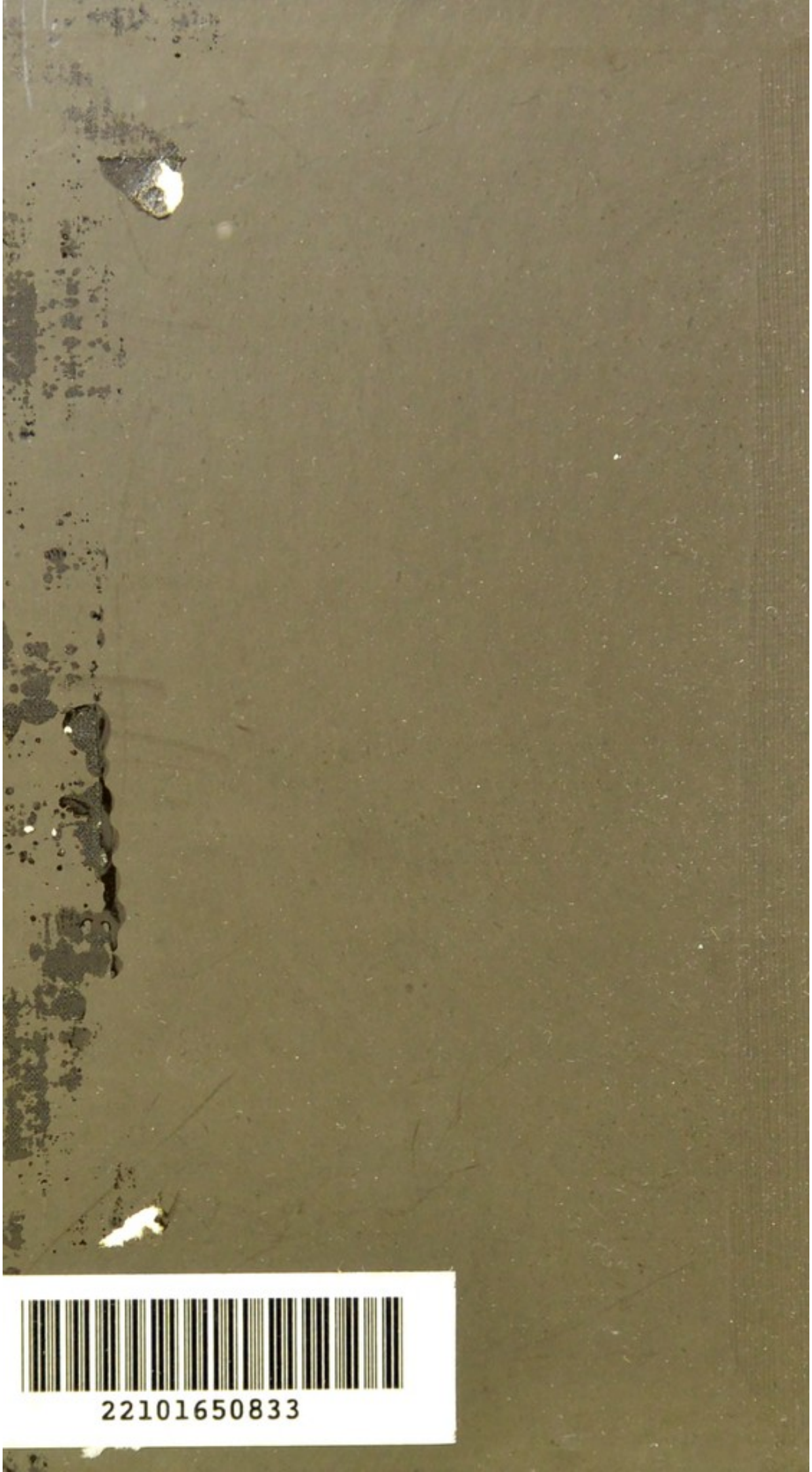
Syphilis of the brain and spinal cord, showing the part which this agent plays in the production of paralysis, epilepsy, insanity, headache, neuralgia, hysteria, hypochondriasis, and nervous derangements / by Thomas Stretch Dowse.

THE BRAIN & DISEASES OF THE NERVOUS SYSTEM

VOL. I.

SYPHILIS OF THE BRAIN

STRETCH DOWSE M.D., F.R.C.P. EDIN.



THE BRAIN AND DISEASES OF THE NERVOUS SYSTEM.—VOL. I.

SYPHILIS OF THE BRAIN AND SPINAL CORD,

SHOWING

THE PART WHICH THIS AGENT PLAYS IN THE PRODUCTION

OF

PARALYSIS, EPILEPSY, INSANITY, HEADACHE, NEURALGIA, HYSTERIA, HYPOCHONDRIASIS, AND OTHER MENTAL AND NERVOUS DERANGEMENTS.

BY

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SECOND EDITION.

LONDON:
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1881.

TO

WM. A. HAMMOND, M.D.,

PROFESSOR OF

DISEASES OF THE MIND AND NERVOUS SYSTEM,

AND OF

CLINICAL MEDICINE,

IN THE

BELLEVUE HOSPITAL MEDICAL COLLEGE, NEW YORK,

This little Work

IS MOST HEARTILY DEDICATED,

AS A SLIGHT TOKEN OF ESTEEM AND ADMIRATION OF HIS GREAT AND PROFOUND LEARNING IN ALL MATTERS RELATING TO THE STUDY OF NEUROLOGY AND PSYCHOLOGY, AND OF THE HIGH POSITION WHICH HE HOLDS AS AN ACCOMPLISHED SCHOLAR AND INDEFATIGABLE WORKER IN THE FIELD OF SCIENTIFIC MEDICINE.

PREFACE TO SECOND EDITION.

THE first edition of the work, entitled 'Syphilis of the Brain and Nervous System,' having been exhausted, I have ventured to reprint the work, and without any material alteration. For, although much has been written by neurologists upon the subject since this work was first published, yet I have failed to find that any new facts have been elicited, either from a clinical or a pathological point of view, to render the diagnosis of Syphilis of the Brain and Nervous System in any way more easy, or to effect in any way its cure with more certainty.

At the present time there are many vague and speculative theories afloat concerning syphilitic disease of the nerves and the nervous centres, and for this reason, if for no other, it is the more necessary for those, who make these affections their especial study, to be extremely guarded in reference to any statements which they may make, touching the pathology, diagnosis, and prognosis of this obscure malady.

There are many writers upon syphilis, and some even who would fain be considered as authorities upon Syphilis of the Brain and Nervous System, whose want of knowledge on the subject is at once apparent, and only the more and more evident from the crude observations which they are pleased to make. Justly has Dr. Hughlings remarked, that 'No one is fitted to begin the special study of syphilitic affections of the nervous system (and much less, I may add, is anyone fitted to treat of them) until he has well studied nervous diseases in general.'

To conclude. The first volume of this work, which is the result of much study and much practical experience, in regard to the subject of which it treats, has been in print for twelvemonths, and has met with no slight amount of approbation and success. It is, therefore, with a certain degree of confidence in its usefulness that I again reprint it, and offer it to the members of the medical profession for their kind and careful consideration.

THOMAS STRETCH DOWSE.

14, Welbeck Street,
Cavendish Square, 1880.

CONTENTS.

SYPHILIS OF THE BRAIN AND NERVOUS SYSTEM.

CHAPTER I.

History and Nature of Syphilis.

THERE can be no doubt that syphilis,* although it was not recognised as an especial and characteristic disease until the end of the fifteenth century, yet existed even at a much earlier period.†

We first find French writers directing attention to this malady about the year 1490, and from that time until now, it has presented a constant theme, for discussion and argument, amongst the most learned members of the medical profession; and, indeed, there can scarcely be found a writer of note in European medical literature, who has not advanced some theory concerning its nature.

The first treatise written in the English language upon 'Lues Venerea' was by Wm. Clowes, one of her Majesty's chirurgeons (1596), who mentions that he had known divers persons infected with it, who were free from any disease of the organs of generation.

