii j.
Camphoræ, gr. ij. 3tis horis.

Rep. haust. p. s. c. ext. belladonnæ, gr. ¼.

24th.—Pulse better, more distinct; skin warm. There is an erysipelatous blush, of a dark colour, on the right hand, an eruption has broken out on the arms, more especially the right. Rep. med. 4tis. horis. Utat. baln. tepid.

26th.—There is sloughing of the back and one toe. Involuntary movements greatly relieved; not much sleep; pulse 100, weak. There is much pain and disturbance in the region of the heart. There is a loud systolic bruit heard most distinctly at the apex, and a still louder diastolic murmur over the aortic valves. Fotus papav. bis indies.

28th.—Has much pain in swallowing; aphthæ on mouth. Syrupi mori, ℥ij.

29th.—Involuntary movements much less frequent; strength is broken down; an abscess which formed on the hand has been opened; lips much chapped.

31st.—The involuntary movements have entirely ceased: the fingers of both hands flexed, and the thumbs bent across the palms: pulse 110; tongue

moist, with much less aphthæ. Rep. pil. 6tis horis.

℞ Haust. morphiæ c. liq. opii sed. ♏xx. h. s.

Nov. 3rd.—Fingers in the same position. There is some cough and expectoration, much debility; pulse 130, weak. Spirit. vini Gallici ex aquâ.

5th.—Pulse very quick; involuntary motions have quite subsided; has had some sound sleep. Much difficulty of breathing; left side of the chest is dull on percussion, and does not dilate on inspiration; murmurs of the heart have ceased. Rep. fotus.

7th.—Pulse still very quick and weak; aphthæ have nearly disappeared from the mouth; there is much cough, with dyspnœa, and great difficulty in bringing up the mucus; had some hours sleep last night; involuntary motions have not returned.

10th.—A little better, pulse regular, 120, stronger. Bowels open; takes food regularly, and breathes more easily. Mutton chop.

11th.—Involuntary motions have returned slightly.

12th.—Died at eight A.M.

SECTIO CADAVERIS.

Body much emaciated, marks of recent erysipelas on the right lower extremity, and also on

right hand; a small opening on the back of the hand, passing between the first and second metatarsal bones; several small superficial sloughs on the body and extremities; a deep and rather extensive one on the sacrum.

Thorax.—A large circumscribed abscess, containing about six ounces of pus, was found at the lower part of the mediastinum, separated from the cavity of the left pleura, which was filled with a large quantity of serum, mixed with pus and lymph; the pleura was adherent at the upper and back part; throughout the remainder of the free pleural surface it was covered with purulent lymph. The lung was much compressed and quite impervious to air at the lower and back part, the remainder apparently healthy in structure. Old adhesions of pleura on right side, on the anterior surface of the lung; lung healthy, but containing much frothy serum. Heart healthy, the walls rather thicker than natural; both sides contained firm coagula, those in the left fibrinous.

Abdomen. — Liver healthy; old adhesions on anterior surface; kidneys and spleen healthy.

Cranium and spinal cord. — Brain apparently congested at the posterior part, apparently from position; a good deal of fluid was contained in the cavity of the arachnoid of the spinal cord; but the cord itself appeared quite natural. A small circumscribed abscess was found upon the vertebræ,

immediately below the diaphragm, containing the same kind of pus as that in the mediastinum; the perichondrium was slightly absorbed where the abscess covered the intervertebral cartilage.

In this case there was only one symptom which could lead to the supposition that there was any positive affection of the brain itself; the hands were constantly flexed, and the thumbs turned inwards on the palms. She had symptoms of effusion into the cavity of the pleura, and inflammation of the lungs, but general bloodletting was contra-indicated by the extreme debility under which she laboured; blisters could not be employed on account of the existence of erysipelas. Fomentations were employed, and certainly with benefit. Here, undoubtedly, the thoracic disease was the immediate cause of death, though I have little doubt but that she would have died from downright exhaustion if this had not existed. I have heard Dr. Seymour mention an extremely interesting case of this kind, which occurred under his care. A young girl was left in a shop to watch some cloth; a man entered the shop, snatched up the cloth, and ran off with it. Whether the poor girl was afraid of being accused of the theft, or whether the apparition of the man had the effect, is hard to say; but she was seized with violent symptoms of chorea, resembling, in some points, the most aggravated form of hydro-

phobia; the muscles of deglutition were affected violently; the tongue was thrust in and out of the mouth, and bitten by the teeth, the face being covered with blood from this cause; there was, however, no dread of water, and no dislike to food; the sound of water did not disturb her, neither did a current of air, nor a sound of any kind; but the symptoms continued, and she died.

Chorea, like hysteria, occurs in anæmic patients, but the anæmia has generally (and always in severe cases) proceeded to a much greater extent in the former than in the latter complaint.

Chorea, as stated, is often connected with a derangement of the digestive organs, particularly when it occurs in children. In such cases, general debility exists as the predisposing cause, having been induced, in many instances, by the use of food, either insufficient in quantity, or of improper quality, or both combined; the patient becomes languid, weak, and more or less emaciated, from the disorder of the assimilating processes; for, as Prout says, "Atrophy may arise from deficient or imperfect assimilation, either primary or secondary, or both; but, in a great many instances, it is connected with excessive action in the secondary destructive processes, by which the various tissues are removed from the body faster than they are produced. This derangement of the balance between the primary and secondary processes of

assimilation, (which usually arises more from affections of the primary than of the secondary organs,) takes place in fevers and many other diseases." This state of affairs may be induced by the above-mentioned causes, for, according to the same author, that which cannot be *reduced* into chyme in the stomach, cannot be *converted* into chyle in the duodenum and lacteals, and can never become *animalized;* consequently food of improper quality, as well as that of insufficient quantity, will give rise to it; the secondary assimilating process goes on, and the tissues, feeding, as it were, upon themselves, emaciation and general debility are the result.

There are numerous other adjuncts tending to the same effect; thus, among the poor we have bad air, from close, crowded habitations, cold and damp, and frequently insufficient clothing, with exposure to the weather; whereas among the higher classes of society we find, in some instances, the mental faculties too early taxed, want of exercise, close confinement, and sedentary occupations, particularly in girls; and common to both classes, we have pre-existing constitutional causes, as scrofula and rachitis. When the affection occurs about and subsequent to puberty, we find various other causes; premature excitement of the passions in both sexes, and in the female, derangement of the genital organs; suppressed, protracted, or any

disordered state of menstruation, occurring either at the commencement of that function, during its continuance, or at its cessation. These two latter periods, however, are rare; for though no age is entirely exempt from it, still it seldom occurs long after puberty, and generally antecedent to that period. From one and all of these effects, the same results occur, as I have mentioned when speaking of hysteria; the circulation becomes affected, the nervous system suffers secondarily, and an exciting cause alone is wanting to bring out the disease.

The exciting cause of this complaint may, as in hysteria, depend upon some local source of irritation which acts primarily, either upon the ganglionic system, the sensory branches of the cerebro-spinal system, or upon the nervous centres themselves; or it may be caused by mental emotion.

The local source of irritation may be caused by intestinal irritation of any kind, either worms or indigestible substances, suppressed cutaneous eruptions, and the cessation of either natural or long-continued abnormal discharges, amenorrhœa, dysmenorrhœa, menorrhagia, the second dentition, or cutting the dentes sapientiæ, manustupration in either sex, direct injuries of the nervous centres from falls, blows, &c., and metastasis of rheumatism to the membranes of the spinal cord. The mental causes may arise from jealousy, envy,

anxiety, fear of future events, excited but unsatisfied sexual desire, and sudden fright.

The true seat of chorea is the medulla spinalis, inasmuch as this is the seat of the reflex action; here it is, as we have seen, that the fibres of the sensory nerves become continuous with those of the motor nerves, and that irritation communicated to the peripheral extremities of the former is propagated by this means to the latter, and involuntary motion is the result. Again, we have seen the intimate connexion which exists between the sympathetic and the cerebro-spinal systems, and the manner in which filaments are given off from the ganglia of the former to the anterior roots of the spinal nerves, while fibres from these may be traced into the sympathetic. Thus, then, worms, or any crude or noxious substance in the intestines, will irritate the peripheral extremities of the sympathetic nerves supplying them, the irritation is conveyed by their trunks to the spinal nerves, and to the medulla spinalis itself, and the reflex action is called into play.

The peripheral extremities of the sensory nerves of the cerebro-spinal system may be directly affected, as in the case of suppressed cutaneous eruptions; the irritation is conveyed back to the medulla, and hence transmitted to the motor nerves.

Where the nervous centres are themselves pri-

marily affected, the irritation is conveyed secondarily to the nerves, and not received from them in the first instance, as it is in the other cases.

In cases of metastasis of rheumatism to the membranes of the spinal chord, besides having the circulation of the cord itself affected, there is direct irritation at once conveyed to the branches of the sympathetic, which principally supply those membranes, and this is secondarily transmitted to the cerebro-spinal system.

The effect of fear, and the deadly pallor which accompanies it, is well known to every one; now, when sudden severe fright occurs, the heart's action is, for the moment, checked, and, at the same time, a spasmodic constriction of the capillaries takes place, by which means the blood is thrown back from the surface; should the shock be sufficiently powerful, the heart may not be able to regain its power, and death ensues immediately, or in a very short time; but if the heart does recover itself, this sudden state of pallor as suddenly passes off, and is succeeded by violent reaction, equally dangerous in its consequences, and frequently giving rise to insanity from the severe shock transmitted to the cerebrum. In strong, healthy constitutions, the circulation gradually recovers its equilibrium, and the effect upon the nervous system gradually subsides without any deleterious consequences:

this, however, is not the case in a constitution debilitated by any of the above-mentioned causes, and predisposed to chorea, the nervous erethism mentioned in hysteria already pre-exists; the weakened peripheral extremities of the nerves are suddenly deprived of their supply of blood, which is then as rapidly transmitted to them with redoubled force; the shock is conveyed by the sensory nerves to the medulla spinalis; the motor nerves are affected, and involuntary muscular action of the most intractable nature is the result.

Closely allied, and extremely analogous in its symptoms to hysteria, is hypochondriasis. This complaint is almost peculiar to males, and when it occurs in females, it seldom if ever happens before the cessation of the catamenia; it is generally connected with, if not dependent upon, chronic dyspepsia; sensibility, as in hysteria, is always increased, and various diseases may also be simulated. I do not, however, believe, that there is nearly the same tendency on the part of the patient to deceive those about him; he *really* believes in the existence of the imaginary disease, and frequently there is some slight functional derangement, which gives rise to and keeps up this delusive idea. The hypochondriac is dull and dejected, has a tendency to make the most of his sufferings, and is extremely anxious about himself;

he is timid and wavering in his manners, and suffers severely from dyspepsia, either existing primarily, or having been induced by some other cause.

This complaint is generally insidious in its attack, and progresses slowly, though sometimes it advances more rapidly. The digestive organs are, in the first instance, deranged; there is great acidity of stomach, accompanied with flatulence and pain, particularly after eating; this gives rise to palpitation of the heart, in the manner before described; and the patient's attention becoming fixed upon this symptom, he frequently imagines that he is suffering from organic disease of that organ. The tongue is foul, and the breath generally fœtid, though the pulse is seldom affected, except when the heart's action is temporarily interfered with. There is, most frequently, a lateritious deposit in the urine, but occasionally that fluid is as clear, limpid, and abundant as in hysteria; the appetite is variable; at some times voracious, at others, totally absent; the bowels, too, are irregular, being generally in a state of constipation, which is, at times, followed by diarrhœa, and the colon is almost invariably loaded with flatus.

As the disease advances, all these incipient symptoms become aggravated, and are accompanied by others appertaining to the nervous system;

headache, vertigo, and dimness of sight, are now often present; a sensation is frequently experienced in the throat, exactly analogous to the globus hystericus, and in some cases, tears, sobs, and laughter alternate with one another, in paroxysms, as in the hysterical fit. The patient becomes morbidly sensitive and extremely anxious, and is incapable of attentively directing his mind to any particular pursuit for a length of time, without its reverting to his own sufferings; he is excessively susceptible to mental impressions, and easily excited to tears; he is tormented continually with fears of imaginary evils, and often suffers from various local pains, which may, in some degree, simulate numerous diseases; but notwithstanding all this, the outward appearance of health is most frequently present, though not invariably so. The mind of the patient becomes more and more weakened, and its ideas more firmly concentrated on his sufferings; but so long as no positive hallucinations are present, the disease *cannot* be classed (as it often has most erroneously been) with insanity.

Hypochondriasis is not nearly so much confined to anæmic patients as hysteria and chorea; it exists equally in the plethoric, and its causes may be divided, as in these two latter complaints, into predisposing and exciting.

The predisposing causes may be attributed

principally to sedentary habits, anxiety, great mental exertion; the energies of the mind being directed with particular attention to some one subject; these, combined with full living and insufficient exercise, must soon disorder the digestive functions, and dyspepsia is the result. There is another powerfully predisposing state of constitution, the phlegmatic variety of scrofula; in this case the digestion is weak, and the appetite often enormous; the bowels are torpid, but the intellectual faculties are often extremely powerful and capable of undergoing great exertion. The great Dr. Johnson was a martyr to hypochondriasis under these circumstances, and I think that no case tends more to refute the idea that this complaint and insanity are identical; for who could for one moment suppose that the Dictionary and the Rambler were the works of a lunatic.

Dr. Seymour, in his work on Insanity, says:— "It is true that inflammation of the bowels will proceed rapidly, and terminate fatally, without involving sympathetically the intellectual functions; but, on the other hand, the degree in which these functions, and even the external senses, are disturbed by the diseased secretions of the stomach, liver, and small intestines, is manifest to every one. The severe and agonizing headache experienced by some patients, from the simple distention of the great intestines, is a familiar instance of this

connexion." Anything, in fact, which is capable of disordering the primary assimilating process for a length of time, is liable to act as a predisposing cause to this complaint.

The whole of the blood returned from the intestines passes through the liver, that great depurating organ, which purifies it in its passage, and at the same time secretes the bile. The intestinal veins are destitute of valves, and consequently the circulation in them is slow; the vena portæ is formed by the union of the splenic with the superior mesenteric vein; the splenic receives the blood from the spleen, pancreas, stomach, and duodenum, by means of the pancreatic, gastric, gastro-epiploic and vasa brevia veins; the inferior mesenteric vein also terminates in it, and this latter, together with the superior mesenteric, return the blood of the entire intestinal canal from the anus to the jejunum. The whole of the blood thus returned from the intestines is dark coloured, and loaded with carbon, and has to pass through the liver, which purifies it.

Now, in such cases as we are at present considering, the portal circulation becomes deranged, more venous blood is returned to the liver than that organ has the power of purifying; the causes still continuing, the interlobular veins become loaded, and active congestion of the liver is the result.

Here, then, we have a cause, at the same time both exciting and predisposing; exciting, inasmuch as it will bring out the disease from the constitutional disturbance produced by the disordered state of the hepatic functions, and predisposing, inasmuch as it tends to keep up the dyspepsia already pre-existing. Another, and not uncommon cause, acting in a similar manner, both as predisposing and exciting, is, excessive sexual indulgence, or masturbation; this, by weakening the system, interferes with the digestive functions, and by the continual irritation produced, excites the development of the complaint; it is often accompanied by a peculiar kind of headache, described by the patient as "an opening pain on the top of the head."

The exciting causes of this complaint are various; mental emotions, as sorrow, long-continued and intense anxiety, disappointment, reverse of fortune, or neglect of friends; the use of opium, mercury, or drastic purgatives; excess in alcoholic liquors and animal food, will all act as exciting causes in a constitution already pre-disposed to the complaint, and some of them may, in the first instance, lay the foundation of it, by giving rise to the original dyspepsia.

The prognosis in these complaints—viz., hysteria, chorea, and hypochondriasis—should be somewhat guarded, always with regard to their duration, and

occasionally respecting their probable termination. Hysteria seldom, if ever, terminates fatally, but the time to which it may be protracted is extremely doubtful, sometimes continuing for a considerable period, though there may be occasional intermissions; and under injudicious treatment, particularly on the part of the patient's friends, it may continue almost through life; as a general rule, however, it may be removed, by proper care and treatment, within a reasonable time. It may terminate, as before shown, in chorea; and in some cases we may even have inflammation of the cerebral and spinal membranes; but by far the most untoward event is the transition of the complaint into insanity, which occasionally happens.