At the end of the last century, amongst the many distinguished

* As to the etymology of the word 'Syphilis,' we are indebted to Fracastor, who was the first to make use of it, and who says its origin is to be found in the following mythical story. 'Syphilis,' who was King Alcithoo's shepherd, having insulted Heaven by vaunting the riches of his master, the Creator afflicted with 'humours' those who raised altars to the monarch, and covered them with 'pustules and ulcers,' the pain of which deprived them of all sleep. The people ever after called this plague by the name of the impious wretch who provoked it.

† M. Littré mentions having found allusion to syphilis in a writer of the thirteenth century, and a correspondent in the *Brit. Med. Journal* of January 23, 1875, suggests that reference is made to this disease in the 38th Psalm of David.

men, who specially signalised themselves in investigating this disease, we find the names of Bartholin, Zacchias, Th. Bonet, Tissot, Morgagni, Astruc, Lazerme, Sauvages, Lieutaud, Cyrillo, Piso, Cardona, Raïken, Pelargus, etc., etc.; whilst the most eminent writers of the modern period are Ricord, Diday, Lagneau, Lancereaux, Fournier, Bazin, Virchow, Wegner, Dittrick, Von Barensprung, Zeissl, Bergh, Boeck, Bidenkap, and Bumstead; and in our own country, Murchison, Moxon, Weber, Payne, Lane, Lee, De Meric, Hill, Gascoyen, Jonathan Hutchinson, and Wilks.

With especial reference to the action of syphilis upon the nervous system and nervous centres, nothing much appears to have been known, not even by such distinguished authorities as John Hunter and Sir Astley Cooper.

Yet it is evident from the works of Fernel and Fracastor, who speak of the cure of venereal algæ,* that the effect of this poison upon the nerves could not have been altogether unknown to them, and Paracelsus† states that the Lues Gallica is at times complicated by paralysis and disease of the heart.

Nicholas Massa speaks of several specific neuralgias.‡ Baillou also writes of specific neuralgias, and mentions the case of a patient who, after suffering from a complicated cephalalgia, with loss of several senses, died through a venereal tumour compressing the optic and olfactory nerves.§

Rivière mentions‖ a cephalée of the same nature. Baglivi¶ mentions the case of a Venetian who was struck with paralysis in one of his limbs, in consequence of a venereal infection.

In 1813 Pariset** stated that sometimes there are found arising from syphilis accidents of a varied character, such as epilepsy. Bard†† also affirms that the syphilitic virus has the power to irritate the nerves and to disturb their tranquillity, without any alteration

* 'Cura doloris an a lue venerea,' 'Universa Medica,' lib. vii., consilium lxxii.
† 'Livre de Chirurgie, De morbo Gallico.'
‡ *Ibid.*
§ 'Liber Paradigmatum,' No. 7.
‖ 'Centurie,' 11, observ. xci.
¶ 'Accroissement de la Médecine prat. trad. de Boucher,' 1851, p. 185.
** 'Dictionnaire des Sciences Médicales,' à l'article Causes. †† *Ibid.*

being perceived in the parts, and also to cause pains in the head, articular pains, tremblings, and epilepsy.

The true recognition of pathological changes in the nervous system appears to take its standpoint in the works of Dr. Zambaco* and M. Lancereaux.†

From their time, year by year, and day by day, additions have been made by pathologists of all countries towards a solution of what is the exact nature of these syphilitic changes. Their nature does not seem to be so doubtful as their seat of origin and mode of progression.

I believe it is due to Dr. Reid, of Belfast, to state that he was the first of our countrymen, who drew attention to syphilitic disease of the nervous system. He was, however, soon followed by Broadbent, Hughlings-Jackson, Buzzard, and many other observers.

Thus far, we have a slight sketch of the history of syphilis. We will now proceed to notice very briefly some essential points in reference to its nature, as evidenced by more recent investigations.

Admitting, that in this disease we have a series of variable phenomena, which for some time induced many observers to conjecture that we had two, or even three, kinds of syphilitic poison, and that this conjecture gave rise to the pluralistic doctrine of Carmichael, and, however much we may be led away by the varying features assumed by syphilis, still I am certainly inclined to believe that the weight of the material clinical fact is rather with the assertions of Mr. Hutchinson‡ and of Sir James Paget, viz., that we have in syphilis, but one malady and one virus. The various ways in which the poison affects the constitution have never, to my mind, proved the dualistic theory, but have rather shown, that certain conditions of the blood, or constitutional states, the diathesis, or even the mental state, can, and do, essentially, influence its action, its course and elimination, as well as, of necessity, the organic changes which it produces in the vital economy.

* 'Syphilitic Neurosis,' 1859, preface, p. 12.
† *Ibid.*, preface, p. 132.
‡ 'Pathological Society's Transactions,' 1876.

Hunter prefaces his work on venereal diseases with the statement that in the action of the syphilitic virus there are four morbid processes at work, which he calls:

1. The adhesive inflammation.
2. The suppurative inflammation.
3. Ulceration.
4. Mortification.

This remark is worthy of the great master who wrote it, but time brings with it modifications.

Histology shows us that there is no very essential difference in structure between an indurated chancre, a secondary tubercle, and a tertiary gumma; and it is well to note here that, in the low forms of inflammations engendered by this virus, they are all more or less distinguishable as fibro-plastic, and consisting of small nuclei, fatty granules and amorphous material. Yet it cannot be affirmed, that all gummata are of precisely the same nature, any more than it can be stated, that the products of the more common inflammations are essentially of the same kind. Sir James Paget,* in speaking of the relation which syphilis bears to other diseases, says, 'I think that one of the things which we have most to study, both in the pathology and treatment of syphilis, is the modifications which it undergoes in persons of different constitutions in whom it may be inserted.' 'I think that we should look for facts which would indicate that out of the constitution of each person into whom the syphilitic virus is inserted there may come a different—not essentially different, but a modified result.'

In my own practice for the past seven years at the Central London Sick Asylum, where I have had over 10,000 patients under my care, I have no hesitation in saying that three-fourths of them were more or less the subjects of acquired or hereditary syphilis, I have often been puzzled how to arrive at a definite conclusion as to the exact type of disease with which I have had to deal.

In the scrofulous, the gouty, the rheumatic, and even the cancerous diathesis, syphilis has been so masked that the functional troubles, as manifested by objective signs and symptoms, have

* 'Pathological Society's Transactions,' 1876, p. 370.

produced a condition so hybrid in character that the most patient and careful investigations have failed for some time to lead me to a correct diagnosis; and I presume that my experience in this respect has not been altogether different from that of other observers. It is in the sequelæ or tertiary stage that these complications are more apt to arise, and especially in middle and advanced life, and in no class of cases is the diagnosis more puzzling than in the many and varied forms of what are called functional neuroses or nervous diseases. If we listen to our patients' own statements as to their history, and expect to find an account of the incubation period, the primary and secondary stages, and of the earthy complexion, nodular or atrophied testes, etc., we shall in many cases fall short of the truth and be led into error. Yet in all such cases, if due care be taken, and the field of clinical research be thoroughly explored, some, although slight, sign will reveal itself, and will throw a flood of light to illumine what was before a darkened camera. This may be a patch upon the choroid, an optic irregular neuritis, a faint interstitial keratitis, an unequal thickening of the vocal chords, with cicatrices of old ulceration, and last, but not least—and especially where syphilis is associated with a gouty habit of body—psoriasis upon the sides of the tongue, as well as an indurated, irregular thickening of the lower bowel. So much do I believe in this latter condition existing, that I feel sure, if it were looked for, it would be found to occur with no less frequency than a psoriasis upon the palms of the hands or soles of the feet. How frequently do we find, well-marked signs of syphilis in its acquired form, even where all evidence of primary infection is absent?

This, I think, cannot be stated, with regard to the secondary stage; and therefore, in instances of that kind, it is well to remember, that inoculation must arise from contact, and that the sore, to produce its trail of sequence, need not (as was at one time supposed) be of necessity a hard Hunterian chancre. I have seen the most severe secondary symptoms follow an abrasion, and where no induration could be detected, which healed in a few days by the use of lead lotion; and yet in this very case, when the patient became weakened physically by continuous mental anxiety,

five years later, a hard indurated nodule appeared on the spot of the primary abraded surface, and at the same time gummata manifested themselves on other parts of the body, and it was proved beyond question that the patient was not in any other way infected.