Dr. Seymour thus alludes to the similarity between hysteria and insanity:*—

"Sometimes the disturbance of the mind is shown in the numerous forms of imposition attempted by the patient on the attending practitioner. Sometimes inordinate pains are complained of in the region of the bladder; and if the disease be doubted, the patient will have recourse to some means, in her own idea conclusive, to convince all beholders. Thus persons at this period of life have professed to have passed gravel, or sand, which, on examination, proved that it never

* Seymour on Insanity, p. 22.

could have been generated or contained in an animal body. At other times, inordinate vomiting is the symptom for which medical advice is required, and it has occurred to me, as it has, doubtless, to others, to find this incessant vomiting kept up by substances taken, for the very purpose, by the patient herself. Sometimes the patient cannot swallow, at other times she loathes food, and will exist on almost incredibly small quantities of it; and yet these patients have received an education which would make them shun falsehood on any other subject, and are of a rank of life where nothing was to be gained by pity, except that commiseration, attention, and astonishment, which excite and occupy the mind.

"Is it possible to conceive such cases otherwise than the result of an alteration in the mental faculties, nearly allied to mania?"

And nearly allied such cases are; in fact, we frequently meet with hysteria in its most aggravated form, assuming such a character that it is extremely difficult to draw the line, and say whether the complaint should cease to be called hysteria, or at once be regarded as insanity.

Chorea, unlike hysteria, is not liable to terminate in insanity, but with regard to the duration of the complaint, the same guarded opinion is necessary; the danger to life is here much increased, inasmuch as the state of anæmia has pro-

ceeded to a far greater extent, and even in the long protracted and *apparently* harmless cases, death may occur unexpectedly and *suddenly;* and where the disease arises from severe and sudden mental emotion, acting upon a constitution already greatly debilitated, that constitution is too weak to bear up against the nervous irritation which is *at once* set up, and sinks beneath it.

Hypochondriasis is sometimes tractable, and sometimes extremely the reverse, depending, in the first place, upon the cause of the complaint; in the second, upon the duration of time that it may have existed when we are called upon to see the patient. This disease, equally with hysteria, is liable to terminate in insanity; but it differs from it in the form which it generally assumes; hypochondriasis merges into melancholia, frequently with a suicidal tendency; hysteria, for the most part, passes into mania. In addition to this, although, as a general rule, the disorder of the digestive organs is of a functional character, yet in the severe protracted forms of the complaint we may have real organic disease, slowly but surely established. In these cases, then, it is necessary, where there is the slightest suspicion of the possibility of such an event, to be upon the alert, and not to treat with total disregard a symptom to which the patient may be continually directing our attention; for by investigating a thing of this kind, we

may be occasionally enabled to arrest mischief, which if left to itself would have been most assuredly irreparable.

In the treatment of hysteria, a strict investigation must be made, in order to discover the *local exciting* cause; and having done this, measures must be taken to remove it; at the same time, the general state of the system, or *predisposing cause*, must be attended to, and improved by proper remedies. This latter cause for the most part depends upon a state of anæmia, in which there is a deficiency of the red corpuscles of the blood, and consequently a deficiency of iron in the system; now, these corpuscles have already been shown to contain a compound of that metal, most essentially necessary to the healthy circulation, as being the medium through which oxygen is absorbed. The various preparations of iron have the power of supplying this deficiency, and are most invaluable in the treatment of this complaint: when they are judiciously administered, the appetite is improved, and digestion promoted, the iron is absorbed by the blood, which then becomes more florid in colour, from the increased quantity of red corpuscles. In addition to this, the preparations of iron act as direct astringents to the alimentary canal, diminishing the secretion from its mucous surface, and sometimes occasioning constipation. But valuable and essentially necessary though this

remedy is, it nevertheless requires some little consideration as to the mode of administering it; if we begin indiscriminately to give it at the very first onset in all cases, we shall frequently bind up the bowels, induce headache and feverish symptoms, heat the patient, and do more harm than good. The better plan, in the majority of cases, is to begin with the fœtid gums, and thus pave the way for the more powerful and effective remedy. These gums are termed antispasmodics, and are supposed to have a direct effect upon the excito-motory system, and certainly their administration is generally followed by the most happy results.

In some cases of debility, where we want to produce a rapid effect, there is no remedy that can be compared to quinine; the appetite and digestion are at once promoted, and the whole system invigorated in a remarkable degree; it should not, however, be allowed to supersede the iron, as it does not produce the same *permanent* effect, but as soon as it has somewhat improved the general health of the patient, it should be given up, and preparations of steel employed in its place.

Quina is an astringent bitter, and acts, in the first place, mechanically as an astringent; in addition to this, it has the property, in common with other bitters, of improving the appetite and digestion; secondly, being taken up into the blood, it is extremely probable that the same astringent

effect is exercised upon the coats of the weakened vessels, improving the vigour of the circulation, but not the quality of the circulating fluid in a direct manner, as the iron does; it does, however, indirectly act in this way, because the primary assimilating process being greatly improved, a more healthy fluid must necessarily be secreted; again, the power of the circulation being invigorated by the tone imparted to the vessels now carrying an improved quality of blood, the secondary assimilating process must also be improved, and the nutrition of the body proceeds in a more natural manner.

It is extremely necessary, in hysteria, to attend to the state of the bowels, which are most frequently confined. In the generality of cases, *active purging* is inadmissible, it weakens the patient and aggravates all the symptoms; in some cases, however, where the bowels have been long neglected and there is an accumulation of fæculent matter in the large intestines, this plan of treatment must be adopted in the first instance, until they are cleared; after this, mild aperients alone are requisite, a gentle regular action being all that is required.

Mercury is extremely ill borne by these patients; I have, however, derived great benefit from administering it for a short time in the following manner:—

℞ Pil. galbani c. ʒss.
Quinæ disulph. gr. xij.
Pil. hydrargyri, gr. ij.
Divide in pil. xij., quarum capiat ij. ter quotidie.

The dose is small, but it is just sufficient to act as a mild alterative, and stimulate the liver and digestive organs to a healthy action, while the usual debilitating effect of mercury upon hysterical patients is prevented by its combination with the tonic and antispasmodic.

The cold shower bath is of most important service in the treatment of these cases; the primary shock and subsequent reaction appear to have a very beneficial effect; the sudden application of the cold water causes contraction of the cutaneous capillaries, and, by repetition, imparts tone to them, while, at the same time, it acts as a direct sedative upon the cutaneous nerves, and more or less so upon the nervous centres themselves. By these means, both the capillaries and the nerves are brought into a condition capable of bearing the subsequent reaction with advantage. It is necessary, however, that there should be sufficient vigour in the constitution for this reaction to take place, otherwise the system only receives a shock, from which it has not sufficient inherent power to recover spontaneously, and a debilitating instead of an invigorating effect is the result. In cases, therefore, of *extreme* debility, cold water is inadmissible, though occasionally a tepid shower bath may be

employed with benefit, the shock from which being moderate, the weakened constitution is enabled to recover itself, and reaction takes place.

Diet should be strictly attended to; good solid food, where the stomach can bear it, should be taken in moderation, but never in sufficient quantity to overload the stomach; all acid and indigestible substances, anything liable to produce flatulence or irritate the intestinal canal, as well as slops, should be avoided—in fact, no more liquid should be taken than is sufficient to quench thirst. A superabundant allowance of fluid acts injuriously, for, according to Prout, "As water constitutes so large a proportion of organized beings, we may naturally suppose that, surrounded as they are by an atmosphere colder and drier than themselves, the quantity of water they contain is liable to perpetual change. Accordingly, we find this to be the case, and that aqueous vapour is either freely separated from the skin, from the lungs, and from other organs; or perhaps, under different circumstances, is as freely absorbed by the same organs from the surrounding atmosphere. In these various modes, much of the water in animal bodies is doubtless liable to be changed; but the great proportion is separated by organs expressly adapted for the purpose—viz., the kidneys; and supplied by fluids taken by the mouth, in the shape of drinks."

The blood, in these cases, contains a larger relative proportion of serum than under ordinary circumstances, and by the continual and excessive imbibition of fluids, this condition is not only kept up, but increased. The patient has almost always a tendency to drink more than is sufficient; but indulging this appetite is not the way to cure it, as is well shown in the case mentioned by Sir B. Brodie, where a nervous lady, suffering from intense thirst, was relieved by the administration of quinine.*

The exciting cause of the complaint must also be sought for and remedied; two exceedingly common causes are, chlorosis and amenorrhœa; the first, consisting of a non-appearance of the catamenia at the age of puberty; the second, of a cessation of the catamenia after they have appeared. The non-appearance of the catamenia may depend upon a mechanical obstruction, from imperforate hymen; the discharge occurs regularly enough in these cases, but being unable to escape, is retained, causing considerable irritation and constitutional disturbance. This cause having been ascertained, the treatment is at once obvious and simple, a crucial incision, and copious injection of tepid water to wash out the uterus and vagina, at once relieve the symptoms. Where the non-appearance of the catamenia depends upon a constitutional

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* Lectures on Local Nervous Affections, p. 30.

cause, emmenagogues may be employed, and various local and general remedies, differing according to the nature of the case.

In amenorrhœa, the same course may be adopted, though not always; for frequently the cessation of the catamenia depends upon a state of general debility, in which case the system must be strengthened by appropriate remedies, and the discharge will return without the employment of emmenagogues.

In the treatment of these cases, we must bear steadily in mind that local congestion is far from being incompatible with a state of anæmia; and though general bloodletting is wholly inadmissible, still the greatest benefit is not only derived from the local abstraction of a small quantity of blood, but it is sometimes absolutely necessary.

The benefit of local bloodletting is shown in the following case:—

Elizabeth Blake, aged 15, Queen's Ward. Admitted March 4th, 1845, under Dr. Seymour. Complains of giddiness and shortness of breath; and it is reported that she has suffered from epileptic fits for the last fortnight. The catamenia have been absent for three months. Broth diet. Hirudines iij uteri ope canulæ, vesp.

℞ Tinct. valerianæ ammon. ʒss.
Ammon. sesquicarb. gr. iij.
Mist. camphoræ, ʒij. b. d.
Pil. aloes c. myrrhâ, gr. x. o. a. n.

9th.—Arrow-root, beef-tea, and milk. Utat. semicupio tepido, o. n.

From this time she gradually improved in health; on the 18th, the leeches were repeated, the catamenia re-appeared shortly after, and on the 31st she was discharged as cured.

There is an objection to this plan in private practice, on account of the strong repugnance which exists to the application of leeches in such a manner; they may, however, be applied over the course of the round ligaments, or cupping on the sacrum may be employed instead. General bloodletting is extremely injurious, and when employed through a mistaken diagnosis, is sure to aggravate all the symptoms.

Margaret Lewis, aged 31, Crayle Ward. Admitted November 12th, 1845, under Dr. Seymour. Complains of pain at the top of the head, of a fortnight's duration; has had no fit, and no loss of power in any of her limbs; the pain is relieved by sleep; catamenia regular, but scanty; tongue clean; urine very abundant; great intolerance of light; pupils dilated; has been bled once largely, and thinks the pain was aggravated by it. Beef-tea and arrow-root.

℞ Spirit. ammoniæ aromat.
Spirit. æther. s. c. āā ʒss.
Mist. camphoræ, ʒiss 4tis horis.

Haust. c. liq. opii. sed. ♏xij. h. s. s.

14th.—The pain in the head was relieved by the anodyne of Wednesday; to-day the pain is worse; no anodyne was given last night.

℞ Pil. galbani c. ʒss.
Ext. conii, ℈j.
Quinæ disulph. ℈ss.
Fiat. pil. xij. æquales quarum capiat ij. bis die.

Rep. haust. anod. h. s. c. liq. opii sed. ♏viij.

18th.—Pain in the head greatly relieved; pulse 84; better strength; regular.

℞ Olei ricini, ʒss, ex aq. menth. pip.

From this time she rapidly improved; the pain ceased; and on the 29th she was discharged.

The diagnosis in such a case as this is simple enough; the state of the urine, voided in large quantities, clear, and not coagulable by heat; the headache relieved, not aggravated by sleep or the recumbent posture, at once show that the pain depends upon acute sensibility of the nerves, and not upon congestion of the brain. Opiates will relieve the local symptom, while the general health may be improved by other remedies, according to circumstances.

Dysmenorrhœa, menorrhagia, and leucorrhœa, will all act as exciting causes;—in the first, the pain at the monthly period must be alleviated by opiates, or sedatives, either in the form of injection, or taken by the mouth, and the local abstraction of blood will frequently be found of great service; in

the second, the excessive discharge must be moderated by local and general remedies; and in this as well as the former, the cases must be treated during the intervals, according to the *peculiar nature of each*, for no positive rule can be laid down on this point. Leucorrhœa may be stopped by an astringent injection, and the use of the cold hip-bath; a solution of alum sufficiently strong to cause slight smarting, not amounting to pain, will generally suffice. Nitrate of silver is much lauded, but has the disadvantage of indelibly staining the linen, and is therefore objectionable, particularly in private practice.

There are numerous other exciting causes in addition to these, which would take up too much space to mention here; I have therefore only alluded to some of the most important.

We find various *local symptoms* which are capable of being relieved, and therefore deserve attention. The first and most common of these is the hysterical paroxysm, consisting, for the most part, of an incontrollable attack of alternate sobbing and laughter. Now, sobbing and laughter, though so diametrically opposed to each other, in their outward appearance, as well as in the mental emotions which give rise to them, are nevertheless both of them dependent on one cause connected with respiration; the glottis is open; the muscles of expiration assume a convulsive motion, and the

air is expelled from the chest in jerks, which becomes more completely emptied than by natural expiration.

Cold water has the power of instantaneously producing involuntary *inspiration*, and if dashed pretty lavishly over the face for a short time, will by this peculiar action invariably stop the paroxysm. Indulgent parents and kind friends will not, however, always permit the use of this remedy to the extent we should desire; "the dear girl is too delicate to bear it;" and we are perforce obliged to modify it, and have recourse to other means; a combination of liq. opii sed. with sulphuric æther and tinct. valerianæ will, as soon as the patient can be persuaded to swallow it, shorten the fit, and generally prevent its recurrence, at any rate for a reasonable time. Where contraction of a limb has occurred, the cold douche should be employed whenever it can, *until* relaxation ensues; perambulation should be insisted on *until* performed. Constant sickness is another and not unfrequent symptom; this may be relieved by small doses of sulphate of magnesia, or, if very obstinate, it will generally yield to hydrocyanic acid and carbonate of soda. The local symptoms of this complaint are exceedingly numerous; and for a more detailed account of them, together with their treatment, I must refer to the admirable work of Sir B. Brodie on this subject.

There is another most important object to be attended to in these cases—viz., the moral treatment, without which our other remedies are almost totally useless. Good country air is of service, but this must be combined with cheerful society and regular hours; the patient must be taught to control herself; she must be treated with determination, but, at the same time, with kindness, and made to understand that she can do as much or more towards promoting her recovery than any one can do for her. She must be taught that her various failings depend entirely upon a want of will, not upon a deficiency of power, and she must be urged to exert that will, to shake off the symptoms under which she may be labouring; and if her friends are sensible, and will abstain from showing their pity, and act strictly up to our advice, the case is almost sure to do well. But if, on the other hand, the friends will not be ruled, but will allow the patient to mope by herself, and commiserate every little ache and pain she has, I then believe that all our remedies are vain; the complaint, although harmless as far as life is concerned, but harassing and annoying to both the patient and her friends, is, under such circumstances, almost utterly incurable.

In the treatment of chorea, as well as hysteria, the exciting cause must be sought for at the same time that the general health is attended to; where

the disease arises from bad food and air, removal from the cause, and a preliminary purge to carry off any irritating matters, are the first things indicated; anthelmintics must be employed for the removal of worms, and any local source of irritation should be removed, if possible, as soon as discovered. Derangement of the digestive organs must be attended to, the bowels kept in regular order, and the general health improved by tonics, which, of course, must vary according to the nature of the case. The mineral tonics I am certainly inclined to give the preference to in the treatment of these cases; steel is exceedingly beneficial, acting in the same manner as in hysteria; sulphate of zinc is also of great service, and occasionally the greatest benefit is derived from the use of arsenic, as in the following case:—

Emily Henney, aged 12, Crayle Ward. Admitted November 12, 1845, under Dr. Seymour, with chorea Sancti Viti, recurring at intervals for four years, principally affecting the muscles of the hands and arms; is much better at times.

℞ Hydrarg. chloridi, gr. ij.
Ext. colocynth c. gr. iv. h. s. s.
Vini ferri, ʒj. ex cyatho aquæ, bis in die.

Ordinary diet, without vegetables. Baln. imbrif.

14th.—No pain in the head; the involuntary movements quieter; bowels much loaded and con-

fined; the use of the shower-bath attended with much benefit. Rep. pil. hydrarg. chlor. h. n.

16.—Much better; involuntary motions much quieter.

17th.—Improving. Rep. pil. cath. h. n.

20th.—Rep. pil.

24th.—Involuntary motions increased, particularly in the hands.

27th.—

℞ Liq. arsenicalis, ♏vi.
Mist. camphoræ, ℥iss. bis in die.

From this time she gradually improved; the involuntary motions were lessened, and eventually ceased, and on the 18th of December she was discharged.

Where the complaint arises from mental emotion, a sedative plan of treatment is necessary; camphor is of great use, and morphia should be employed in preference to any other preparation of opium, as it does not cause constipation; belladonna, too, is often extremely serviceable, as was shown in the case of Anne Morgan. In speaking of this latter remedy, Dr. Seymour says: "The most powerful of all the class of vegetable sedatives is undoubtedly the belladonna. It is not to be wondered at, therefore, that it has been recommended for diminishing the sensibility and irritability of the brain in mania; it is not an opiate, but diminishes pain." Its powerfully sedative action upon the nervous system

is well shown by the manner in which it acts upon the pupil, causing paralysis of the muscular fibres of the iris, and consequent dilatation. The cold shower bath is of service here, as well as in hysteria, in fact, the same remarks made upon the treatment of that complaint are equally applicable to cases of chorea, the same *general* plan of treatment being necessary for both.

In the management of hypochondriasis, the state of the general health must be strictly attended to, and great attention paid to a regular system of diet; all sedentary habits must be abandoned; a wholesome amount of exercise should be taken, either on foot or on horseback, but not pushed to the extent of causing actual fatigue; cheerful society and good air are also necessary adjuncts. A state of dyspepsia is always present, and very frequently there is congestion of the liver; this, however, is not to be treated with large doses of calomel and strong cathartics; such a system, if persevered in, invariably weakens the digestive organs, and tends rather to keep up the complaint. Milder preparations of mercury should, however, be administered; occasional doses of blue pill, followed by a mild, warm aperient, or a combination of hydrargyrum c. cretâ and ipecacuanha, continued for some time, are of great service. The state of the bowels should always be attended to, and, if loaded, free purging must be resorted to; but as soon as the desired

object is gained by this means, it must be given up, and a gentle regular action maintained. Vegetable tonics, bitters, and alkalies, in many cases, do good, whereas, in others again, more benefit is derived from the mineral acids; a combination of trisnitrate of bismuth with magnesia is frequently of great use, and occasionally opiates may be required; the practitioner must, however, be guided by his own judgment, according to the peculiarities of each case, it being utterly impossible to lay down any one plan equally applicable to all. The moral treatment is perhaps almost as necessary as in hysteria, the patient being capable of doing as much, if not more, for himself, than we can do for him; and the same general remarks made upon this subject when speaking of hysteria will, with some very slight modifications, hold equally good here.

CHAPTER IV.

Epilepsy—its symptoms—causes, either centric or eccentric, as well as predisposing and exciting—Case—Complications attending epilepsy—Case—Seat of epilepsy—Prognosis—Treatment—Catalepsy and ecstasy—Their symptoms and causes—Prognosis and treatment.

EPILEPSY has generally been described by writers as a distinct complaint, when, in reality, it should rather be considered as a symptom, and not an independent disease; it arises in the course of other complaints, and the train of symptoms with which it is connected is liable to pass into others, giving rise to great complication. Epilepsy thus described consists of a paroxysm or fit, varying in intensity, for which reason these fits have been divided into two classes, and most appropriately named by the French *grand mal et petit mal.*

In the latter of these the patient is attacked suddenly with vertigo; the countenance becomes fixed and pallid; there may be slight convulsions of a few muscles, and there is either partial or total loss of sensibility and consciousness; this passes

off, and complete recovery takes place within two or three minutes from the commencement of the attack. These slight seizures are sometimes premonitory, and in many cases take place at variable intervals during several years previous to the occurrence of the more severe paroxysm.

The *grand mal* consists of three distinct stages; in the first, the patient in most cases having uttered a scream, falls backwards to the ground, totally deprived of sensibility and consciousness; the countenance, at first pale, rapidly becomes livid, from imperfect aeration of the blood; the muscles of the body are rigidly contracted, and respiration is almost totally suspended from the spasmodic contraction of the glottis, as well as of all the muscles engaged in that function. This state, generally speaking, soon passes off, and gives place to the second stage; the insensibility and unconsciousness still remain, but violent convulsions of the whole body now occur; the eyes are either turned upwards and fixed, or rolled about in an unnatural manner, and generally the pupil is insensible to light; the face becomes more and more livid, and the veins of the head and neck are turgid with blood; the teeth are ground together, often with sufficient force to break them; the tongue being protruded is bitten, and the blood coming from it mingles with the white foam which issues from the mouth. Respiration is not so materially

impeded as in the first stage; it is, however, extremely irregular, short, and gasping. Involuntary discharge of fæces and urine sometimes occurs, as well as erection of the penis in the male, with emissio seminis. This stage, of much longer duration than the first, now passes into the third; the respiration becomes less and less interrupted; the convulsions cease, copious perspiration breaks out, and the patient sinks into a half comatose state (for it can hardly be called sleep) with stertorous breathing, from which he at last emerges without the slightest recollection of anything that has happened. He is at first dull and heavy, but soon recovers from this state, regaining his usual healthy condition both of mind and body, unless the constitution has been weakened by a long repeated continuance of the fits.

The ordinary relative duration of these stages is commonly as follows:—The first only lasts a few seconds, the second from one to fifteen or twenty minutes, and the third about an hour. These periods are of course liable to variation, and though the whole convulsive paroxysm (*i. e.* the first two stages) is generally terminated within a few minutes, it does sometimes last for several hours, consisting most frequently, under such circumstances, of two or more fits, with slight intervening remissions.

These fits are generally, though by no means invariably, preceded by the aura epileptica, a pecu-

liar sense of formication, commencing for the most part in some organ more or less remote, and proceeding from thence towards the head; it, however, sometimes commences at the head, and terminates on arriving at some other part of the body: but in either case the result is the same; in the first instance, whenever it reaches the head, and in the second, as soon as it terminates, the paroxysm begins. There are, moreover, frequently other premonitory symptoms, though not so *immediately* preceding the attack, as, vomiting, confusion of thought, tinnitus aurium, temporary affections of the speech or vision, and various derangements of the senses.

The causes of this affection are numerous; they may be either centric or eccentric—that is, they may depend upon direct injury or irritation of the nervous centres, or they may affect these secondarily, from the nervous sympathy which exists between them and remote parts; again, the causes may be predisposing or exciting, and consist of such as combine the two.

Of the predisposing causes, the first and most genuine is hereditary predisposition; we then have the two opposed conditions of system, anæmia and plethora. In anæmia, the whole nervous system is weakened, the peripheral extremities of the nerves, the nervous trunks, and the nervous centres themselves, are all affected, they being supplied with blood of improper quality, and insufficient in quan-

tity; the same nervous erethism exists, already described as arising from this state, and an exciting cause at once produces the paroxysm. In plethora the same thing happens, but in a diametrically opposed state of constitution; the circulating fluid is here too rich in the amount of red globules, and on account of the excess of oxygen carried by these, is of too stimulating a quality, and nervous irritation is the result; in addition to this, there is a greater tendency to local congestion, and in such cases we commonly meet with congestion of the cerebro-spinal centres.

There are several other causes, both of a predisposing and exciting nature combined, most of which affect the assimilating process, either primarily or secondarily, and by this means the whole system. In the first place, we have disorder of the digestive organs, in which case all the dyspeptic symptoms of hypochondriasis are present; the digestion is exceedingly slow, and very much impaired; the stomach itself appears to be torpid, and chymification is most imperfectly and tardily carried on, so much so, that a considerable quantity of food may even remain in it for two or three days, and then be ejected by vomiting; in addition to this, the bowels are very much constipated. Derangement of the liver itself, with or without this state of stomach, will produce the complaint.

Irritation of the bowels will act as a predisposing

cause, by the effect it has upon the assimilating process, and as an exciting cause from the direct irritation exercised upon the branches of the sympathetic supplying the intestines. Crude indigestible substances, as well as excessive purging, have this effect; but of all, the most common and powerful is the presence of intestinal worms, and those which generally produce it are the ascaris lumbricoides, the tænia solium, and bothriocephalus lata. In the following case, the deranged state of the intestinal circulation previous to death, evidently gave rise to the fits, the superior and inferior mesenteric arteries having most probably lost their power of contractility during life.

Esther Williams, aged 43, married, Wellington Ward. Admitted November 12th, 1845, under Mr. Cutler. Complains of pain in the epigastric region, loss of appetite, and general debility. Her breast was removed for scirrhus in June last, and there is no appearance of a return of the disease in the cicatrix. Countenance sallow, pulse very weak; seems hysterical.

℞ Haust. rhei, ℥iss. statim.
Tinct. assafœtid.
Tinct. rhei c. āā ℥ss.
Spir. ammoniæ fœt. ♏xx.
Mist. camph. ℥iss. ter die.

14th.—Rep. haust. rhei statim.

15th.—Complains of headache and great thirst; tongue very dry. Baln. calid. statim.

℞ Hydrargyri chloridi
Opii, āā gr. j. o. n.
Haust. salini, ℥iss, 4tis horis.

18th.—Complains of great depression of spirits, headache, and pain in the epigastrium.

℞ Haust. salin. ammon. efferv. ℥iss.
Tinct. opii, ♏v. 4tis horis.
Vini albi, ℥iv. in dies.

19th.—Emp. lyttæ epigastrio.

20th.—Pain somewhat relieved by the blister.

22nd.—Complains of pains in the bowels.

℞ Olei ricini, ℥ss.
Tinct. opii, ♏x. statim.

23rd.—Rep. oleum ricini c. tinct. opii.

24th.—Rep. oleum ricini c. tinct. opii.

25th.—Was seized with a fit of an epileptic character at seven A.M.; the head was forcibly drawn towards the left side; there was strabismus of both eyes, pupils dilated, but contracted slightly on the application of light. The fits followed one another in rapid succession, with scarcely any intermission, till nine A.M., when she died, quite exhausted.

SECTIO CADAVERIS.

Body well formed, and in good condition. Large cicatrix about the region of the left breast, the result of an operation performed some months

back, for the removal of a scirrhous disease affecting that organ. The skin itself in the neighbourhood of the cicatrix was quite healthy; but scirrhous deposit existed in the shape of two small tubercles in the cellular tissue immediately beneath the cicatrix, and in its neighbourhood. Several of the glands of the left axilla were enlarged slightly, and affected with scirrhous deposit. The other breast and glands were quite healthy.

Cranium.—The subarachnoid cellular tissue contained a quantity of limpid fluid, but the membranes themselves were neither thickened nor opaque. The brain was extensively congested both in its grey and in its white substances. The ventricles were somewhat larger than natural, and filled with limpid fluid, but the brain was otherwise healthy. The vessels and bones of the skull were also quite healthy.

Spine.—The vertebræ, the cord, and its membranes, were all carefully examined, and found to be perfectly healthy.

Thorax.—Old and extensive adhesions existed on both sides of the chest. The lungs were healthy anteriorly, but posteriorly they were loaded with large quantities of red, frothy serum. A puckered cicatrix, and some chalky deposit existed in the apex of the right lung. Heart somewhat larger than natural, and with two white patches, one on the anterior surface of the right

ventricle, the other on the posterior surface of the corresponding auricle; all other parts healthy. A few patches of atheroma existed about the root of the aorta. Large and very dark coagula in the right cavities and large veins; small coagula, for the most part fibrinous, in the left cavities and in the aorta.

Abdomen.—The viscera contained in this cavity were healthy, with the exception of the kidneys, which were much congested, but not otherwise diseased. Several large and extensive spots of ecchymosis existed in the subperitonæal cellular tissue of the mesentery, of the gastro-colic omentum, and in the left and right lumbar regions. These ecchymoses were all connected with, and in the course of the various branches belonging to, the superior and inferior mesenteric arteries, many of which were very hard, and looked as if they had been injected with coarse black injection, by which they had been over-distended. When cut into, these vessels were found to be blocked up by dark coagulated blood, perfectly hard, and resembling damson cheese in appearance; these coagula were with some difficulty pressed out of the vessels, but neither the coats of the vessels nor the coagula appeared to be otherwise diseased. The portions of the intestinal canal corresponding to the blocked up arteries presented nothing remarkable.

Left humerus.—This bone, at almost its middle

part, presented a transverse fracture, and the muscles in the neighbourhood of the fracture were bruised and somewhat infiltrated with blood. The fracture of the bone was found to have taken place at a point where the cancellous structure and the greater part of the cortical structure were destroyed by a deposit of an encephaloid nature, which was also found in other parts of the shaft and head of the bone, the cancellous structure having disappeared.

Left femur.—The neck of this bone was also fractured, and a large quantity of encephaloid deposit was also found in the cancellous structure of the bone, the cortical part of which had all but completely disappeared at the point where the fracture existed. The capsular ligament was not injured, but the lower portion of the fractured bone was drawn up on the dorsum ilii, so that the foot was turned out and the limb shortened.

Disordered menstruation acts as a predisposing cause, by giving rise to derangement of the whole system, and as an exciting cause, from the local source of irritation consequent upon it.

The eruptive period of exanthematous fevers acts occasionally in a similar manner; the fever affecting the general constitution lays it open to the attack, and the critical eruption produces it.

Excessive venery and masturbation are two powerful and not uncommon causes, particularly

the latter. It has been before stated, that the semen is derived from the albuminous and oleaginous principles, consequently, a continual demand upon this secretion must materially interfere with the healthy process of albumification, thus impairing the secondary assimilating process of the formative kind, and so giving rise to emaciation; again, all drains upon the system produce a diminution in the amount of the red globules of the blood, and thus a state of anæmia is produced; from both these causes the amount of animal heat is diminished, and the nervous system suffers as in anæmia arising from any other cause; in addition to this, there is extreme and direct irritation of the whole nervous system itself, every time that the act is performed, which is further increased by the excited state of the circulation at such times.

The exciting causes of epilepsy consist either of those which depend upon some severe and sudden mental emotion, or upon some local source of irritation, as the suppression of hæmorrhoidal or any other accustomed discharge; repelled cutaneous eruptions; irritation of the female generative organs—either by manustupration, uterine congestion in amenorrhœa, or the irritability induced by dysmenorrhœa; and direct irritation or injury of the nervous trunks. Again, the causes may be even more direct, as in affections of the nervous centres themselves, either from injury or disease.

We meet, occasionally, with two complications in this complaint, which, though they almost occur as cause and effect, can hardly be classed as positive causes, either being capable of occurring independently of the other, and only happening together accidentally. The first is a complication of the epileptic with an apoplectic fit; in this the symptoms of either may take the precedence, either the apoplexy first appearing, and being followed by epilepsy, or *vice versâ*.