If this case stood alone, it could not be accepted as proof that the blood and tissues might not have become syphilised by some other process than that promulgated by a hard, indurated sore; but it is now the accepted doctrine, that a syphilitic exanthem can result from any kind of sore with which the virus has come into contact.

This fact was completely substantiated in the evidence, which was taken by the Medical Commission, appointed by the Admiralty so far back as 1865, and presided over by Mr. Skey, in order to investigate the whole question of venereal disease, with a view to its prevention. The committee, in their report, stated that twenty-nine experienced witnesses gave evidence that sores, both soft and hard, might be followed by every variety of syphilitic eruption.

Dr. Wilks, who has studied the subject of visceral syphilis, has made the statement—which is borne out by my own experience—'that in those cases where the primary and secondary manifestations of syphilis are least marked, the viscera and nervous system are affected in an inverse ratio.' From many *post-mortem* examinations which I have made of syphilitic disease of the nervous system, where the meninges (as well as the substance of the brain and spinal cord) have been involved, I am bound to admit that I have not found similar changes in the liver, spleen, heart, and lungs, as a rule; and that, on the other hand, where gummata and syphilitic products have been found freely distributed through these viscera, the nervous system has usually been found free. I may note that a similar condition, of equal comparative value, exists between the nervous system and the more objective syphilitic factors and signs, which have been described; so that diagnosis of syphilitic lesions of the spinal cord, as apart from other degenerative connective tissue-changes, is a matter of no small difficulty, and of very questionable certainty. Let it be remembered that I

am here referring to the nervous system *per se*, and not to pressure upon it by changes in the osseous system.

This appears to be a point of so much clinical importance that it ought not to be passed over lightly. Often have I had patients totally ignorant of having at any time acquired or experienced the signs or symptoms of syphilis in its primary, or secondary stages, and yet the sequelæ have been made manifest in many ways, particularly in many of the obscure diseases of the nervous system, in which where there were none of the common forms of objective paralysis, or of gross lesion of brain and spinal cord; and yet there has been good evidence in proof of functional derangements, which were the result of albuminoid changes in the vaso-motor and sympathetic centres.

In reference to the syphilitic virus in producing constitutional changes, we have, as it has been seen, considerable difficulty in making ourselves acquainted with the precise stage of the disease, with the periodicity of the stage in question, and the time that the poison has been lying dormant in the blood, previous to the secondary rash having made its appearance. Here we find it, in practice, not an easy matter to map out, with Mr. Hutchinson's geometrical precision, the stages of the definition of specific fever. But this by no means detracts from the fact, or invalidates the comparative relationship. For here we find many causes to alter the typical course of syphilitic agency, in precisely the same way that we find other specific fevers to vary in their manifestations, course, and sequelæ; and, though I do not accept the doctrine of the duality or plurality of the syphilitic virus, still I think it impossible to discard altogether the idea of the poison being so modified —I do not mean merely diluted—that its action might be unable to produce the stage of exanthem, and yet its sequelæ become the more striking, although, perhaps, not of such definite character. That the stages of the syphilitic fever, leaving diathesis or temperament out of the question altogether, can be completely changed by the mode of life in the person infected, is, to my mind, and in my own experience, quite a recognised fact.

In the lower class of prostitutes, who drink and but rarely eat,

and who are exposed to vicissitudes of atmospheric influence, the change from the secondary to the tertiary period is so rapid and so wanting in definition that I have seen many cases where gummata and rupial masses have co-existed with the roseola maculata of two weeks' duration. I have also had cases, which will be detailed presently, showing, that, in addition to the gummata and roseola co-existent, there have been pulmonary hæmorrhage and albumino-fibroid changes going on in the viscera, and the urine loaded with albumen, and that there also existed retinal extravasations, localised cerebral thrombosis and eclampsia. These patients have got rapidly well by treatment, but not necessarily by iodide of potassium or mercury. Again, in some cases which I have published of basic cerebro-spinal meningitis, I found this form of disease associated with syphilitic roseola; and, in fact, in most of all my cases of this basic form of inflammation, occurring in young people, there has been a marked history of syphilis, and in its secondary stage. This is interesting, and has not been noted by other observers—as in fact it is I believe usually admitted that the nervous system is rarely, if ever, influenced by the syphilitic poison whilst in the secondary stage. We shall, I trust, clearly disprove this idea. So far, I repeat, it is difficult sometimes to define the stages of syphilis with accuracy, and for this reason the one-virus theory might still be open to some doubt.

Again, the same may be said of visceral syphilis becoming manifest during the secondary stage—I mean the active period. The liver and spleen may become enlarged, but I do not think that these glands are so much influenced as the lungs. If at the same time we have pulmonary hæmorrhages and pneumonia—a not uncommon circumstance—I think that we are justified in assuming that the *origo mali* is syphilis, the more especially as mercury rapidly cures it. Here we find the pathological condition of the lungs very different to that, in which we have chronic syphilitic changes. In the former case, we find the air-cells centrally and primarily involved, as well as the endothelium of the small vessels; whilst in the latter, we find peri-vascular and peri-bronchial cell and fibre proliferation. I would here remark that in my experience the

poison of syphilis does not influence the tubercular diathesis or the tendency to gout or scrofula, but rather keeps their respective actions dormant, or in a state of subjection, whilst it is running an active course. I have had very many cases to prove this, so that if in the second stage of syphilis we have an active pneumonia, I should unhesitatingly characterise this as syphilitic, much sooner than I should a fibroid lung in advanced syphilis with caries of the bones, nodes, etc.

The syphilitic picture at present exists in bare outline, and it only requires the master-hand of some skilled workman to fill in the details and give the true colouring. We see in the background a dark chaotic mass shaded here and there by vague tints of an uncertain hue, which, however, are being gradually developed, but with a rapidity which bids fair soon to present us with a consummate masterpiece of medical art. In regard to the more important phases of this disease we find an infinite variety of opinions. 1. There are some medical men who deny that it bears any resemblance to a specific fever, and who say: 2. That its stages, if any exist, are so indefinite and variable that the comparison is of little practical value. 3. That in the tertiary form it continues to be a blood disease; and, 4. That there is not in their symmetry any especial distinguishing characteristic between the exanthem and gummatous periods.

Again, other medical men make these divisions their standpoints, but no one has as yet brought forward any evidence to upset the careful and philosophical reasonings of Mr. Jonathan Hutchinson.

Syphilis, once acquired, maintains a tendency in the body to every morbid change that comes under the head of active hyperæmia, inflammation, or of inflammatory growths. A robust, healthy man is inoculated with the syphilitic virus, and in a very short time he becomes a physiological and pathological curiosity; his whole being undergoes a change. In fact, he is transformed into a living mass of disease. His body becomes enfeebled, his nervous system weakened, and his intellectual powers impaired. The saliva, and every other secretion of his body will, if inoculated into other living healthy tissue, produce a diseased and

unhealthy inflammatory action, and if the man give origin to his species, the result will be a want of normal development in the offspring at once suggestive and deplorable. He may, however, contract syphilis, and the poison from some constitutional or other cause may not then produce that active change which is made manifest by skin symptoms, ulcerations of the throat, and periosteal nocturnal pains. But in after years his health will suddenly give way, his digestive powers become faulty, and he will lose his especial aptitude, either for business or pleasurable pursuits, he will falter in his gait, become confused in conversation, and have attacks of minor epileptic seizures, which, should they yield to treatment, he will then probably be told by his medical man that he is as well as ever he was in his life. The sequel, however, will unfold a tale. I do not think that there can be any doubt concerning this by no means unimportant pathological condition, which should be carefully borne in mind, and of which I shall have more to say hereafter.

There is something so subtle and uncertain about syphilis which puzzles the histologist, pathologist, and clinicist alike, that it is probably this peculiarity which gives to it so much scientific interest. Yet there is a profundity of research in the study of this disease which defies scientific investigation, that is, as regards its heredity. It takes a range far wider than any other in the whole field of pathology. Let a man once become infected with syphilis, we then can predicate with certainty, that not only he, but his children, will in some measure become the subjects of syphilis.