Zara Schmidt, æt. thirty-two, was admitted into St. George's Hospital, 29th April, 1845, under the care of Dr. Nairne, with anasarca arising from disease of the heart. On the following day, she had a fit, at half-past three P.M., as she was crossing the ward; she fell on her face, and became perfectly insensible, with convulsions of the muscles on the right side of the face; the lips became blue during the fit, which was followed by frothing at the mouth, and a deep sleep, which lasted some hours. On seeing her the next day, there was complete paralysis of the entire right side, and partial loss of sensation. The paralysis continued up to the time of her death, which occurred on the 26th of August, when the following appearances were found within the cranium.

A large quantity of fluid was found in the subarachnoid tissue, and the visceral layer of the

arachnoid was thickened and opaque, whilst the free surface of the parietal arachnoid, corresponding to the upper part of both hemispheres and to the tentorium cerebelli on the right side, was covered over by a very thin, delicate membrane of a slightly yellowish tinge, and containing in its tissue numerous very minute points of blood, disposed in an arborescent form, and making it, at first sight, appear as if the vessels beneath the parietal arachnoid were very minutely injected, but the whole was easily peeled off in the shape of thin films; these appearances were more marked towards the posterior than towards the anterior parts of the skull. The brain itself was of a palish colour generally, but the puncta of blood in the centrum ovale of Vieussens were large and very numerous. The ventricles were slightly dilated, and contained some clear serum. In the central part of the left corpus striatum was a yellow spot, of the size of a sixpence, the surrounding part of the nervous tissue being of its natural colour; both the yellow spot and the parts in the immediate neighbourhood were softer than any other part of the brain. The other parts of the brain and its vessels were healthy.

The other complication, and that with which it most commonly happens, is insanity; this, for the most part, comes on after a long-continued series of epileptic fits.

According to Sir Alexander Morrison—"Epilepsy frequently brings on insanity, but it is worthy of remark, that when it occurs in early youth, or infancy, idiocy is the usual result, whilst dementia is, perhaps, a more common termination than mania in more advanced life.

"Out of 385 cases of females, mentioned by Esquirol, 269 were in a state of mania or of dementia.

"When mania is produced, it has been observed that the fury which occurs, is of the most violent description.

"Epileptic patients, who are not at other times insane, frequently experience delusions *before* a fit, and, in almost all cases, more or less of feebleness of intellect is felt *after* the fit. The tendency to dementia appears also to be much accelerated when the fits are accompanied by vertigo or giddiness."*

The epileptic fits, however, are not always the precursors of the mental alienation; they sometimes occur subsequently to the appearance of this malady, particularly in cases of idiocy; as in a case mentioned by Sir A. Morrison, of a patient, aged thirty-nine, an idiot from birth, who had been all his life in the workhouse. "This idiot," he says, "is capable of some degree of education, and is employed in teasing hair for mattrasses, and in turning

* Lectures on Insanity, pp. 307, 470.

a mangle. He is very subject to epileptic fits; his head is remarkably small, with a retreating forehead; he is nearly blind, and squints very much."

The head of this patient measures only fifteen inches round, and the organs of generation are undeveloped.

This instance of insanity, complicated with epilepsy, is congenital, and connected with malformation of the cranium, by no means an uncommon occurrence in such cases.

The medulla spinalis has been shown to be the seat of chorea, where we meet with involuntary muscular movements, without any loss of sensibility or consciousness; in epilepsy, on the other hand, there is a total deprivation of sensibility and consciousness, in addition to violent convulsive movements, consequently the cerebrum itself is affected as well as the medulla, and the functions of the entire cerebro-spinal axis are interfered with to produce the phenomena witnessed in an epileptic fit. Whether this affection consists of cerebro congestion, or whether it arises purely from nervous irritation, may be hard to decide; there are many cases which might seem to weigh in favour of both; and again, there are some where we might even suppose that it depended upon a want of blood, and not at all upon congestion. I am certainly myself in favour of the opinion, that the first onset of the attack depends solely upon

irritation; and that the cerebro-spinal congestion (however much it may tend to aggravate the symptoms, and whatever effects it may produce) is merely a secondary result dependent upon the impeded condition of the acts of respiration and circulation, which impeded condition is produced by the effects of the nervous system upon the organs engaged in these processes.

Epilepsy is, generally speaking, extremely intractable, and very frequently dangerous to life, either at a remote period, from the complications to which it is liable, or from the cause which may have given rise to its development, or it may prove immediately fatal during the paroxysm. The average duration of the whole fit is from one to fifteen or twenty minutes, but if it continues for a longer period than this without intermission, it is most frequently fatal, from the effects consequent upon severe cerebro-spinal congestion; death may even take place in the first stage of the paroxysm if sufficiently prolonged, from spasm of the muscles of respiration, and consequent cessation of that function.

The immediate danger of the fit having passed, the next thing to be considered is the cause of its development: if it depends upon sympathy with any organ, it may be remediable by removing the exciting cause — as worms, or crude, indigestible substances in the intestinal canal, uterine

irritation, &c.; in fact, all causes of an eccentric nature may be removed, and by so doing we may hope to put a stop to the appearance of the fits, if they have not existed for any length of time; but if there has been a long continuance of the fits, it is often extremely doubtful whether a cure can be accomplished; and insanity is not an uncommon termination under such circumstances.

Sir Alexander Morrison remarks—"With regard to epilepsy occurring in the insane state, it may be observed, that an intimate connexion between epilepsy and mental disease — especially that in which a state of dementia takes place—has long been noticed. Indeed, when epilepsy has existed long, it, for the most part, brings on more or less of dementia, or debility of the mental powers. It, however, may exist for several years without producing this effect—more especially if the first attack of the disease has been posterior to the occurrence of the mental disorder.

In some cases of epileptic mania, the excitement is of the most violent description; but the most common influence of epilepsy upon the brain, as before observed, is to weaken, and ultimately abolish, all manifestation of mind."*

Where this complication exists to its full extent the case is hopeless, and eventually terminates in

* Lectures on Insanity, p. 264.

the death of the patient. This remark will generally hold good, where an injury of the head has been the cause, as well as where it depends upon disease, with organic lesion of the nervous centres: under these circumstances considerable danger is to be apprehended, not only with regard to the ultimate termination of the complaint, but also during the occurrence of each fit, particularly if a state of plethora is present. Hereditary predisposition is also an unfavourable circumstance, such cases being extremely intractable. When the fits occur in early youth, they sometimes cease spontaneously at puberty; the duration of the complaint is, however, in all cases, extremely variable, depending, in many cases, very much upon the habits of the patient.

During the continuance of the fit, the handkerchief and shirt collar should be loosened; the patient having been placed in a recumbent posture, with his head and shoulders raised, his struggles should be gently restrained, and a cork, or anything which can act as a gag, placed between his teeth. Beyond this, as a general rule, nothing can be done during the paroxysm; it is by far the safest plan, if any doubt exists as to the nature of the fit, and all that is *necessary*, where this is not very severe, and no complication exists.

Where the fit depends upon plethora, and much cerebral congestion exists, bleeding is necessary,

—this, also, is requisite, where it depends upon the suppression of some accustomed discharge, or where it occurs in the puerperal state. Venesection, however, frequently requires much consideration; it is often extremely noxious, very difficult to be performed at this time, and should never be had recourse to in the third stage of the fit, unless complicated with apoplexy. Cold affusion may be employed with advantage where there is much heat of head; but where the head feels cold, and the circulation is languid, it is likely to do harm. Turpentine enemata are of service here as well as in apoplexy.

The treatment, during the intervals between the paroxysms must be guided by the state of the general health, and the nature of the exciting cause, as well as by any complication which may happen to be present.

When a state of anæmia exists as the predisposing cause, the same rules are applicable as mentioned in speaking of hysteria, in addition to which the head should be kept cool, and blisters should be occasionally applied behind the ears. The cause of the anæmia itself must be sought for and remedied. All drains upon the system are liable to produce it, and particularly excessive venery and masturbation; moral treatment is here extremely necessary; a powerful appeal must be made to the patient's own good feelings, and the impropriety

and danger of the proceeding should be clearly set before him. No good can be expected if these practices be persevered in, and all remedies are generally useless; the bodily health becomes more and more deranged, the mental faculties more and more impaired and debased. The patient may sometimes be anxious and willing to act according to our advice, but the irritability of the parts is so great, from constant gratification of the passion, that even a lascivious idea, or the friction of the clothes, is sufficient to produce an involuntary discharge of semen, which occurs without a perfect erection; defæcation also produces the same effect in some cases of long standing. The *porte caustique* of Lallemande should be used to allay the irritability of the urethra; tonics, bitters, and alkalies, are to be employed, but the greatest care must be taken not to heat the patient. Mild laxatives should be administered, to regulate the bowels, but drastic purgatives are inadmissible; aloes, also, are extremely objectionable, on account of their irritating effect upon the rectum, and the nervous sympathy which exists between this part and the organs of generation. Enemata of cold water are useful, and cold bathing is of the greatest service, in the treatment of these cases.

Where plethora exists as the predisposing cause, an antiphlogistic plan of treatment is necessary; either local or general bleeding, antimonials, and

salines, are here indicated; the diet must be extremely moderate, and all stimulants given up. Issues, setons, and blisters to the nape of the neck, are sometimes of service; and cupping, in the same situation, is useful, by way of local depletion. This latter remedy should be employed every fortnight or three weeks, as the fits often occur regularly, sometimes to the very day; hence the necessity of observing a regularity in the periods for the abstraction of blood. The various other causes of this complaint must be treated according to circumstances, always bearing in mind that the remedies employed are to be directed rather to the removal of the *cause*, than to the alleviation of the epileptic symptom.

When the paroxysm depends upon a weakened state of the system, with impaired tone of stomach, and deranged condition of the alimentary canal, after removal of all sources of irritation, the most effective remedy is the sulphate of zinc; this, to be of any service, should be given in considerable doses; for an adult, two grains, three times a day, should be administered at the commencement, and gradually increased; if administered in smaller quantities it is useless, and will completely fail in producing the desired effect. According to Dr. Pereira, its physiological effects are as follow:— "In small and repeated doses, it acts as an astringent on the alimentary canal, checks secretion,

and promotes a constipated condition of the bowels. It exercises a specific influence over the nervous system, manifested by its power of removing certain spasmodic affections; hence it is reputed anti-spasmodic. To the same influence is to be referred its power of preventing the recurrence of intermittent maladies, from which it has principally derived its denomination of a tonic. Its astringent effect is not confined to the bowels, but is manifested in the pulmonary and urethral mucous membranes, the secretions from which it diminishes: hence the advantage of its use in catarrhal affections of these parts. It does not appear to possess the power of checking cutaneous exhalations."* This remedy may, at first, produce a sensation of nausea, when given in the quantity above recommended, but this speedily passes off, the stomach becomes accustomed to it, and its beneficial effects are soon apparent. The nitrate of silver has been much praised as a remedy in these cases, but it has the power of indelibly blackening the skin of the patient, which is an insuperable objection to its use, especially when other remedies, as sulphate of zinc, or sulphate of copper, acting in a similar manner, can be employed with equal advantage. Very large doses of this salt have been administered, and without the

* Elements of Materia Medica, vol. i. p. 823.

supervention of any dangerous symptoms, which may be accounted for in the following manner:— In certain states of the stomach, as much as a drachm of strong hydrochloric acid has been found in a pint of the fluid ejected from that organ; the nitrate of silver meeting with this, is decomposed, and converted into the chloride, which salt is almost insoluble, and perfectly innocent, but, nevertheless, possesses the power of blackening the skin, perhaps more quickly than the nitrate. This is easily accounted for when we consider the composition of the two:

	Atoms.	Eq. Wt.	Per cent.
Oxide of silver	1	116	68·23
Nitric acid	1	54	31·76
Nitrate of silver	1	170	99·99
Nitrogen	1	14	25·9
Oxygen	5	40	74·1
Nitric acid	6	54	100·0
Anhydrous nitric acid	1	54·0	80
Water	1½	13·5	20
Sesquihydrate of nitric acid	1	67·5	100
Hydrogen	1	1	2·75
Chlorine	1	36	97·25
Hydrochloric acid	1	37	100·00
Hydrochloric acid gas	1	37	33·95
Water	8	72	66·05
Liquid hydrochloric acid, sp. gr. 1·162	1	109	100·00

The chlorine and the silver combine to form chloride of silver, and the nitrogen and oxygen of the nitric acid, together with the hydrogen of the hydrochloric acid, are set free, and given off in the form of gas.

Whatever plan of treatment is adopted, it must be remembered that the epileptic paroxysm is but a *symptom* depending upon some cause, either predisposing or exciting, and to this cause must the appropriate remedies be applied, in order to remove it, if possible.

Catalepsy and ecstasy are two exceedingly rare affections occurring in persons of a nervous, susceptible temperament. Catalepsy is mostly confined to females, and consists of a fit, in which there is a sudden cessation of sensibility and consciousness, with a deprivation of voluntary motion; the patient retains the same position she may happen to be in at the commencement of the seizure, if left alone; but there is no rigidity of muscles; a limb may be moved, and will remain in whatever posture it is placed; the body may be bent, or the patient placed upright upon her feet, in which position she will continue until she is moved, or the fit ceases. There is, however, a minor form, in which consciousness and sensibility are retained, but voluntary motion ceases.

The attack is generally sudden, though it may be in some cases preceded by premonitory symptoms,

as, confusion of thought, ringing in the ears, headache, &c. The duration of the fit is very variable, lasting from a few minutes to several hours, and occasionally, though rarely, for some days; it generally ceases as suddenly as it commenced, the patient not having the slightest recollection of its occurrence.

In ecstasy, the power of voluntary motion is not completely lost; the mind is more affected than the body; the patient appears absorbed in some idea, sometimes singing passionately, at others, talking with vehemence, and quite unconscious of the presence of surrounding persons and objects; the countenance assumes an animated expression, and the muscles are somewhat rigid, instead of being flexible, as in catalepsy. It is, however, impossible to give a more perfect idea of this affection than has been so ably, though unconsciously, given by Virgil, in his description of the Cumæan sybil. We have here not only a perfect description of the affection itself, but a case in which it arises from one of its most common causes—viz., religious excitement:

"Ventum erat ad limen, quum virgo, Poscere fata
Tempus, ait: deus, ecce, deus! Cui talia fanti
Ante fores, subito non vultus, non color unus,
Non comptæ mansêre comæ, sed pectus anhelum,
Et rabie fera corda tument, majorque videri,
Nec mortale sonans; afflata est numine quando
Jam propiore dei. Cessas in vota precesque,
Tros, ait, Ænea! cessas? neque enim antè dehiscent

Attonitæ magna ora domûs. Et talia fata
Conticuit. * * * * * *

At, Phœbi nondum patiens, immanis in antro
Bacchatur vates, magnum si pectore possit
Excussisse deum: tantò magìs ille fatigat
Os rabidum, fera corda domans, fingitque premendo.
Ostia jamque domus patuêre ingentia centum
Sponte suâ, vatisque ferunt responsa per auras."+

The causes of these complaints are very nearly the same as those of hysteria and chorea; they depend upon a state of anæmia, in which there is a diminution in the force of the circulation with an impaired quality of the circulating fluid, and an increased irritability of the nervous system. This acts as the predisposing cause; the exciting causes generally depend upon various mental emotions, as, disappointed affection, long-continued sorrow,‡ anxiety, and religious excitement, excited but ungratified passion, or excessive venery and manu-stupration. Local congestion, as before stated, may exist contemporaneously with a state of general anæmia; and we often find that, during the fit, there is more or less cerebral congestion, marked by the increased force of the circulation in the carotids, and exalted temperature of the

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+ Æneidos, lib. vi. v. 45—82.

‡ This is no uncommon cause of many more severe and dangerous maladies, for, as Louis most justly observes, "Parmi les causes de la phthisie pulmonaire, je n'ai connu des plus certains que les passions tristes, surtout quand elles sont profondes et de long durées."

head; this, however, is by no means always the case; for sometimes the heart's action is so extremely feeble, that one might almost, without careful investigation, suppose the patient to be dead.