CHAPTER II.

Diagnosis.

It must be admitted, that we are powerless to combat disease successfully, unless we have a thorough and complete insight into its mysterious and marvellous workings, and that want of success in treatment is, in many instances, really due to this lack of insight.

The faculty of observation is one thing, but the power of using this faculty aright is another.

When we take into consideration the whole composite individual, with his intellectual and physical attributes and peculiarities, the complex structure of his organism, and the laws and powers which regulate his being, we then experience a sense of conscious inferiority, relative especially to what has been, and is now being, done by the most thoughtful scientific observers, to unravel the relationship which exists between life and health, and to bring a more direct influence to bear upon the connecting links between disease and death. It is then only, that we begin to see the huge task which lies in the path of the physician, and to comprehend the right and sure road, by which he can arrive at a complete and thorough investigation of subjective, not less than objective, morbid processes.

If we do not, however, make ourselves acquainted with the true position of human science, which is the true philosophy of Nature, we shall never be able to grapple with the obscure signs and symptoms, which are the evidences of the disruption and disor-

ganisation of Nature's normal processes. We must bring the force of intellect to bear upon every point, and not one single faculty or function must be unheeded, since want of knowledge in the least minutiæ, has not unfrequently reversed the balance between life and death. Even a due appreciation and a sure judgment have sometimes failed, until the mind has been quickened to the consideration of that which, under ordinary circumstances, might have been thought to be matter of little moment. Yet there are physicians of eminence, who will not allow the claim of men devoted to natural science, mere physicists, as they are called, to advance an opinion, which has a direct medical bearing.

To speculate upon an opinion is an act of the most egregious and unpardonable folly. To be dogmatic and self-assertive, without due reason, is illogical and unjustifiable. Yet this tendency does exist oftentimes in the minds of the profoundest thinkers and philosophers, and oftentimes proves the greatest obstacle to the spread of truth, and the most fruitful source of error.

For the correct diagnosis of diseases of the nervous system and for the employment of rational curative remedies, we have at our command materials of potential value. As the stethoscope is to the chest, so is the ophthalmoscope to the brain ; but the one is certainly of no more special value, than the other. Disease of the chest can be elucidated without the stethoscope, and disease of the brain without the ophthalmoscope, yet they both are aids to a perfect diagnosis, which a careful observer would not think of setting aside.

One cannot consider this branch of the field of medicine, without feeling, how very greatly indebted the profession is, to the valuable and extensive labours of Hughlings-Jackson, Clifford Allbutt, Hutchinson, and Gowers. As the eye is one of the most sensitive tests of pathological processes, so the knowledge of its action, in disease of the brain and nervous system, will certainly be found of considerable value.

Neuro-retinitis is a common accompaniment of syphilis, and may perhaps be a characteristic feature.

Choroiditis is an almost undoubted indication of old standing syphilis.

Optic atrophy is the least important of all the ocular changes as a sign of syphilis, and should be relied upon, merely as an aid to other diagnostic evidence.

In *La France Médical* of March 27th, 1875, M. Bouchat, who has given especial attention to medical ophthalmoscopy and cerebroscopy, lays down the following four laws in reference to the formation of intra-ocular lesions, which depend upon diseases of the brain, spinal marrow, and meninges: '1. Whenevever the circulation is obstructed, in the cranium or in the sinuses or meningeal veins, in consequence of compression through distension of ventricles by serosity, or by any other cause, and an arrest of the venous circulation occurs, which produce swelling, hyperæmia, and œdema of the papilla, varicosity of the veins, and sometimes hæmorrhage in the eye. 2. When a tumour with encephalitis, or partial encephalitis, is present, and a descending phlegmasia occurs, and brings on sclerosis of the optic nerve, and exudations which imprison the papilla, and eventually produce atrophy. 3. When the spinal marrow is diseased by anterior or posterior sclerosis, since that organ, on account of its relation with the great sympathetic nerve, acts on the eye, and papillary hyperæmia of the eye results, which in time brings on atrophy. This is what is seen in locomotor ataxy. 4. Finally, when in all diatheses, and in poisonings in which the whole organism suffers, the eye suffers like the rest of the body, and certain forms of neuritis or choroiditis result.'

Again, as in percussing the chest we may ascertain its resonant power, so, in percussing the skull, and finding out by the tuning-fork the initial vibratory radiation of sound, we may thus discover the existence of subjective morbid phenomena, which give outlines, of no small importance, to complete the clinical picture.

Then, we have the faradaic and continuous currents, the dynamometer and the dynamograph, each of which has its own especial use.

In dealing with many forms of disease of the brain and nervous system, the greatest care is often required, to lead us to a true and

successful issue. There is not, on the part of patients, one tithe of the supposed dissimulation of diseased state, about which we constantly hear so many remarks.

There are thousands and tens of thousands of the occupants of our globe suffering from absolute disease of the brain and nervous system, who are set down by the world at large as ill-conditioned, morose, disagreeable creatures, hysterical, irritable, and discontented; in fact, anything but what they should be. Their friends will say the most extravagant things of them—that they cannot be responsible, that they cannot be in their right minds, and this last statement is in a measure justified.

What is the condition of the brain of the true dipsomaniac, who has less power than a child to resist the craving for drink, whilst in all other respects the character and life of the individual may be unexceptionable? or of the kleptomaniac, who cannot resist the propensity to steal? or of the hysteromaniac, who believes that her legs are powerless, and that she is suffering from some grave disease which will cause her death? or of the melancholic, who has an idea that he is doomed to perdition? What is it, that sometimes induces a high-minded girl, whose life has been, both by physical and mental training, that of absolute purity, to suddenly become possessed with the idea that she has committed some dreadful deed which cannot be pardoned by God or man, and impelling her to the thought or commission of suicide?

Again, we often find the creature of mere impulse suddenly performing the most extravagant acts without rhyme or reason, and quite unable to explain the motive for so acting. This condition is invariably associated with epilepsy, and the subject afflicted with it is as much an epileptic, as anyone who has confirmed epileptic seizures.

The time has passed (thanks to the recent researches of scientific investigation) for us to look upon these conditions as partaking of a morbid spiritualistic or psychical origin. We now know well, that there is a material cause at work which gives rise to the arrest of functions, either secretive or excretive, partial or complete, and undermines many of our special mental attributes, and so

disturbs the harmony which normally exists between the higher and most complex functions, of which volition, intellect, and reason are the human manifestations. The brain and nervous system being the organic congeners of these perturbed states, it scarcely requires reflection to assure ourselves of the truth of these remarks. For instance, a poisoned blood, having its origin from within the body, by an arrest of the secretory normal action of the liver, the kidneys, or the skin—or from without the body, by the introduction of septic or poisonous matter, will produce them. A vaso-motor paresis of the vessels of the kidney will suddenly cause acute madness, lasting, it may be, for ten minutes or twenty-four hours. The same condition of the vessels of the brain will produce a paralysis more or less profound, or it will affect only the depressing or stimulating nerves, which govern the rhythmical action of the heart, lungs, stomach, intestines, or involuntary muscles generally or locally, and also cause an irregular pulse and cardiac depression, paroxysms of difficult breathing and asthma, indigestion, biliousness, constipation, or diarrhœa; and when nutrition becomes seriously impaired, then will commence those organic changes with which pathology has made us so familiar.

Now, of all indwelling poisons, there is not one which plays so important a part in upsetting the primary laws, which govern the stability of the nervous system, as syphilis. Paracelsus was familiar with this when he stated that syphilis takes, in every man, the character of that disease to which he is inclined by hereditary or other predisposition. There can be no doubt, that gout plays a very important part as the *fons et origo* of the morbid phenomena just enumerated, but in comparison with syphilis it is as nothing. The universality of syphilis, and the constitutional changes to which it gives rise, both in the acquired and the hereditary form, as well in derangement of mind as in defects of body, are, I am fully convinced, only just beginning to receive anything like their due share of attention.

It is only within a very few years that syphilis has been considered a 'disease proper' for the physician; and, what is more anomalous still is, that, until recent investigations, physicians have

sometimes discarded, even with indifference, signs and symptoms which we now know to be essentially syphilitic. We have only just commenced to tread firmly upon this hitherto forbidden ground, and it still needs exploration. I would here, however, remark, that a heavy responsibility rests upon the shoulders of any medical man who neglects to enforce upon his patients the absolute necessity of a mercurial course in the primary stage of syphilis, for an incomplete, hesitating treatment of external syphilis specially predisposes to subsequent affections of the nervous system.

When writing of the pathology of syphilis we noted that syphilis can affect the brain, the spinal cord, their nerves and their membranes. It can do so in several ways :

1st. By pressure from gummatous outgrowths of the cranial bones, or from inflammation of the endosteal lining through which the nerves pass in making their exit from the skull.

2nd. By pressure from growths in the membranes, most frequently of the dura mater, rarely in the pia mater, and still more rarely of the arachnoid membrane.

3rd. Quite exceptionally, by growths commencing in the brain substance, and in the tunica adventitia of the vessels.

4th. By vascular changes, commencing in the inner wall of the vessels, leading to mal-nutrition exudations, hæmorrhages, softening, atrophy, and thrombosis.

5th. By changes in the sympathetic nerve ganglia, most frequently associated with protoplasmic and albumenoid visceral changes. It is at the commencement of these changes that we find functional nerve troubles arise.

6th. By changes in the vaso-motor, and intrinsic ganglia, and trophic nerve plexuses of the heart, spleen, and uterus, associated with both an acquired and an hereditary form of syphilis, but more particularly with the latter.

We shall see, as we proceed, how these varying abnormalities are to be recognised.

There are two prime factors which tend to induce syphilis to expend itself upon the brain and nervous system. The first of these, and perhaps the most important, is an unstable condition of

the brain and nervous system, arising from hereditary predisposition. The second is due to an instability which is the result of previous inflammatory change (either idiopathic or traumatic in its origin), or from molecular derangement, followed by want of due selective nutritive capacity in the nerve or connective tissue cells, by which their tonicity is impaired. Such a condition as this arises from exhaustive debilitating diseases (the exanthemata, for example), but more particularly, in shattered constitutions, from the effects of alcohol and exposure, and, in fact, from excesses of all kinds. *I have clearly traced a cerebral syphilis where the exciting cause has been venereal excesses, over-study, mental anxiety, worry, and even fright.*

Lancereaux states 'that more cases of cerebral syphilis occur among the learned professions than among the lower classes, which may be due to the demand made upon them for great brain exertion.' We must not, however, forget that special relapses of constitutional syphilis, under some conditions, favour the outbreak of nerve syphilis.

I have heard it stated that it is impossible to distinguish a hemiplegia, the result of a syphilitic lesion, from a hemiplegia, the result of any other tumour of the brain; but if two disconnected paralyses give evidence of two cerebral growths, then syphilis may be expected, and such a condition of brain, as a cause of paralysis, could scarcely be doubted, if the skull were carious, and nodes were to be found upon its surface, or upon the exterior surfaces of the long bones. I think that there can be but few medical men who doubt these facts. In dealing with syphilis in any of its forms, no matter whether of nerve, muscle, or of bone, experience has taught me, as it has many others, that definition, symmetry, and uniformity are by no means its especial attributes in any of its stages; in fact, its manifestations may be symmetrical, or they may not. Mr. Hutchinson, with all his experience, speaks of syphilis as a 'wizard'; but, as Dryden says, the 'wily wizard must be caught,' and, doubtless, in time he will be secured, if hunted down by men of Mr. Hutchinson's sagacity.

At present, however—and we must deal with facts as they stand

—it is the vagaries of syphilis which give to its study an especial charm, and which undoubtedly materially aid us to realise its existence.

If vagueness, evanescence, and vagrancy be the characteristics of syphilis when contrasted with other diseases, it behoves us to deal with syphilis, in such a manner and under such circumstances as would appear unnecessary when applied to other diseased states. Then let it be clearly understood, that among the protean signs of syphilis of the nervous system are its instability of character, its tendency to spontaneous resolution, and its disposition to necrobiotic change when subjected to the action of mercury. There is no other tumour of the brain or its membranes, or of the spinal cord or its membranes, of which the same condition may be affirmed in anything like the same degree; and there are only three factors of paralysis—if we exclude reflex and hysterical paralysis—namely, embolism, thrombosis, and hæmorrhage, by which syphilis can be confounded with other processes; but the onset of these is usually sudden and complete, whereas syphilis in its working is slow, and alternately progressive and retrogressive.

It must not be forgotten that apoplexies do occur in association with gummata and with arterial changes, but there are always prodromata which the practical senses can detect long before this event arrives.

And even if we have not positive evidence of syphilis about our patients, we are not to conclude from this that their disease has no connection with syphilis, neither can we in all cases be guided by their own statements in this respect, and the reason for this is obvious enough. The differences above referred to may now be more fully considered, and I hope that some essential points may receive elucidation.

Pressure on the Brain and Spinal Cord from Endosteal Gumma.

The following two cases will show in a manner at once definite and comprehensive the signs and symptoms by which this form of invasion may be diagnosed.

CASE I.—*Endosteal Gumma of internal and external table of the Skull in the posterior part of Right Superior—Antro-parietal area exercising pressure upon the Convolutions bounding the upper extremity of the Fissure of Rolando—Ferrier's Centres for complex movements of the Arms and Legs—Recovery.*

T. M., an officer aged 60, came under my care in the spring of 1877. When young, he fell heavily whilst riding in India, and besides fracturing the right collar-bone, he struck the right side of the head. For a while he was unconscious, but eventually recovered, and enjoyed excellent health. At the age of 43, he contracted syphilis in a very severe form, which so depressed his spirits and unfitted him for his duties, that he was compelled to resign his commission. After a considerable time he improved, and all went well enough with him for many years. At the age of 59, in the middle of a hot summer's day, he became faint and partially unconscious. From this time he complained of great pain in the head, coming on at a certain time every night, and continuing until a certain hour in the morning. It was more or less circumscribed, and confined to the parietal eminence, which was the focus of intensity, and from which the pain radiated. When pressure was exercised upon this central spot, the pain was increased, and was of a dull aching and, at times, throbbing character.

It would continue for a few days, or even weeks, and then leave him for a time, to return again with increased severity.

When I first saw him he was pale and weak, and, as he truly said, thoroughly worn out with pain and sleepless nights. His appetite was bad, and digestion faulty. The ophthalmoscope showed no retinal change. During the paroxysms of pain the intellect was obscure, the memory weak, and the frame of mind variable. There was a pseudo-paresis of the *left* side of the face, arm and leg. His attention was first drawn to the failure of power in the arm when he was in the act of raising a fork to his mouth, the grasp became relaxed, and the fork fell. Sensation was less affected than motion, there were no formications, and only slight subjective sense of heaviness. The paralysis was evanescent, and at times the leg would feel weaker than the arm; at other times the arm would feel weaker than the leg. Upon examining the head, I found a semi-elastic circumscribed swelling over the parietal eminence, and concluded that in addition there was caries of the skull, and an endosteal swelling similar to that visible on the outer surface, but from the manner in which the patient im-

proved under antisyphilitic treatment, with enforced nutritious diet, I was led to the belief that an internal as well as an external gumma existed, with an inflammatory hyperplasia of the bone structure.

In casting our eye over the signs and symptoms here very briefly enumerated, we find a ground for diagnosis of the utmost practical value. There is the dual history of injury to the head (a weak spot in the man's physical being), and of syphilitic infection. It must be observed that beyond fainting there were no fits, no inco-ordinate convulsive movements, or sudden jerking of the extremities; no neuralgic pains affecting the fifth-spinal accessory, or cervico-brachial nerves; that the headache was of a wearing dull character, unaccompanied by any great increase of nocturnal temperature; that it was not diffuse, but radiated from a given centre, and that this centre was of higher temperature than its surroundings; that the paralyses were confined to mere weakness, and a sense of heaviness about the limbs, and that it was evanescent.

Judging from signs and symptoms, and from pathological experience, I concluded that the dura mater proper, the other membranes, or the surface of the brain, did not participate in this syphilitic inflammation; but that pressure, only to a slight extent and evenly exerted, produced the paretic state.