These affections, as a general rule, do not terminate fatally, but are liable to pass into insanity, or they may be the precursors of epilepsy; they occur as complications in the course of insanity, particularly in puerperal mania, and follow some aggravated forms of hysteria. The existence of these two forms of nervous affections has often been doubted, and looked upon as altogether fabulous, or as downright impostures; this idea arises from their great rarity, many practitioners never seeing them, even in extensive practice, and others only seeing a few scattered cases. I have seen but one *true* case of catalepsy, occurring in an attack of mania; in this case all the symptoms were well marked, and can leave no doubt on my mind as to the existence of the disease, or as to its occurrence independent of imposture.

The treatment of these cases differs but little from that required for the various forms of hysteria; there is, however, more tendency to cerebral congestion, which must be relieved by the local abstraction of blood, if severe, or by the cold affusion, if occurring in a minor degree. The uterine functions must be attended to, and the

state of the bowels regulated, more active purgatives being required, as a general rule, than in hysteria; while sedatives, antispasmodics, and tonics, are administered according to circumstances. The ordinary causes of these affections are of a depressing nature, and such being the case, however much depletion may be requisite for the removal of local symptoms, it must be discontinued as soon as ever this object is accomplished, and not persevered in to the extent of affecting the whole system. A strict investigation must be made for the causes, both predisposing and exciting, and the appropriate remedies employed for their removal; moral treatment is also necessary, as well as in hysteria; and where the fits occur in the course of insanity, our endeavours must be directed to the restoration of the shattered intellect, which end being attained they will cease, having only existed as complications of the mental derangement.

CHAPTER V.

State of collapse dependent upon shock of nervous system—Causes—Symptoms vary in degree according to the severity of the shock—It may terminate in healthy reaction, or be gradually or suddenly fatal—Treatment—Over-stimulation followed by excessive reaction—Delirium traumaticum; its symptoms and treatment—Case—Tetanus, divided into acute or traumatic, and chronic or idiopathic—Acute tetanus—Symptoms—Chronic tetanus—Symptoms not essentially different from acute form—Causes of tetanus—Tetanus infantium vel neonatorum—Causes—Prognosis—Post mortem appearances—Treatment.

In the class of cases already considered, we have seen that in the majority there has been some predisposing cause acting upon the constitution at large, thereby inducing an irritable state of the nervous system, and rendering it liable to be affected by any local source of irritation. There is, however, a state of constitution, in certain subjects, where this irritability of the nervous system exists naturally, acting itself as a predisposing cause to certain affections; or it may be produced by particular kinds of injuries affecting the ex-

tremities of some of the nerves, and thus setting up the nervous erethism which ensues under such circumstances.

There is a state, produced by various causes suddenly depressing the nervous system, termed collapse. At the commencement of this state, the whole nervous system receives a severe shock, sufficiently powerful either materially to impair, or temporarily suspend, its proper functions. There is a partial or total loss of sensibility and consciousness, depending upon the severity of the shock, which indicates the primary affection of the nervous system; the circulation becomes contemporaneously affected, from the intimate connexion which has already been shown to exist between the two systems. The action of the heart is immediately depressed, or may be, in severe cases, at once stopped; this cause then acts secondarily upon the nervous system, inasmuch as the brain receives less than the necessary supply of blood, and syncope is the result; the surface of the body is cold from the diminished cutaneous circulation, the pulse is weak, and the respiration impaired and difficult, or scarcely perceptible.

Collapse may be produced by any severe shock, affecting either the body or mind; it is not, however, necessary that this shock should be received *directly* through the medium of the *nervous centres*. I have before endeavoured to explain the con-

nexion existing between every part of the nervous system, which is so intimate that it is impossible for a shock of any severity to be produced upon a part of it, without the whole suffering, more or less, in proportion to the nature, intensity, and situation of that shock.

This state, then, may be produced by concussion of the brain, in which case the cerebrum itself is primarily and directly affected: by a blow on the epigastrium causing concussion of the solar plexus; this plexus forms a large and most important part of the sympathetic system, and through the intimate connexion which exists between the two, the cerebro-spinal system is instantaneously, though secondarily, affected: by very severe burns, the shock being transmitted by the nervous trunks to their centres; and in such cases the absence of pain is an ominous symptom, inasmuch as it shows the powerfully depressing effect which is produced upon the nervous system: by severe accidents of any kind, giving a great shock to the system at large, or severe surgical operations, both of which are liable to produce the same effect, and in the same manner, as severe burns: by powerful mental emotions, as joy, fright, passion, or a strong effort on the part of the mind to control its feelings under certain circumstances, as, for instance, to prevent the *expression* of excessive pain. The mind acts most powerfully upon the nervous system; and it

is most natural to suppose that it would, for the cerebrum is the medium through which it acts—the connecting link, in fact, between the material and the immaterial being; in many cases it is sufficient for an individual to be prepossessed with an idea that death is inevitable after a dangerous accident, operation, or disease, to render that event tolerably certain.

The collapse arising from any of these causes may be slight, and then it is of no material consequence, passing off, and terminating in, healthy reaction; but if it be very severe the case is extremely different, the symptoms above mentioned become aggravated, the stupor continues and becomes more profound, the respiration more and more affected, the coldness of the surface and extremities greatly increased, the sphincters relaxed, the force of the circulation gradually weaker and weaker, until the enfeebled heart ceases to act, being unable to regain its power from want of a due supply of nervous influence, and death terminates the scene. This unfortunate result does not always happen in the gradual manner I have just described, many of the above-mentioned causes, if sufficiently severe, being able to produce it instantaneously.

Means must be taken to remove this state of collapse where it exists, but the utmost caution is necessary in the administration of the remedies for

this purpose; the debilitated vital power of the system must be *supported* and *gradually assisted* in its *natural* efforts to regain the standard of health. The remedies are, wine, spirit, or diffusible stimuli, which latter I consider far preferable where they can be easily and readily obtained, inasmuch as they produce their effect quickly, do not leave the same bad effect behind them as the former do, and are not so likely to be left to the indiscriminate administration of unprofessional people, being looked upon as medicine, and therefore left to the discretion of the medical attendant. The cutaneous circulation should be stimulated to produce warmth of surface: this may be done by means of the warm bath, mustard poultices, and various local stimuli, according to circumstances. The greatest caution is, however, necessary, that the stimulation be not carried to excess, for the reaction which ensues may be excessive; the circulation becomes excited, and reacts secondarily upon the debilitated nervous system, now rendered too weak to bear the increased stimulus; the vital spark (if we may use the term) brightens up for the moment, flickers like a candle in the socket, and is extinguished beneath the premature excitement which overwhelms it.

If, then, the reaction becomes excessive, we have certain symptoms occurring, very analogous in their character to delirium tremens, and commonly

known under the name of delirium traumaticum, the state of system in which they appear having been most appropriately denominated by Mr. Travers "prostration with excitement," and has been so ably and correctly described by him, that it is impossible to convey a better idea of it than by quoting his own words:—

"Prostration with excitement is marked by the signs of languor and stupor, or drowsiness, in the commencement, to which, after a variable period, succeed nausea, rigor, præcordial anxiety, restlessness, jactitation; a rapid and bounding pulse; oppressed respiration, with frequent attempts to sigh; flushed countenance, contracted pupil, dry heat of skin, parching thirst, rejection of liquids taken into the stomach, incoherence and wildness of expression, sometimes amounting to fierce delirium. This state is succeeded by exhaustion, marked by somnolency, profuse chilly and clammy sweat, haggard and livid aspect, a small, irregular, or fluttering pulse; innumerably rapid; panting respiration; passive convulsions, hiccup and subsultus; the stupor and stertor of apoplexy; and death."*

In such cases as these, whatever may have been the original exciting cause, the symptoms depend upon an irritable and excited condition of the

* Travers on Constitutional Irritation, p. 111.

nervous system; that system, being greatly debilitated, is unable to support itself under the excitement. Such being the case, it is absolutely necessary that this irritability and excitement should be allayed, as there is great danger to life so long as they remain unchecked; the symptoms, then, depending upon the state of the nervous system, to this system must our remedies be directed. Sedative medicines, of which opium is undoubtedly the most efficacious and certain, must be administered in full doses; frequently the stomach will not retain anything, and then opiate enemata must be employed. The delirium which is present depends upon the excited state of the nervous system, and not upon inflammation or congestion of the brain; it is relieved by sedatives, and not by depletion, which, if injudiciously employed in such cases, is not only liable to aggravate all the symptoms, but will also increase the prostration of the vital powers, and accelerate the fatal termination.

The following interesting case illustrates this train of symptoms exceedingly well, as also the efficacy of the sedative plan of treatment. The constitution of this man had been kept in a continual state of excitement, from his intemperate habits; and the shock of the operation, together with the necessary deprivation of his accustomed stimulus, produced the delirium which followed.

Thos. Jackson, aged 45, stableman. Fitzwilliam Ward. Admitted 10th May, 1844, under Mr. Hawkins. The patient has suffered from inguinal hernia ever since he was six years old, for which he has worn a truss; the hernia has frequently come down, but he has always been able to reduce it himself. Fifteen hours previous to his admission, the hernia came down, and he has been unable to reduce it. The tumour contains a considerable quantity of flatus and fluid, and is apparently very tight at the inner ring, but the external one is lax; there is some slight tenderness about the inguinal canal, but there has been no sickness, or any very urgent symptoms. Pulse 80.

Unsuccessful attempts at reduction were made by Mr. Bannister, the house-surgeon, and Mr. Hawkins; he was now put into a hot bath, but without benefit; ice was next employed, and then a large injection, but neither were of any use. All these means having been tried, and found ineffectual, and there being considerable hardness of the ring, and no impulse given on coughing, it was thought better to operate at once, than to wait for more urgent symptoms. The bowels acted a short time before the hernia came down.

Nine P.M.—The operation was performed; pulse still 80. It was at first intended only to divide the neck of the sac, but this was at once abandoned; for on cutting down upon the stricture, it

was discovered that the tendon of the external oblique came down considerably, and the neck of the sac extended far down, rendering it necessary to open the sac freely, which contained a little fluid; the parts strangulated were the cœcum, with its vermiform appendix, and a considerable portion of the colon; there was considerable difficulty in pressing out the air contained in the intestine, and reducing it, but this was at last accomplished; two sutures were used to bring the edges together, and the wound lightly dressed. Intestine appeared healthy, and only slightly vascular. Pulse but little altered by the operation.

℞ Hydrargyri chloridi, gr. v.
Opii, gr. iss.

11th.—Seven A.M.—Pain and fulness above the incision. Hirudines, xx part. abd. dolent. The bowels acted freely at three A.M.

Ten A.M.—Pain relieved; pulse 80; One P.M., manner hurried and tremulous, pulse 88; Three P.M., Hydrargyri chloridi, gr. ij.; Ten P.M., Hydrargyri chloridi, gr. ij., opii, gr. $\frac{1}{4}$.

12th.—In the evening he became furiously delirious, for which he was put under the influence of opium. Tinct. opii., ♏xv., statim.

13th.—One A.M.—Tinct. opii., ♏xxv.; Five A.M., Tinct. opii., ♏xv.; Six A.M., Tinct. opii., ℥j. He was now fully under the influence of opium, the delirium having continued all night.

Ten A.M.—Slept a little after the last dose of opium; still delirious; pulse 120; pupils contracted. Inject. com. cum olei terebinthinæ, f℥iv.

One P.M.—Bowels have acted once; still most effectually under the influence of opium, snoring loudly, and having only eight respirations in a minute; it required cold affusion to rouse him; he was then able to answer the questions put to him, but almost immediately sank into a sound sleep again. Pulse quiet; tongue dry. Beef tea.

Vespere.—Rep. inject. Is now much quieter.

14th.—Quite sensible; complains of some pain in the bowels. Tongue moist; wound suppurating kindly; has nearly lost the redness round it. Pulse 90, more steady. Fotus abd. The bowels were freely opened in the course of the day, which relieved the pain; motions lumpy.

Vespere.—More pain in the abdomen. Hirudines xv part. abd. dolent.

15th.—Great relief from the leeches: feels low; pulse quiet; countenance pale; slight tremor; wound healthy; water dressing to be applied. Mutton chop and half a pint of porter.

16th.—Tongue clean and moist; no tremulousness; no pain; wound healthy; pulse soft. One pint of porter.

17th.—Pulse quiet; tongue clean; no return of delirium. Ordinary diet.

He now continued to improve, and on the 27th was discharged.

One of the most violent and intractable of all nervous affections is tetanus; this complaint is divisible into two kinds, varying as to their cause, the severity of their symptoms, and their termination.

The one is termed *acute*, from the severity of its symptoms, and the rapidity with which they run their course, and *traumatic*, from the nature of the exciting cause, this being some local injury: the other is termed *chronic*, from the comparatively diminished intensity, and prolonged continuance of its symptoms, and *idiopathic* from the nature of its cause, which depends upon some general derangement of the whole system.

The symptoms of this affection consist, essentially, of *continued* spasms, attacking either a set or the whole of the voluntary muscles; these spasms do not remit, as in hysteria and epilepsy, but are incessant, though they vary in intensity. Certain sets of muscles alone are occasionally affected, and from this cause various names have been applied to denominate the local symptoms then present; those most commonly affected are situated about the jaw and neck; hence the name of trismus, or locked jaw: the whole body is often curved backwards; the abdomen raised, constituting the convexity above, while the concavity is formed by the back, the occiput and heels alone touching the bed; this is called opisthotonos: this

action is sometimes reversed, the back forming the convexity, the abdomen the concavity, and is then termed emprosthotonos: again, the trunk may be bowed on either side, which appearance is denominated pleurosthotonos.

The traumatic, or acute variety, follows the receipt of an injury at a variable period of time; but it may be taken as a general rule, that the sooner it appears after its exciting cause, the more surely is it unmanageable and fatal. The most common kind of injuries which are likely to be followed by tetanus, are lacerated and punctured wounds involving tendinous parts, but it may occur after almost any injury; clean incisions, as in surgical operations, scarcely ever give rise to it, though cases are recorded in which it has occurred after amputation of the extremities,* and removal of the breast.† Occasionally it follows the injury almost immediately, and runs on to its fatal termination with a rapidity scarcely to be credited, even within a quarter of an hour.‡ Generally, however, it both commences and runs its course in a much more gradual manner, beginning, in most cases, with a sensation of stiffness about the neck; there

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* Curling on Tetanus, Appendix. Cases, 29, 30, 31, 45, 127.

† Cooper's Surgical Dictionary. Art. Tetanus.

‡ A negro wounded his hand with a piece of broken china and died of tetanus, within a quarter of an hour.—Rees' *Encyclopædia.* Art. "Tetanus."

is spasm of the facial muscles, giving a peculiar expression, which resembles a painful smile; these symptoms increase, and there is a sense of uneasiness complained of about the root of the tongue, attended with dryness of throat; soon this passes into difficult deglutition, and mastication is prevented by spasms of the muscles firmly closing the jaws. The act of deglutition becomes more and more difficult, so much so that the wretched patient has often very nearly as great a terror at the sight of water as in hydrophobia. In addition to this, there is severe pain shooting from the pit of the stomach to the spine, caused by spasm of the diaphragm; the muscles of the glottis are also affected, and during the severity of the paroxysms respiration is materially interfered with, if not altogether suppressed. Other muscles are at the same time affected, causing either opisthotonos, emprosthotonos, or pleurothostonos, the first of which is most common; the abdomen is as hard as a board, and muscles are sometimes ruptured by the violence of the spasms; and in the majority of cases there is obstinate constipation of the bowels. These symptoms increase in severity without any complete remission, but the periods of intense aggravation, which are termed the paroxysms, follow one another in more rapid succession as the disease advances; the power of

speech, though impaired from the closure of the jaws, is for a long time retained, in consequence of the tongue being unaffected; this organ, however, frequently suffers at last, is rigidly protruded and fixed between the teeth; the whole features are affected from violent spasm of the facial muscles, and, most frequently, death suddenly terminates the scene during a violent paroxysm.