CASE II.—*Intermittent Paralysis of the Lower Limbs of motion only, presumably from growth of a gummatous nature proceeding from the* 11*th or* 12*th Dorsal Vertebra, and involving the Anterior Columns of the Spinal Cord, the Membranes, and Nerves, producing severe Reflex and Automatic Movements* (Spinal Epilepsy) —*Recovery.*

M. A., æt. 43, was admitted under my care in January, 1875. There was undeniable evidence of syphilis contracted when she was 37 years of age, but no nerve symptoms were noticed until she was nearly 40. There was no neurotic history, and her general health was usually good.

About six months previous to disordered nerve-manifestations, she suffered from an attack of small-pox, and after this she was weak, and never gained her strength completely. She complained of dull aching pain in the spine, but especially about the 12th dorsal vertebra. For a time it was fixed to this spot, but became always worse at night, extending up the back between the shoulders. In a little while she was seized with cramp in the muscles

of the thighs, associated with tonic spasms of the lower limbs, sometimes brought on by sudden movement. There was marked absence of the signs of a local myelitis of the anterior horns of grey matter, such as formications, tingling, intrinsic muscular movements, cramps, and subjective sensations of burning, coldness, etc. The sphincters were never affected. The urine was of acid reaction and of normal gravity. At times there was a feeling as of a cord tied round the belly, but this was very variable. The electro-cutaneous and muscular response was either normal or exalted. Stohrer's induced current gave the following results:

Cutaneous Sensibility.

Feet	...	...	20 cells.
Flexor surface of legs		...	12 ,,
,,	,,	thigh ...	10 ,,

Over Spinal Cord.

Region.	Time of Response.	No. of Cells.
2nd Dorsal Spine ...	... 4 sec. ..	... 12
4th ,, ...	... 6 ,, ...	... 12
6th ,, ...	... 1½ ,, ...	... 12
10th ,, ...	... 3 ,, ...	... 12
2nd Lumbar Spine...	... 3 ,, ...	... 12

There was no muscular response to anything under 20 cells.

Now, concerning the actual paralysis; it came on in the following manner:

She was wakened out of her sleep during the night by startings of the lower limbs, and on the following morning she found that she was unable to stand without support, or to move the lower limbs freely while lying upon her back.

During the day, as the extremities became warm, her condition improved, and she could shuffle along from one part of the room to the other. But sometimes she would fall down suddenly, as if shot, and say that her legs completely gave way under her.

It must be remembered that none of the signs of postero or even unilateral pressure were observable. At one time, motor power was almost completely lost, but sensation and sensibility remained normal.

Taking these signs to guide me, I came to the conclusion that my patient was suffering from pressure upon the cord, the mem-

branes, and the efferent nerves, which must have been caused by one of three conditions :

1st. By an abscess, due to necrosis of the bodies of the vertebræ (there was no spinal distortion).

2nd. By some low chronic form of inflammation of the membranes, involving the anterior columns.

3rd. By some growth.

The two former supposed causes I decided were inadmissible, from the objective and subjective signs and symptoms, both direct and indirect. In fact, I felt sure that the third condition was the most probable—viz. that some tumour was exercising pressure. Cancer, tubercle, and possibly osteo-sarcoma, were at once set aside, and it was considered that a gumma was, in fact, the nature of the growth in question. The treatment bore out the diagnosis. Twelve leeches were applied, and then the painful spot, as well as the whole spine, were treated by the application of a strong, hot solution of chloral.

Morphia injections were used night and morning, and the ordinary blue pill, with iodide of potassium, was given freely. No perceptible change in the paralysis was observable for three weeks, but at the end of this time all her troubles seemed to be relieved as if by magic, and at the end of a month nothing but weakness remained, as testamentary evidence of a very grave and serious malady. Galvanism and cold douches helped to perfect the cure, and she left the building in the month of March, apparently well.

She then went to service, and kept in good health for two months, when she again came under my care with precisely similar symptoms. She said her back became painful, and then the spasms and paralysis returned in the same way as before. A precisely similar treatment was adopted, and her recovery was, of the two, more rapid. She followed my advice, and continued to take the iodide of potassium for many months. I saw her last November, and she told me that she had had no return of the paralysis whatever.

I do not think that it requires either much skill or great care to diagnose satisfactorily the nature of the disease just mentioned. Its precise local manifestation, as well as the local functional disturbance of the spinal cord, and its somewhat rapid advent and hasty departure, with a well-marked syphilitic history, are proofs conclusive.

These two cases which I have taken from my note-book es-

pecially illustrate a by no means uncommon form of paralysis by pressure of a gummatous growth; and these growths may arise and make considerable advance before their presence is detected, when, quite suddenly, we have apparently very serious nerve lesions produced, and not unfrequently has hæmorrhage or thrombosis been diagnosed as their cause, when these conditions have not existed.

Under these circumstances, local blood-letting and mercurialism are the appropriate remedies, no matter what is the apparent constitutional state of the patient, as long as he is carefully fed and well-nourished. Arterial tension and vaso-motor influences can be treated by strychnine, ergot, and digitalis, upon strictly physiological principles, when the disease has become so chronic that iodide of potassium and mercury are no longer able to prove their potency, and the patient's withered limbs stand forth as spectres of clinical reclamation.

The second mode of invasion of the nervous system is that by which the membranes of the brain and cord become primarily the seats of syphilis. When occurring in the dura mater alone, syphilis may be localised, and not associated with a more diffuse arterial change. In a measure, the same rule applies when the advance is made from without to within; and when the membranes and the brain substance are successively invaded. But when, however, diffuse miliary gummata exist in the pia mater, causing softening and destruction of the convolutional surfaces beneath, then diffuse cerebral arterial change may be anticipated.

Let us now see how these two states may be diagnosed; the prognosis of the former is hopeful, *the prognosis of the latter is without hope.*

Of all diseases of the nervous system, no less than of all other diseases, *pain* is one of the most important elements to be taken into consideration in the diagnosis; but in syphilis of the brain and its membranes, *Headache*, in reference to its periodicity, its radiation, its advent and departure, with the inferences to be drawn from the effects of treatment, is, perhaps, of all aids the most vital and most significant. But let me add, that, although I

lay considerable stress upon this point, we must take care and not be led astray by the existence of one factor alone, let it be ever so weighty in itself.

For my own part, I know of no cerebral growth that produces the peculiar pain, which is so exceptionally diagnostic of a syphilitic gummata, and it is in all probability because these are found at the cortex, and in connection with the brain membranes. I have never seen, and I am inclined to doubt the existence of, an isolated gummatous tumour in the central substance of the hemispheres, or motor ganglia, in the same way that we often find glioma, sarcoma, and tubercular growths. I have shelled out sarcomatous tumours from a man's brain, aged twenty-nine, who never suffered from any cerebral symptoms, pain, or otherwise, until a fortnight before his death; in reference to tubercle, we have age and location to guide us. Gumma of the cerebellum is rare. The cerebellum is the most frequent seat of tubercle. I showed at the Pathological Society (see 'Path. Trans.,' vol. xxvii.) an enormous glioma in a man's brain, who had rarely suffered from pain.

I do not wish here to draw out a differential diagnosis between cerebral growths, but the importance of *headache* in making a differential diagnosis of the seat of the syphilitic lesion will be readily seen and acknowledged. There is no description of *headache*, and one might say no kind of *pain*, which equals in intensity that which results from a localised syphilitic hyperplasia of the dura mater.

It is of a different character altogether from that which will be shown in Case 33; and it is important to remember that it matters not whether the neoplasm be situated at the base, and involving the tract of some important nerve, or whether it be over the surface of the hemispheres and in contiguity with any special sensorial or motor functional area. Why the dura mater under these circumstances should be so sensitive, it is not easy to explain. Yet we know by experiment that this membrane is very sensitive to the electric current, and that the most violent and general muscular movement results from its action. Again, the nature of the texture invaded by the growth has to be taken into considera-

tion. When once the inflammatory action has ceased in the membranes, and the brain substance becomes attacked, then, and not till then, does the *pain* lose its intensity.