According to the late Mr. Samuel Cooper, "The perspiration is generally profuse over the whole body; but sometimes is confined to the face and chest. It continues during the whole course of the disease, and has a peculiar pungent odour."* Now this peculiar odour is by no means confined to the perspiration of patients afflicted with tetanus; I have often noticed it in severe cases of hysteria, and it is far from uncommon in many other nervous affections; it is also met with in insanity, and is well described by Sir Alexander Morrison: "Many of the insane perspire with difficulty; and, in some cases, especially where depression prevails, there is a partial cold and clammy perspiration. Occasionally, also, a very disagreeable smell is perceived about their persons, which is most probably caused by want of proper cleanliness—sometimes, no doubt, by the state of the perspiration. It has

* Cooper's Surgical Dictionary. Art. "Tetanus."

been compared to the smell of cat's urine, or of henbane in a state of fermentation. This odour, as may be supposed, is strongest in the morning, before the patient's room is cleaned out." *

Pain is not an invariable symptom, for fatal cases (though rare) are recorded, in which there was no positive pain from beginning to end.

The truly idiopathic or chronic variety does not follow the receipt of an injury, but arises from some general derangement of the constitution, acting both as a predisposing and exciting cause. The symptoms of this form of the complaint do not materially differ from those of acute tetanus, excepting in intensity, and the length of their continuance, and where death ensues, it occurs from downright exhaustion, and not, as in the other case, during a violent paroxysm at an early period of the disease.

Death may occur, then, either from asphyxia or exhaustion, varying according to the general health of the patient, the intensity of the spasms, and the muscles which they affect. The diaphragm and other muscles of respiration may be affected in various degrees, their action being either partially or totally suspended; or the glottis spasmodically contracts, and causes death suddenly. Both these causes are sometimes combined, but where the

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* Lectures on Insanity, p. 157.

former happens alone, death is more slowly induced.

In exhaustion, no nourishment is taken, the prolonged and often violent excitement of the nervous system wears out the vital powers; this excitement itself, towards the termination, becomes diminished in force, from its long continuance, and the patient *gradually* sinks.

The causes of tetanus are very nearly similar, in their general nature, to those of chorea, though the symptoms arising from them are far more severe and dangerous in their result. Irritation is produced in a sensory nerve or nerves, and is thence transmitted to the medulla spinalis; the motor nerves are then affected, and involuntary spasms are the result, dependent upon the reflex action thus induced. The irritation thus set up becomes permanent in the medulla, and will run its course, the removal of the exciting cause being seldom, if ever, of any avail.

Cold, damp, sudden change of temperature, intestinal or uterine irritation, &c., may act as predisposing causes to the traumatic, or as predisposing and exciting causes combined to the idiopathic variety. Generally speaking, irritation is excited slowly in the medulla, acting gradually upon it, being reflected from the injured nerve or nerves to which it is, in the first instance, entirely confined. Where cold acts either as a predisposing or

exciting cause, it checks the perspiration, and thus affects the cutaneous nerves; for, as Larrey observes—"Dans le cas où le froid contribue au développement du tétanos l'irritation, transmise par la blessure au système nerveux, est sans doubte augmentée par la suppression de la transpiration cutanée qui porte ses effets sur les organes, et principalement sur les portions déjà malades."* Worms are by no means an uncommon cause, particularly in negroes; it may also arise from direct injury of the upper part of the medulla spinalis, followed by inflammation, but this is rare.

The disease occurs most frequently in persons of strong constitution, and is more common in males than in females. "Every class of individuals is exposed to its attacks; but infants, a few days after their birth, and middle-aged persons, are said to be oftener affected than older subjects, or others in the more youthful period of life. The male sex more frequently suffer than the female, and the robust and vigorous more frequently than the weak."† Now, taking this into consideration, may we not reasonably suppose that plethora does, in many cases, act as a predisposing cause? We have already shown that anæmia produces a state of nervous excitement, predisposing to certain

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* Mem. de Chirurgie Militaire, tome 1, p. 246.

† Cooper's Surgical Dict. Art. "Tetanus."

affections of the nervous system, and also that these affections, arising in a debilitated constitution, however violent they may be in their outward appearance, owe their origin to this very state of debility, and require to be treated with such remedies as strengthen the system at large. We have seen what alarming and dangerous symptoms this state of anæmia is liable to produce in the nervous system, and reasoning from analogy, how much more severe might we not expect to find these symptoms, when dependent upon an exactly reverse state of the circulating system as a predisposing cause. In plethora there is an excess of the red globules, consequently the blood is of too stimulating a character; the nervous irritation is not produced here, as in the last case, from a supply of blood insufficient in quantity, and deficient in the proper amount of oxygen, but from the circulation of a fluid which acts as an undue stimulant both to the organs carrying it, and to the various tissues which it is destined to supply. The nervous system is of course affected, and laid open to any exciting cause which may arise, and when this does occur, the irritation which follows should be of a most acute kind, rapidly running its course, and from its very violence, speedily terminating in exhaustion, not only of the nervous system, but of the vital powers at large.

There is a form of tetanus occurring in new-

born infants, very commonly described as a distinct variety of the complaint, but not in reality differing in any way from that which appears in persons of more advanced age; it is, however, more confined to certain localities, and is, to a certain extent, endemic, though we can generally trace a cause for its occurrence in such places; the which being removed, it would, in all probability, disappear from them. It occurs to an alarming extent in the Vestman Islands, but is said to be almost unknown on the main island of Iceland; it is also common in the western islands of Scotland, and the black children in the West Indian Islands suffer severely from it. There is a predisposing and an exciting cause in these localities; in the first-named northern island, the parents live almost entirely upon the salted flesh of sea-fowls and their eggs, scarcely if ever tasting vegetable food; their habitations, also, are dirty and ill ventilated. We may naturally suppose, then, that the child born of such parents would be unhealthy, possessing, as it were, an hereditary predisposition; the filth and want of ventilation also act as predisposing causes, as well as the fact of the child being fed with the same unwholesome food as the parents; under such circumstances, the division of the umbilical cord, and the application of irritating substances to it, acts as an exciting cause, and the disease assumes the acute traumatic type, rapidly proving

fatal. The negroes are themselves coarse feeders, and are, moreover, known to be extremely liable to be attacked with idiopathic tetanus, and also with the traumatic variety, upon the receipt of the slightest injury; the children may, therefore, also possess a kind of hereditary predisposition, in addition to which, they are not so well taken care of after birth as the children of the whites; and the division of the umbilical cord acts here also as the exciting cause.

The prognosis in tetanus must vary according to circumstances; in the acute form it is generally unfavourable, the disease for the most part proving fatal; this event is, however, by no means certain, for some few cases (and pretty severe ones) recover. The fatal termination of acute traumatic tetanus generally occurs before the eighth day, but may sometimes be prolonged to the twentieth. The period of its first appearance after injuries is very uncertain, but the sooner it shows itself the more likely is it to be fatal. Tetanus infantium vel neonatorum is almost as generally fatal as the acute traumatic kind in the adult; it differs but little if anything from it, either in its causes, both predisposing and exciting, or in its symptoms, which are exactly analogous; it occurs, however, in the infant, immediately after birth, and, consequently, there is not the same strength of constitution to bear up against it.

The idiopathic form will, for the most part, run its course, and pass off of its own accord, whatever plan of treatment may be adopted; as a general rule, having passed through a certain train of symptoms, and, after a variable period, the patient recovers.

The post-mortem appearances are, upon the whole, unsatisfactory, tending to throw but little light upon the subject; they go far, however, to prove that the disease is of an eccentric origin, and does not commence in the nervous centres, no organic change of structure being discoverable in them. The general appearances cannot be better described than in the words of Larrey:—

"A l'ouverture que j'ai faite des cadavres de personnes mortes du trismus, j'ai trouvé le pharynx et l'œsophage considérablement reserrés, leurs membranes internes, rouges, enflammées, et enduites d'une humeur visqueuse et rougeatre."*

With regard to the treatment of this complaint, Mr. Travers has most correctly observed that "medicines and all external agents, which, according to our experience, operate promptly and powerfully in composing disturbed natural sympathies, and occasional and ordinary morbid sympathies, are comparatively inert when the morbid action is established and universal; it is now a

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* Mem. de Chirurgie Militaire, tome i. p. 247.

disease unconditional and independent, and of the most destructive, as well as incontrollable kind, from the tremendous exhaustion of power which attends it."* In tetanus, we may occasionally guide the complaint, do much to relieve the patient and assist nature; but in our present state of knowledge it is absurd to say that we can *cure* it. In the traumatic form, sedative applications appear to be of little or no use; according to Larrey, suppuration in the wound becomes greatly diminished, or completely suppressed on the accession of tetanic symptoms; hence we might suppose that a restoration of this process would be followed by favourable results, and such an opinion seems to be borne out by experience, at any rate, in some instances blisters near the wound or upon it, or any other irritating application have afforded relief, and the actual cautery has been found extremely beneficial in the hands of the eminent French surgeon just alluded to. The division of nerves is a doubtful remedy, and generally useless; amputation is objectionable, and certainly inadmissible where it would entail the loss of an important part.

Purgatives are always of use, for the bowels are obstinately confined, and crudities, acting as irritants upon the intestinal canal, frequently pre-

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* Further Inquiry concerning Constitutional Irritation, p. 300.

dispose to the disease; thus, worms are exceedingly common in negroes, who are also extremely liable to suffer from tetanus.

Plunging the patient into a cold bath, and affusion of the whole surface, are very objectionable; both have proved *suddenly* fatal in more than single cases; the shock is too sudden and too severe. The cold douche is more easily regulated, and its powerfully sedative effect has been so well established in cases of mania, that it is worth an extensive trial in such cases as we have just been considering.

CHAPTER VI.

Nervous affections may depend upon a poisoned state of the circulation—Delirium tremens—Its symptoms when fully developed — Premonitory signs — Case — Difference between delirium tremens and phrenitis—Prognosis—Case—Appearances after death — Symptoms of inebriation — Ordinary and occasional effect—Causes of delirium tremens—Alcohol not absolutely essential for its production—Treatment—Hydrophobia—Case—Symptoms in the dog—Cause of the complaint—Necessity of prophylactic measures before the appearance of any symptoms.

The nervous affections already treated of, have been either dependent upon a vitiated state of the circulation, arising from some constitutional cause, or have been produced by direct irritation of the nervous system itself. The introduction of poisons into the circulation, whether generated in the system, or received from extraneous sources, has been already shown to be capable of producing violent and alarming nervous irritation. The action of this latter class of poisons may be in some instances rapid, the effect immediately following the introduction; in others it may be more slow, the symptoms induced being gradually developed, until they arrive at their acme; or again, in

other cases, there may be a considerable period intervening between the receipt of the poison and the appearance of any symptoms whatever.

The vice of drinking is, unfortunately, in this country, indulged in to a most alarming extent by a very great number of its inhabitants, and members of our profession are almost daily seeing sad spectacles in the ravages made upon previously good constitutions by this wretched indulgence in an excess of alcoholic liquors. Fortunately, in the higher classes of society, this vice has fallen into disrepute, but amongst the lower grades it still exists in all its hideous deformity.

The complaint which we are now about to consider is not at all an uncommon one, but at the same time it is necessary to be careful and prompt in our diagnosis, for there is another disease with which it is sometimes confounded, and to which, in some points, it certainly bears a strong resemblance—this is inflammation of the brain and its membranes; in this case, the most active antiphlogistic treatment must be at once adopted; whereas such a plan in delirium tremens would only aggravate the symptoms and speedily bring it to a fatal termination, since the complaint depends upon increased sensibility and excitement of the nervous system, with a diminution of power.

The symptoms of delirium tremens consist in great irritability of the nervous system, marked

by excitement of temper and a wild expression of countenance; there is absence of sleep; the temperature of the extremities is low, and the whole body is generally covered with a profuse clammy perspiration. In addition to these symptoms there is a peculiar tremor pervading the muscular system, to a greater or less extent, from which the complaint takes its name of delirium tremens, or delirium cum tremore; the tongue is almost invariably affected in this way, and cannot be steadied when protruded from the mouth. There is always a hurried manner, the patient seeming exceedingly anxious to do everything quickly; he will start up in bed at the appearance of his medical attendant; he will thrust out his tongue almost before he is asked, and perform every action in the same abrupt way. The pulse is either small or soft and compressible; the tongue white; and the bowels generally confined, though sometimes they are relaxed.

These symptoms increase, delirium sets in; the patient talks incessantly to himself, and appears to be engaged in his former occupations; he is capable of being roused from this state, and will answer questions in a rapid manner, but immediately afterwards again relapses into his former state; he now becomes more and more restless, the pupils are often contracted, he is violent when thwarted, and it is exceedingly difficult to keep

him in bed. This condition having continued for about three or four days, either yields to appropriate remedies, and gradually passes off, or exhaustion sets in and the patient sinks. In this latter case, the above mentioned symptoms increase, the nervous irritability progresses with unabated force, while the vital powers become more and more exhausted, until the patient sinks, worn out by the violence of the complaint. Death is frequently preceded by coma, but in some cases is ushered in by convulsions.

This is the usual train of symptoms when the complaint is fully established, but in most cases there are certain premonitory signs occurring previously to its development; there is great depression of spirits, anxiety and watchfulness; the sleep is broken and disturbed by frightful dreams; there is some feverishness with loss of appetite, nausea and vertigo, and there is much general debility; the tongue is tremulous, and frequently, though not invariably, tremors of the hands are present. The duration of these premonitory symptoms varies in different cases, seldom, however, continuing for more than a few days, and sometimes passing into the fully developed attack in one or two.

Ann Jones, aged 40, dressmaker, Queen's Ward. Admitted 20th May, 1845, under Dr. Nairne.

Pulse 108; skin hot and moist; bowels open; tongue white and moist; urine scanty, and high coloured; countenance flushed and expressive of great excitement; manner hurried; is constantly pulling the bed-clothes about, and trying to get out of bed; can answer questions, but in an abrupt way, and then talks about other subjects; has tremors of the limbs.

It is reported that from embarrassed circumstances she fell into a desponding state, and took to drinking. On the 15th she became much excited and could get no rest at night; this continued until the 19th, when the attack came on. To have a mutton chop and strong beef tea.

℞ Morphiæ acet., gr. ½.
Spirit ætheris s. c., ʒss.
Spirit. lavandulæ c., ʒj.
Mist. camph., ʒvjss; 2ndis horis.

21st.—Nine A. M.—Has had no sleep; still much excited and trying to get out of bed; fancies she sees different objects, which frighten her; the quickness of manner does not appear to be quite so violent; appetite good; bowels open; tongue white. To have some bottled stout.

℞ Tinct. opii, ℥ij.
Aq. menthæ pip., ʒjss; 2ndis horis.
Haust. sennæ c. m.

Eight P. M.—Has just had a violent epileptic fit, which lasted only a few minutes; this was followed

by sleep, which lasted for about an hour, after which she became calmer, and slept at intervals throughout the night. The last dose of opium was taken at seven P. M., making in all ℈x.

22nd.—Much better; tongue white; pulse 96; skin very hot and perspiring; sweated much in the night; manner not so hurried; answers questions rationally; has twitchings of the muscles, as if startled; is very thirsty; bowels not open, Strong beef tea.

℞ Tinct. opii, ♏xxx.
Spir. æther, s. v.
Spir. lavandulæ c. aa. ♏xxx.
Mist. camphoræ, ℥iss. ter die.

23rd.—Slept well; tongue cleaner, pulse 88, quiet; manner quick; not so startled; still heavy; less perspiration; bowels open.

24th.—Tongue white; bowels not open; slept at intervals during the night; complains of giddiness and swimming before the eyes, and headache; is more startled and perspires much.

25th.—Tongue clean; less agitated; slept pretty well. Rep. mist. bis indies.

27th.—Still complains of drowsiness; had a return of tremor last night, and was obliged to have some brandy; still rather delirious; slept pretty well, but dreamt much; tongue white; bowels open. P. spirit vini Gallici, ℥ij.

29th.—Had headache; tongue white; bowels open. Rep. mist. o. n. tantum.

31st.—More agitated; still has headache; sleeps pretty well; dreams much; bowels very open; tongue clean.

June 3rd.—Still much agitated, and dreams much; has starting of the limbs at night; tongue white; bowels not open. Rep. haust. o. n. c. tinct. opii, ℈ij.; Rep. haust. o. m. c. tinct. opii, ♏xx.

5th.—Looking better; has less appetite; is still restless at night; bowels not open; tongue white. Rep. haust. o. n.

℞ Mist. camphoræ, ʒx.
Tinct. hyoscyami, ♏xxx.
Spir. æther. nit., ʒj.
Spir. æther. s. c., ♏xx. b. d.

Haust. sennæ, o. m.

7th.—Sleeps better; has less starting; tongue clean.

10th.—Tongue still rather white; less nervous; sleeps well; has still a little starting.

11th.—Left cured.

These are the ordinary symptoms in most cases of this kind, and it may be as well here to mention one or two points which mark the difference between this disease and phrenitis; there is the same want of sleep in both cases, and there is delirium; but in the latter the delirium is constant, and generally violent; the patient, moreover, being unable to answer questions rationally; the pulse,

too, is hard and frequent, whereas in the former complaint it is generally soft and compressible; the skin is moist and generally covered with profuse perspiration, while in the other case it is dry and parched. In addition to the above-mentioned symptoms, our diagnosis is confirmed by the previous history of the case; we almost invariably find that the patient is an inveterate drunkard, and frequently that the accustomed stimulus has been cut off. How many striking examples of this do we see in surgical cases; a drunkard meets with an accident, he is restricted as to his diet, and his stimulus is stopped; an attack of delirium tremens is the result; and this, perhaps, is the first thing which opens our eyes to the man's previous habits, for there is generally a great desire to conceal the fact, probably through shame.

In all cases of this kind our prognosis should be extremely guarded; a first attack is more likely to terminate favourably than a subsequent one, though it is far from impossible for the first attack to prove fatal. Where the symptoms appear to become more mild, and give way to quiet sleep, we may generally hope for a successful termination. Where the constitution is much debilitated, or where we have reason to suspect the presence of organic disease in any of the viscera, and particularly if it is not the first attack, the chance of recovery is very materially diminished, and the

patient may be considered in the most imminent danger. The following fatal case shows this well; for though the man did sleep, and we might, from this circumstance, have had some slight hope of his recovery, still, taking into consideration the fact of his having organic disease of the liver and kidneys, in addition to the delirium tremens, which was a third attack, we could hardly expect any other termination than that which eventually happened.

David Davis, aged 35, hairdresser, Hope Ward; admitted 18th June, 1845, five P.M., under Dr. Nairne. Skin cold and clammy; pulse 96, soft and compressible; tongue coated in centre, red at tip and edges; eyes suffused; bowels open; urine free; superficial veins of face very turgid. He talks incessantly, and answers questions correctly, but soon wanders to other subjects; puts out his tongue almost before he is asked to do so; has great quickness of manner, and twitching of the muscles, but no tremors; lies tolerably quiet in bed; has no picking of the bed-clothes; has had no sleep for three nights; he is a hard drinker, gin being his favourite beverage.

Four years ago he had an attack of a similar kind, which was again repeated six weeks previous to the present one; he has complained of pain in the loins for some years, and his legs have been

œdematous since the last attack, though there is not much swelling at present.

Seven P.M.—Had an epileptic fit, attended with foaming at the mouth and strabismus, his evacuations passing under him; this fit lasted ten minutes, after which he was more delirious, very irritable, and had picking of the bed-clothes.

Ten P.M—

℞ Morphiæ acet., gr. ss.
Spir. æther. nit., ʒj. statim.
Haust. sennæ, o. m.

19th.—Fell asleep about an hour after taking the morphia, and slept till four A.M., but not soundly; is more composed this morning; manner less hurried; eyes less suffused; talks less; has no picking of the bed-clothes; is perfectly sensible. Pulse 96; bowels well opened; urine small in quantity, and high-coloured; perspires much. Spirit. Genevæ, fʒvj.; Rep. haust., nocte et mane.

20th.—Very delirious in the night; running about the ward, and trying to jump out of window; sweated much during the night, and vomited matter of a green colour; is somewhat quieter this morning; eyes more ferrety than yesterday; is more agitated; talks more; fancies himself at work; has more twitching of the muscles; and is often getting out of bed. Pulse 88, very full and

soft; tongue cleaner; urine very thick, depositing a pink sediment; no albumen in it.

One P.M.—

℞ Tinct. opii, ♏xxx.
Spir. æther. s. c. ♏xxx.
Mist. camph., f℥xj.; 6tis horis.

To have a bottle of stout and a mutton-chop.

Half-past eleven P.M.—Became furiously delirious, trying to bite the nurse, and getting out of bed, fancying the house was on fire; strait-waistcoat and shackles obliged to be put on.

21st.—Had no sleep; delirium continues, but he is more exhausted; constantly talking, and swearing at the nurse; has made no water since six P.M., yesterday; catheter passed, and about ℥iij. of thick urine drawn off; perspires profusely; bowels not open; abdomen hard and tympanitic; sordes on teeth and lips; pulse 120, quick and soft; tongue still loaded and moist; urine contains a little albumen; does not take his chop. To have two bottles of stout. Spir. vin. Gal., f℥iv.

℞ Pil. colocynth. c. hyoscyamo, gr. x. statim.

22nd.—Had a sleepless and restless night, being furiously delirious at intervals; countenance is now pale and haggard; there is more sordes on teeth and lips; slight cough; breathing hurried; sweats profusely; tongue red and dry; pulse 131, more full; abdomen softer; bowels well open, a

turpentine injection having been administered during the night. A small quantity of water was drawn off. There is great prostration of strength. To have ʒiv. more brandy and an egg.

℞ Spir. æther. s. c. ɱxx.
Camphoræ, gr. v.
Mist. acaciæ, ʒij.
Tinct. opii, fʒss.
Haust. pimentæ, fʒix.

Post hor. ij. et rep. vesp. Omit. alia.

Seven P.M.—Had two epileptic fits following each other closely, both of ten minutes' duration; he then became comatose, and remained so till ten P.M., when he threw up some blood from the mouth, and died instantly.

SECTIO CADAVERIS.

Thorax.—Old and very extensive adhesions, uniting the right lung to the sides of the chest; the lung itself was, throughout its whole extent, loaded with large quantities of red frothy serum, except at the back part of the lower lobe, where the structure was condensed by red hepatization, and soft in texture. The left lung was also loaded towards the back part with red frothy serum, which came out in large quantities when the parts were cut. In both upper lobes there were, on the surfaces of the lungs, depressions, with puckered margins, where the tissue of the lung was condensed, and contained several tubercular deposits.

No tubercular matter was found elsewhere. The heart was pale in colour, and soft in texture; all its cavities were dilated, but without any hypertrophy of the walls; both the aortic and mitral valves were slightly thickened, and somewhat contracted; the other valves were healthy. The blood contained in the cavities of the heart was fluid and very thin; a few patches of atheromatous deposit existed at the root of the aorta.

Abdomen.—Cavity of peritoneum contained a small quantity of dark-coloured serum. The liver was of a fawn colour throughout its whole extent; its margins were round, and its surface presented a well-marked granular appearance; when cut into, the structure of the organ presented a variegated appearance, from the condensation of the cellular tissue, which, in several places, had separated the acini, and partially compressed them. Both kidneys were large and congested on their surfaces and lobules; the capsules peeled off easily, and their surfaces presented, in several places, slight depressions, as if the cortical structure had disappeared; in the other parts, the surfaces were perfectly smooth. The other organs were healthy.

Cranium.—Dura mater was more than usually adherent to the calvarium; the subarachnoid cellular tissue and pia mater were filled with large quantities of clear fluid; the cineritious substance was pale, and the white matter presented slight

venous congestion. The ventricles were not enlarged. The structure of the brain appeared to be perfectly healthy.

The appearances after death are, upon the whole, unsatisfactory, inasmuch as they tend to throw but little light upon the real nature of the disease; those just mentioned, are what we very generally meet with in such cases. The fluid effused between the membranes has a very peculiar appearance on opening the cranium; it looks exactly as if there was a coating of transparent jelly over the brain, but immediately on cutting the membranes it runs out. The substance of the brain is frequently more wet than natural, and there is an increased quantity of fluid in the ventricles; we sometimes find opacity of the arachnoid to a slight extent, which membrane may be also thickened, and there may be considerable congestion of the vessels, but these are far from being invariable symptoms. Disease of either abdominal or thoracic viscera, particularly of the liver and kidneys, are very often met with; this is, however, merely a complication; and although having been produced by the intemperate habits of the patient, has nothing whatever to do with the production of the delirium.

In considering the causes of this complaint, it will be necessary to allude to the ordinary phenomena attendant upon drunkenness. A person

indulging in drink at first becomes exhilarated, his countenance assumes an animated expression, his ideas flow more rapidly and more brilliantly, he becomes more communicative and loquacious, and his cares are forgotten in his present temporary state of felicity; as his potations increase, the true nature of his disposition shows itself, and many silly things are said and done which would never have been dreamt of under other circumstances; the force of the circulation is increased, the face becomes flushed, and the heat of the whole surface is much augmented:

"Potare et spargere flores
Incipiam, patiarque vel inconsultus haberi.
Quid non ebrietas designat? operta recludit:
Spes jubet esse ratas; in prælia trudit inertem;
Sollicitis animis onus eximit; addocet artes." *

This short period of bliss rapidly passes off, and is succeeded by the more positive and unpleasant signs of inebriation; the intellectual faculties become more and more confused, and numerous symptoms, indicating implication of the nervous system, show themselves; thus, the voice becomes affected, and the feat of clipping the Queen's English is accomplished; the power of locomotion is impeded, being performed in anything but a straight line, and accompanied with a staggering gait; double vision and vertigo are commonly

* Q. Horatii Flacci Epistolarum, lib. I., epist. v.

present in this stage, which is very frequently terminated by the act of vomiting. This state is succeeded by stupor, which, after lasting for a period varying in duration according to circumstances, passes off, and is followed by headache, nausea, loss of appetite, and various other unpleasant feelings, which gradually subside.

This is the common termination of such cases; but we occasionally meet with examples in certain individuals, where a debauch of this kind is followed by the most violent maniacal delirium, so severe in its nature as to render it absolutely necessary that the patient should be placed under proper restraint during its continuance; this state passes off generally in a few days, but is liable to return after every fresh debauch.

That a portion of the alcoholic liquor is absorbed into the circulation is indubitably proved by its easy detection in the breath of an intoxicated person; and the above-mentioned symptoms show, moreover, what an amount of irritation the circulation of this poison is capable of producing in the nervous system. Where this vice is only occasionally indulged in, the symptoms will run their course, and probably leave no permanent bad effect behind them; but this is not the case where the indulgence is frequently repeated at short intervals. The habitually-confirmed drunkard has his blood continually poisoned by the absorbed

alcohol, and his nervous system, continually in a state either of unnatural excitement, or of unwonted depression, whenever the accustomed stimulus is withdrawn. This state having existed for any length of time, the over-stimulated nervous system becomes materially weakened and predisposed to the attack, which either supervenes upon some debauch of unusual extent, or upon the sudden and total removal of all stimulants.

Indulgence in alcoholic liquors is not, however, the only cause of delirium tremens. Opium, mercury, and other substances are capable of producing it; and very analogous symptoms may be induced by anxiety, or any long-continued excitement of the mind.

In considering the treatment, we must remember that the complaint consists in an increased action and irritability of the nervous system, with diminished vital power, but that this increased action does not depend upon inflammation, and, consequently, an antiphlogistic plan would be calculated to do harm. The main object is to sooth the existing irritation, which is best accomplished by administering such remedies as will induce sleep. Opium is our sheet anchor, and the only remedy upon which we can rely in the treatment of this complaint. In all cases it is proper, in the first instance, to clear out the bowels, not by violent cathartics, but by a sure, efficient, and

moderate purgative, after which some one of the preparations of opium should be given in a full dose, and repeated in somewhat smaller doses, the effect being carefully watched. It is useless to begin with small doses; such a plan is quite as likely to increase as to allay the irritation; the remedy must be given with the intention of speedily putting the patient under its influence, at the same time being careful not to push its exhibition too far. Frequently, opium alone is insufficient to gain our point, and then a portion of the stimulus to which the patient has been accustomed should be administered in conjunction with it, which plan, in very many cases, succeeds speedily.

If by these means we can procure quiet sleep, the patient generally awakes refreshed, and more quiet and collected in his manner; the opium should still be continued in smaller doses, and the amount of stimulus should be gradually diminished in quantity, until it can be entirely discontinued with perfect impunity. This last object having been gained, the patient should be most strenuously urged to persevere in its observance, and should have it strongly impressed upon his mind, that total abstinence is far more easily endured than partial restraint. This advice, unfortunately, is seldom taken; the patient again pursues his old

habits, and madly rushes on to his certain destruction, some subsequent attack proving fatal.

The next complaint of which we have to speak is hydrophobia, the most alarming, intractable, and assuredly fatal of all known diseases. It is an affection in which a specific animal poison is introduced into the circulation; there it remains latent for a variable period, giving no signs of its presence until almost immediately before the appearance of its awful effect. The poison is received from extraneous sources, and is necessary for the production of the disease, which is never idiopathic—at any rate in the human being. The whole train of symptoms occurring in the human subject are so completely set forth in a case which I witnessed under the care of Mr. Cæsar Hawkins, at St. George's Hospital, that it is my intention to introduce it here, in preference to entering into any separate detailed account of their appearance.

Charles Haveus, aged 13, Winchester Ward. Admitted 11th June, 1844, under Mr. Hawkins. On April 22nd was bitten by a dog in the right hand; the wound was small, and healed in three days, and there has been no fresh inflammation or pain running from it to the trunk, nor is there any redness or soreness. At the carpal extremity of the right thumb there is a small elevated cicatrix, with

a scratch on each side of it. Complains of his shoulder from a fall he had three days ago. He remained well till eight this morning (the 11th), when he complained of feeling ill, as his mother was washing him. He allowed her to wash his hands, but when the water was about to be applied to his face, he ran away with dread, and frequently placed his hand on his throat, saying he was going to be choked. Brought to the hospital at nine P.M., with furred tongue, hot skin, and quick pulse—with slight difficulty in swallowing, and some redness of the fauces.

℞ Hydrargyri chloridi, gr. vi.

Had two motions after the calomel.

12th.—Had no sleep during the night, and this morning is much distressed, his countenance being expressive of the greatest anxiety at any surprise, a noise, any one approaching him, &c. The least breath of air, the noise of water—especially the sight of it—the idea of swallowing, bring on violent spasms of the muscles of the throat, especially those connected with the function of deglutition, and he complains of great pain in them when he attempts to swallow, which is done with effort.

Ten A.M.—After much persuasion, swallowed a pill composed of cannabis Indicæ, gr. j., with liquorice powder.

Eleven A.M.—Took another; a piece of ice was

given him, but he could not put it to his mouth, "it took his breath away." The motion of the bed-clothes also brings on spasm, and he holds his hands violently to his mouth whenever the door is opened, or when there is the slightest current of air; the spasms of the throat are more frequent. Pulse 90, intermits irregularly. No effect was produced by the pill. Intellect unimpaired.

Twelve A.M.—In the same state. Acidi hydrocyanici Scheelii, ℿiij. statim.

Half-past twelve P.M.—Rep. Acidi hydrocyanici, ℿiij. statim.

Two P.M.—Perspiration breaking out; medicine has had no apparent effect; spasm of the throat as frequent, terror as great; fauces are not red now. A little beef-tea was offered him; after considerable persuasion he took it up, threw it into his mouth, and gulped it down; this was followed by spasm and great distress. There is some wandering and confusion of thought; fancies he sees things and persons on the walls and around him.

℞ Ext. cannabis Indicæ, gr. ij. statim.

Three P.M.—Rep. Ext. cannabis Ind., gr. ij. statim.

Four P.M.—More wandering; spasm of throat not so frequent; some perspiration. A beef-tea enema was attempted, but he resisted it so violently that it was given up; horror great for a long time. Rep. Cannabis Indicæ, gr. ij.

Half-past five P.M.—Ext. cannabis Ind., gr. ij. Æther and laudanum, in equal parts, applied on linen to chest; seemed to make him worse for a time.

Half-past seven P.M.—Foaming at mouth; violent mania; less spasm of throat, but will not take his pills.