The invasion of parenchymatous structures by morbid growths is never attended by the *severe pains* which are associated with them when they are in more compact textures. The former condition of pain is much more diffuse than when the bone is primarily involved, although it cannot be said to produce a more general hyperæsthesia of the scalp. The latter form of pain will sometimes extend to all the muscles of the neck and upper extremity, and induce very severe hyperalgia. *It is not relieved by pressure.* On the contrary, pressure, if possible, *increases* its severity.

Again, this pain is remittent; in this it differs from the case just alluded to, where it was found to be relapsing.

In addition to the peculiar nature of the pain, when the dura mater is the special seat of syphilitic disease, we find signs and symptoms according to the particular area implicated, which we can only deal with in a very general way.

Muscular hyperalgia, and disturbance of muscular sense, with cramps of isolated or combined groups of muscles, are of all others perhaps the most important. Epileptic seizures may occur, but when they do, it is a sure sign that the growth is making advances toward the convolutional cortex, if indeed it has not already invaded it. Although the pain is so diffused, the temperature of the head is locally increased, so that temperature and pain bear an inverse ratio to each other, and often the precise seat of inflammation can be detected by these means.

Lastly, a pseudo-ptosis and a contracted pupil are associated on the same side as the lesion, when it exists in relation with the anterior lobes, although the third nerve is not directly affected.

With this review of the signs and symptoms usually attendant upon gummata of the dura mater proper, we will now consider what the signs and symptoms would be, if this growth were allowed to extend itself into the brain substance; this is a question of pathological interest. How far these gummata are merely the sole local manifestations of syphilis is uncertain, and it becomes a point

for consideration whether they are, or are not, usually attended with diffuse vascular changes.

From my own observations, I conclude that the latter is the real condition, only in the more advanced stage of the growth. On the other hand, it is common pathology to find syphilitic disease of vessels and softening of the brain without gummatous growths.

If this be true, and my own experience confirms it, we have in syphilis of the brain a diffuseness as well as a vagueness in its manifestations.

And here again we find another point of interest which helps us to diagnose a syphilitic from other forms of tumour. For instance, a man has a paralysis of his *left* third, sixth, and seventh nerves, and a palsy of his *right* arm and leg. It would be inferred that he had some lesion of the *left* hemisphere of the brain, possibly in the pons varolii or crus cerebri. If the lesion were due to hæmorrhage, or to a sarcomatous or gliomatous tumour, would the state of that man be actually the same, provided the lesion were syphilitic? We will, for the present, leave history and age out of the question altogether, however important aids they may be in diagnosis.

If we use the ophthalmoscope, we shall probably find some ischemic or neuro-retinal change, which will avail us little, and the same may be said if we examine the palsied members; no electric current will help us to come to a correct estimate, but there will be diffuse changes, revealing psychical derangements, which, I maintain, are rarely associated with other than syphilitic growths when combined with objective signs of paralysis.

Some of these conditions have been noted in the chapter on 'Pathology,' and will be referred to again.

The following case will possibly demonstrate my meaning:

CASE III.—*Gumma of Pons Varolii, involving the Third, Fifth, and Seventh Nerves—Slight alternate Hemiplegia of Sensation and of Motion—Complete Right Facial Paralysis, and Intense Neuralgia of the Right Half of Head and Face—Disturbance of the Sensorium—Recovery.*

S. B., æt. 42, contracted syphilis, and suffered greatly from it when 19 years old. At 23 years of age he went to India, and,

whilst there, he had fever and ague; and also sunstroke. It was not, however, until he was 40 years of age that he suffered severely from headaches. So severe were they at first that he was unable to sleep for nights together. If he took an excess of stimulant (to use his own words), 'he became like a madman.' He placed himself under medical care, *and got quite well*—so much so, that he said he felt as well as ever he did in his life; but when he became excited, and especially if he lived too freely, *his head felt heavy, and he lost himself momentarily.*

At other times, his memory failed so, that he would break off in the midst of a sentence, and forget the nature of the subject on which he was speaking. Sometimes he became embarrassed in his speech, and would misplace a whole sentence, or give one word for another, or his speech would become of a drawling, hesitating character.

At the age of 42 his headaches recommenced, and he became morose, irritable, and violently passionate, or he would burst out into a fit of crying. He complained of a weakness in the *right* arm and leg. A month before he came under my care, in 1876, he awoke one morning to find that there was loss of movement of the *right* side of the face. Three weeks after, he saw double vision with the *left* eye, and had very great difficulty in raising the *left* eye-lid.

When I first saw him, his extreme pallor attracted my attention, and as regards facial expression he at first sight appeared to be demented, but was not so, for he at once gave me his history clearly enough. There was no marked failure in reasoning power. He suffered from the most agonising pain in the *left* half of the head, face, and jaws, and extending well round to the occipital region. This pain was purely paroxysmal—it usually came on about seven o'clock in the evening, and continued until four or five on the following morning. He was rarely giddy, but, whilst walking, he would stop, and say that he felt confused.

1st nerve was normal; 2nd nerve involved. He said that the sight of the *left* eye was not so good as that of the right. The ophthalmoscope showed no difference—the discs were dim and hazy; they seemed swollen, and the veins enlarged.

3rd nerve. Both of the pupils were greatly contracted, and the left eye seemed to be at a standstill, as though the 6th and 4th, as well as the 3rd, were palsied—there was partial ptosis.

5th nerve. There was intense hyperalgia of the sensory branches of the 5th on the *left* side. He complained of great stiffness about the muscles of the jaws.

7th nerve. The paralysis of this nerve was almost complete.

8th of the glosso-pharyngeal and 10th of the pneumogastric nerves. The latter was not involved, but the spinal accessory seemed to be, for at times there was rigid spasm of the trapezius muscle.

9th nerve. The tongue was slightly pushed over to the *right* side—its *right* half seemed atrophied when compared with the left, and was furred and coated (trophic nerve derangement), whilst the left half was usually clean. The sense of taste on the right side was decidedly impaired.

Of the extremities, the *right* were first involved, but more in sensation than in motion, and more so in the arm than in the leg—the paralysis was slight. The left arm and leg were also paretic to motion, but not to sensation.

I must admit that I looked upon the case as hopeless, and stated such to be my opinion, but knowing that the man had contracted syphilis, and feeling sure that the tumour was of the nature of a gumma, and seeing further, from signs and symptoms, that it was localised, and possibly originating in the dura mater, covering the basilar process of the occipital bone, I then commenced his treatment by giving him half-dram doses of iodide of potassium with decoction of bark, three times a day. This was continued for six weeks with some slight improvement, especially in the patient's general health. His appetite became good, and he was fed freely.

Stimulants were at first administered, but with caution. The iodide was then discontinued, and three grains of blue pill were given, night and morning, for one month. There was slight ptyalism, but the mercury was continued with an admixture of quinine and chlorate of potash, and with this he washed out the mouth before swallowing. The man's slow but sure progress was really remarkable. The ptosis of the left eye and vision was the first to become normal, and at this time the nocturnal pains ceased, sensation returned to the right side of the face, and the paralysis, although never completely cured, was scarcely noticeable.

He was under my care for six months, and from a mere wreck of humanity he became a healthy man. I recommended him to continue taking iodide of potassium.

There is nothing either novel or exceptional in this case, for we are constantly meeting such in our practice, but I was anxious to draw attention to it, because in addition to the signs of a tumour situated at the base of the brain, we had the disturbance of the

sensorium; and independently of any other sign, this would at once have led me to suspect, but not to be certain, of the existence of syphilitic disease, probably of the vessels. And besides this, it was at that particular stage which convinced me also that softening had not taken place. There is one important factor, however, which, if not taken into consideration, would invalidate our diagnosis. I refer to the existence of albuminuria in association with a gliomatous mass occupying precisely the same position, and producing similar signs and symptoms to those which this case has presented.

When the blood is loaded with urea, and the capillaries have undergone atheromatous and fibroid changes, and we find undue tension of the vessels, we may have accompanying these objective signs the subjective symptoms of mental perturbation, which have been observed, but no clinicist would permit this state to pass unheeded. And, withal, when we come to consider the degenerative changes of the brain which arise from associated renal and vascular disease, and when to these are added the history and general textural changes, we find this class of paralysis to stand apart from the rest, with a clearness most unmistakable.