℞ Acidi hydrocyanici Scheelii, ♏iij.

Eight P.M.—Rep. Cannabis Ind., gr. ij.

Nine P.M.—Rep. Cannabis Ind., gr. ij.

Half-past ten P.M.—Much quieter from spasm; wanders, and talks incessantly; has sucked an orange, and taken a little beef-tea. Caustic to thumb. Rep. Cannabis Ind., gr. iij.

13th. Eight A.M.—Between one and two A.M. had several fits of spasm of the throat. Two violent fits, accompanied with opisthotonos, each lasting for about a quarter of an hour, with an interval of twenty minutes; since the occurrence of these, he has been more quiet and collected, free from spasm and alarm, and continued so till seven A.M. During this time, he took three eggs, some bread and butter, and beef-tea, without apparent difficulty, talked sensibly, and once appeared to sleep for a few minutes. Pulse weaker, and expression more careworn, and he has some retching. Has taken at one A.M., cannabis Ind., gr. ij.; two A.M. cannabis Ind., gr. ij.; five A.M., cannabis Ind., gr. ij.; seven A.M., cannabis Ind., gr. ij.; eight A.M.,

cannabis Ind., gr. ij.; nine A.M., cannabis Ind., gr. ij.

Ten A.M.—More violent; refuses to take anything; talks incessantly; pulse weaker; extremities becoming cold; eyes hollow and staring; expression of countenance horrible; perfectly delirious, talking, singing, and shouting; vomiting constantly black matter, which he brings up with hiccup; has heaving of chest, but not much difficulty of breathing. Rep. Ext. cannabis Ind., gr. ij.

One P.M. — Furiously delirious, but evidently weaker. Pupils dilated; eyes wild and prominent; mouth constantly filling with dark-coloured foam, which he snatches with his fingers, and throws about on those around. Extremities colder, hands more blue, no pulse perceptible at wrist, and heart's action exceedingly feeble; there has been no spasm since nine A.M. Gradually became more feeble, respirations not more than two in a minute, and died at two P.M., without further struggle.

SECTIO CADAVERIS—*twenty-four hours after death.*

Spinal Canal.—Small quantity of serum effused in the subarachnoid cellular tissue, both in the upper part of the cervical region and in the lumbar region. Membranes of cord apparently perfectly healthy; posterior and spinal veins less turgid than in many cases, although the body had been lying on its back since the death of the patient.

Cranium. — Membranes of brain apparently healthy; no effusion in the subarachnoid cellular tissue. Both substances of the brain were, throughout their whole extent, congested, and of a darker colour than usual. The grey matter presented a marked pinkish colour, especially that portion which was in contact with the pia mater. Ventricles did not contain more fluid than natural.

Cerebellum.—Pons and medulla oblongata carefully examined through the microscope by Mr. Toynbee and Mr. Hewett, and presented nothing remarkable. The different parts of the brain were somewhat softer than usual, but this softness was general, and might probably be attributed to the time of the patient's death and the state of the weather.

Pharynx, Larynx, &c.—Mucous follicles at the base of the tongue very large and numerous; mucous membrane of the fauces and pharynx congested, and of a dark colour; the discoloration did not extend beyond the level of the superior thyroid cartilage; below this the mucous membrane of the larynx and of the pharynx, and œsophagus, was of its natural colour. The mucous membrane of the windpipe was but slightly congested; there was no thickening of the submucous tissue of the larynx.

Thorax.—Right lung universally and firmly adherent, both lungs gorged with blood, (but no

serum,) especially at the back part, where they were very soft, and of a dark colour. A few scattered tubercles in the right lung. Mucous membrane of the bronchi slightly congested; heart natural; the blood contained in its cavities, small in quantity, very dark and thick, and with one or two small loose coagula, also of a very dark colour; they presented no remarkable appearance under the microscope.

Abdomen.—Small circumscribed arborescent congestion in the immediate neighbourhood of the œsophagus and region of the stomach; no other morbid appearance of this organ. Liver, spleen, kidneys, and intestines congested, but otherwise healthy. Both pneumogastric nerves were carefully examined throughout their whole extent, but they presented nothing remarkable.

The dog, which was a spaniel belonging to the resident at the next house, was being driven by the boy out of his own house, when it bit him, and it had been observed by its master to be ill previous to this. It was then tied up, but a cat was bitten by the dog, and a servant girl was also bitten in the thumb. The dog then fell off in his appetite, had frequent catchings in his throat, became snappish, and died a week afterwards.

The cat was ill for some days after the bite, but soon recovered; about a fortnight afterwards it

became stupid, giddy, and wild; running up and down stairs, and refusing food; while in this state it scratched the boy's hand; it died in three or four days after this, having had several fits. A medical man examined the stomach of the cat, and a farrier opened the dog, and both assured the owner of the dog that they died from natural causes.

This being the ordinary course of the complaint in the human subject, it will be as well to consider the symptoms which appear in the dog, and in so doing, I shall follow the able description given by Mr. Youatt, in his work upon that animal.

"The early symptoms of rabies in the dog are occasionally very obscure. In the greater number of cases these are sullenness, fidgetiness, and continually shifting of posture. Where I have had opportunity, I have generally found these circumstances in regular succession. For several consecutive hours, perhaps, he retreats to his basket or his bed. He shows no disposition to bite, and he answers the call upon him laggardly. He is curled up, and his face is buried between his paws and his breast. At length he begins to be fidgety; he searches out new resting-places, but he very soon changes them for others. He takes again to his own bed, but is continually shifting his posture He begins to gaze strangely about him as he lies on his bed. His countenance is clouded and suspicious. He comes to one and another of the

family, and he fixes on them a steadfast gaze, as if he would read their very thoughts. 'I feel strangely ill,' he seems to say, 'have you anything to do with it?—or you?' Has not a dog mind enough for this? If we have observed a rabid dog at the commencement of the disease, we have seen this to the very life. * * * A peculiar delirium is an early symptom, and one that will never deceive. A young man had been bitten by one of his dogs. I was requested to meet a medical gentleman on the subject. I was a little behind my time. As I entered the room I found the dog eagerly devouring a pan of sopped bread. 'There is no madness there,' said the gentleman. He had scarcely spoken, when in a moment the dog quitted the sop, and, with a furious bark, sprung against the wall, as if he would seize some imaginary object that he fancied was there. 'Did you see that?' was my reply—'what do you think of it?' 'I see nothing in it,' was his retort; 'the dog heard some noise on the other side of the wall.' At my serious urging, however, he consented to excise the part. I procured a poor, worthless cur, and got him bitten by this dog, and carried the disease from this dog to the third victim. They all became rabid, the one after the other, and there my experiment ended. * * * I have again and again seen the rabid dog start up after a momentary quietude, with unmingled ferocity

depicted in his countenance, and plunge with a savage howl to the end of his chain. At other times he would stop and watch the nails in the partition of the stable in which he was confined, and fancying them to move, he would dart at them, and occasionally sadly bruise and injure himself, from being no longer able to measure the distance of the object. * * * Dispersed by the magic influence of his master's voice, every object of terror disappears, and he crawls towards him with the same peculiar expression of attachment that used to characterise him. Then comes a moment's pause—a moment of actual vacuity; the eye slowly closes, the head drops, and he seems as if his fore feet were giving way, and he would fall; but he springs up again, and every object of terror once more surrounds him; he gazes wildly around, he snaps, he barks, and he rushes to the extent of his chain, prepared to meet his imaginary foe."—p. 131.

"In almost every case in which the dog utters any sound during the disease, there is a manifest change of voice. In the dog labouring under ferocious madness it is perfectly characteristic. There is no other sound that it resembles. The animal is generally standing, or, occasionally, sitting, when the singular sound is heard. The muzzle is always elevated. The commencement is that of a perfect bark, ending abruptly and very

singularly, in a howl, a fifth, sixth, or eighth higher than at the commencement. Dogs are often enough heard howling, but in this case it is the perfect bark and the perfect howl rapidly succeeding to the bark. * * * There is another partial change of voice to which the ear of the practitioner will, by degrees, become habituated, and which will indicate a change in the state of the animal quite as dangerous as the dismal howl; I mean when there is a hoarse inward bark, with a slight but characteristic elevation of tone. In other cases, after two or three distinct barks, will come the peculiar one mingled with the howl. Both of them will terminate fatally, and in both of them the rabid howl cannot possibly be mistaken." —p. 138.

The term hydrophobia is certainly misapplied in the case of the dog, for the animal has no dread of water; on the contrary, its thirst is insatiable, and where there is no paralysis of the jaws or tongue; it will continue to drink so long as it can obtain water; even where there is paralysis of the jaws and tongue, the poor creature plunges its muzzle into the water up to the eyes, in endeavouring to moisten its parched fauces.

"The stories that are told of the mad dog covered with froth are altogether fabulous. * * The increased secretion of saliva soon passes away. It lessens in quantity; it becomes thicker,

viscid, adhesive, and glutinous. It clings to the corners of the mouth, and, probably, more annoyingly so to the membranes of the fauces. * * * The dog furiously attempts to detach it with its paws. It is an early symptom in the dog, and it can scarcely be mistaken in him. When he is fighting with his paws at the corners of his mouth, let no one suppose that a bone is sticking between the poor fellow's teeth; nor should any useless or dangerous effort be made to relieve him. If all this uneasiness arose from a bone in the mouth, the mouth would continue permanently open, instead of closing when the animal for a moment discontinues his efforts. If, after awhile, he loses his balance and tumbles over, there can be no longer any mistake. It is the saliva becoming more and more glutinous, irritating the fauces, and threatening suffocation."—p. 135.

The appetite is depraved, and unnatural substances are eaten, such as thread, hay, straw, and even the creature's own excrement and urine.

There is in the dog, as well as in man, a period intervening between the reception of the poison and the supervention of the symptoms.

"In the dog I have never seen a case in which plain and palpable rabies occurred in less than fourteen days after the bite. The average time I should calculate at five or six weeks. In three months I should consider the animal as tolerably

safe. I am, however, relating my own experience, and have known but two instances in which the period much exceeded three months. In one of these, five months elapsed, and the other did not become affected until after the expiration of the seventh month. * * * The duration of the disease is different in different animals. In man, it has run its course in twenty-four hours, and rarely exceeds seventy-two. In the horse, from three to four days; in the sheep and ox, from five to seven; and, in the dog, from four to six."—p. 144.

The cause of this complaint is the application of the saliva of a rabid animal to an abraded surface, and its subsequent absorption into the system; it is not by any means necessary that a bite should be inflicted, though this is the usual manner in which it is received; the slightest abrasion of the skin is sufficient, if a rabid dog happens to lick the part; and it is extremely doubtful whether it can be applied to a mucous surface with impunity, even though that surface be perfectly whole and unbroken. The period at which the symptoms occur after the receipt of the poison is extremely variable, from six weeks up to three or four months is about the average, though there are cases recorded in which many months, and even years, are said to have intervened. These latter cases cannot but be looked upon with some degree of

doubt, more especially when we consider the extremely small portion of poison required to produce the effect, and the insidious manner in which this may be received; there is a case mentioned by Mr. Youatt, in which a man contracted the disease by untying, with his teeth, a knotted cord which had been used to confine a rabid dog. Such being the case, it is very probable that, in these cases, the virus has been unknowingly received, at a reasonable period before the appearance of the symptoms.

The interval succeeding the reception of the poison is termed the period of incubation; during this time no inconvenience is felt, until the period of recrudescence sets in; this is marked by some peculiar sensation in the cicatrix, if one exists, as pain, numbness, or tingling, or the part may become red and swollen; this sensation extends, then, from the original local injury towards the trunk, giving warning of the attack which follows in a few hours, or, at latest, in a few days. This premonitory sign is almost always present, though it is very likely to be overlooked, and, therefore, supposed not to have existed.

The definitely marked symptoms of hydrophobia having once set in, they run their course rapidly and violently, death being caused by exhaustion, generally within two or three days,

though, in some rare cases, not until the fifth, sixth, eighth, or even ninth day.

The appearances after death are very similar to, and quite as unsatisfactory as, those met with in tetanus; they tend to throw but little light upon the nature of the disease, except proving that it is of an eccentric origin, there being no organic lesion of the nervous centres; the brain and spinal cord may be more vascular than usual, but this is far from constant; the mucous membrane of the fauces, œsophagus, and stomach, as well as that of the air passages, is very generally found covered with tenacious mucus, and reddened.

When the disease is once fairly established, all remedial agents have hitherto failed to prevent the fatal result; our main hope must, therefore, rest upon prophylactic measures, adopted as speedily as possible after the receipt of the poison, and antecedent to the appearance of any symptoms. The only hope of warding off this fearful complaint consists in entire removal of the affected part, which should be done by the knife, if possible, or by means of caustic where this cannot be employed. The following remarks by Sir Benjamin Brodie upon this subject, which are here quoted at full length, cannot be too strongly impressed upon the mind of every medical man.

"There is an occasion on which you will not unfrequently have occasion to apply caustic, and where it is very material indeed that it should be done in a careful and scientific manner. I refer to cases in which a person has been bitten by a rabid dog, or a dog supposed to be rabid. On these occasions it is generally better to excise the part thoroughly, and to take out a good deal of the surrounding parts. But it sometimes happens that this cannot be very easily accomplished. A person, for instance, is bitten in the palm of the hand; the dog's tooth penetrates into it, and it would be a very serious thing to cut out tendons, nerves, and everything else, down to the metacarpal bones; or, it may be, that after the excision, you find on examination that the tooth has penetrated further than you supposed, and where you cannot very easily follow it with the knife. On these and similar occasions, you can do nothing better than trust to the application of caustics. Mr. Youatt, the veterinary surgeon, who has had great dealings with rabid dogs, tells me, that when he has been bitten, he has always applied the nitrate of silver, and he is alive and well now; so that, in his case, this kind of caustic has done all that has been required. But then he applies it at the very instant when he is bitten; whereas very few of your patients have the nitrate of silver in their pocket, or could apply it if they had. The best caustic, I

apprehend, for you to use on these occasions is the caustic potash, and for this reason, that it dissolves the parts with which it comes in contact, and that afterwards the dissolved caustic penetrates still farther beyond the part to which it has been actually applied. If the tooth penetrate to the cellular membrane, by the time that you are consulted, some of the saliva may have reached the cells beyond, and if you apply the nitrate of silver or the nitric acid, these will coagulate the fluids and harden the solids, while the caustic potash, becoming diffused, will follow the course of the saliva. A convenient way of applying caustic on these and on some other occasions is this: melt it in a silver or platina spoon, and when melted, dip into it the blunt end of a probe. It will come out with a varnish of the caustic upon it; dip it in again until the button of caustic has obtained a sufficient size. By means of a probe thus armed you may carry the caustic even into a very narrow wound, so that you are sure it will penetrate wherever the dog's tooth has penetrated; after which, from the particular nature of the caustic (as I have just explained), you may be certain that it will penetrate still further, and as far as the poison can have reached."*

The longer this operation is delayed, the less is

* Lecture on Pathology and Surgery, p. 323.

the chance of success; there is, however, always hope previous to the appearance of the stage of recrudescence, for it is still a question as to whether the poison has extended far beyond its original seat, before that period arrives; even after this stage has set in, it should be done, and has been recommended after the appearance of true hydrophobic symptoms, though it is much to be feared that no benefit could then be derived from it.

Treatment, during the last and fully developed stage, appears in our present state of knowledge to be almost useless, there being no case of recovery on record. Various remedies have been employed, but the one which can afford relief or remove the symptoms remains yet to be discovered; opiates seem to be the most rational means of obtaining relief, but like all others, they have as yet failed.

Hopeless though this complaint has hitherto proved to be, it most fortunately is rare in its occurrence in the human being, and although several persons may be bitten by a rabid dog and no precautions taken to avoid the consequences, in all probability but few of them will have the complaint; this may be accounted for by supposing that the part bitten has not been naked, and the teeth have been wiped clean in passing

through the clothes. However, be this as it may, the possible chance of becoming affected with such a frightful malady is quite sufficient to justify the employment of any means at all likely to prevent its occurrence.

THE END.

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