Before we consider the signs of disease of the brain produced by the arterial changes in the middle-sized leading cerebral vessels, as described by Heubner, we will first refer to a similar condition commencing in the vessels on the cerebral surface of the pia mater.

This condition is often associated with disease of the medium-sized vessels of the brain, but, as a rule, when co-existent, it has invariably preceded it, so that a differential diagnosis is necessary.

The signs of syphilitic inflammatory hyperplasia of the pia mater are to be distinguished from those of the dura mater. A syphilitic inflammation of the dura mater resolves, and the patient gets well. A syphilitic inflammation of the pia mater is usually less circumscribed, rarely resolves, invades the grey substance, and produces softening and atrophy of the cortex, and of the convolutions, and the patient dies demented in two, three, or four years. The chief

reason for this is, that the disease progresses without showing to any one but a skilled observer, any more objective signs, than a *slight* headache, with increase of temperature of the head towards night and all the feelings accompanying general *malaise*, until, to the surprise of himself and those about him, the patient is suddenly seized with an epileptic fit. After this he is more carefully observed, and sensorial rather than motor phenomena are noticed. After this fits may often occur, and be frequent at intervals for days or even weeks, according to the extent and course of the lesion, and the invasion of the discharging centres. Some objective paralysis may follow them—generally defect in co-ordination of unilateral, or, it may be, bilateral groups of facial muscles, and of the muscles of the tongue ; or a pseudo-hemiplegia may be the result. The seat of this inflammatory change, for what reason I know not, is almost invariably over the convolutions of both anterior lobes, and very rarely over one lobe alone.

We have observed that the headache in syphilitic disease of the cranial bones and of the dura mater is most intense, and increased by pressure, and that the increase of temperature is usually localised rather than diffused. The reverse of this is the case in syphilitic inflammation of the pia mater ; there is no intensity of pain ; it is never localised, but invariably diffused over the forehead, and is of a dull, aching, congestive kind. The temperature of the head particularly, and of the body generally, is higher than when the dura mater is alone involved. There is greater constitutional disturbance ; vomiting and constipation may occur, but alteration of character is a sure accompaniment—and illusions, hallucinations, delusions, melancholia, and dementia the sequence. Case XXXIII. is an excellent illustration of the form of disease, and the signs and symptoms are there fully delineated and dwelt upon, so that it is unnecessary here to say anything more about them.

The following case is one which came early under my care, and yielded to treatment :

CASE IV.—*Syphilis of Pia Mater involving convolutional surfaces of the Anterior Lobes—Epileptogenesis—Recovery.*

W. J., æt. 37, was married, and (lately) of extremely temperate and regular habits, but, when young, he contracted syphilis, and suffered severely from it even until a very recent date. He was engaged in a large way of business, and, for the past year or two, had been much harassed on account of business matters. He attributed the headache from which he suffered to this cause. His friends became alarmed about him on account of the remarkable and almost sudden change in his disposition. His honesty and strict integrity were never doubted, but now his chief aim seemed to be to enrich himself at any cost, and he would tell his agents to make the most exorbitant demands, in the most unbusiness-like way. His feelings also towards his wife and children had undergone a change which, to them, seemed unaccountable. He had been under medical treatment, and, not getting better, an acquaintance of mine, who was a friend of his, advised him to consult me.

When I first saw him, in May, 1877, he gave me the impression of being in fairly good health, and he told me that he was perfectly so in every way. His memory and general intelligence were good. I thought that I occasionally detected some tremor in articulation, and I was determined to put this very conclusive proof to the test by inducing an exaltation of function in the motor ideational centres. I therefore requested him to repeat, for one dozen times, the two words 'proceed-procrastination.' He said that nothing was easier, and at once began, but before he had arrived at the seventh time, his articulation was a mere jumble, and the inco-ordinate movements of the lips and facial muscles, with his apparent anxiety to accomplish the task, told me at once a true tale. As he was leaving my house, he fell down in a fit—the first he had had. I told my friend my opinion of the case, and, after a little persuasion, the man was induced to place himself under the treatment I suggested.

I ordered him to take plain roast or boiled meat, to abstain from alcohol in any form, and particularly to discontinue smoking. Tea and coffee were forbidden, and all business pursuits. He was to take carriage, but not walking exercise. I particularly enjoined him to discard all inclination to sexual indulgence. The treatment I adopted was active (I do not believe in bromide and iodide of potassium unaided in these cases), for if this condition be allowed to progress beyond a certain point, then all is lost.

I gave this patient the iodide of potassium with three grains of blue pill three times a day from the first, but, in addition, I ordered two leeches to be applied to each temple every third day, and to be repeated for three days; after the bleeding, cold spirit and water was frequently applied to the forehead. The last thing before going to bed the feet and legs were immersed in strong mustard and water for ten minutes.

The headache gradually ceased, so that at the end of three weeks his nights were not in this respect disturbed. The mustard baths were discontinued. At the end of six weeks he was in every way so much improved that I had the greatest trouble to keep him from business. I succeeded, however, in getting him away to the Isle of Wight for two months. He was ordered to discontinue the pills, but to continue taking the iodide of potassium. I am happy to say that his malady has subsided. I say subsided only, because I am fearful of another outbreak.

I am inclined to the belief that hyperplastic inflammation of the pia mater of the cord is not uncommon during the second stage of syphilis. I have no pathological evidence in proof of this, beyond the cases given (see cases), where this condition was associated with myelitis. The following case is typical of several which have come under my observation:

CASE V.—*Syphilitic Inflammation of the Pia Mater of the Spinal Cord in Lower Dorsal Region—Pseudo-Paraplegia—Recovery.*

A. B., a strongly-built and healthy-looking woman, æt. 24, was admitted under my care with syphilis in June, 1876. She contracted the disease on the 16th May, 1876, and on June 1st she observed the rose-coloured rash over her chest; in a day or two it extended over the greater part of the body, and the throat then became sore. On her admission into the Central London Sick Asylum at Highgate, the chancre, the rash, and sore throat were indicative enough of syphilis.

On June 21st she complained of the legs aching, so that she could scarcely advance one before the other—they felt heavy, like lead. She said that her spine ached, but that there was no tenderness upon pressure. The passage of a sponge filled with hot water, or of a lump of ice, along the spine made her start when either of them came in contact with the spine of the lower six dorsal vertebræ. The flexor muscles of the legs were exceedingly painful, and subject to violent cramps. There were no convulsive

movements of the lower limbs, except when she was asleep, and then she was awakened by them. When walking, she said that she felt as though she were walking upon nothing; and that, when made to walk blindfolded over stones, blankets, or wood she did not experience any difference between them. There was no sensation as of a ligature or cord being tied round the body. The sphincters were unaffected.

The urine was acid, of normal gravity, and free from albumen. Reflex excitability was rather lessened than increased; this might have arisen from exudation and pressure. We know, from pathological examination, that exudation is extremely rapid in syphilitic inflammation of the membrane at the base of the brain, and in syphilitic inflammation of the membranes of the spinal cord. Cutaneous sensation to 20 cells in 40 seconds. Œsthesiometric test 1⅛ inch. Muscular excitation normal.

The treatment in this case consisted of the application of leeches over the dorsal spine, and was followed daily by dry cupping and highly nutritious feeding, with the use of wine. The blue pill, which she was taking at the time, was not discontinued. Perfect rest was enjoined. In about three weeks she was well.

CASE VI.—*Syphilitic Congestion of the Membranes of the Spinal Cord in the Dorso-Lumbar Region—Recovery.*

E. S., æt. 38, came under my care on the 9th July, 1874. She was a woman of dark complexion and of tubercular history. There were psoriasis of the tongue, deep-seated ulcers of the pharyngeal mucous membrane, chronic periostitis of the shin-bones, and nodes over the scalp; the hair came off plentifully, her face was bloated, and the urine was alkaline and albuminous. The skin was covered with a desquamating, copper-coloured eruption, and in some places rupial elevations were seen. She had contracted the disease six months previously to her coming under my care.

The first symptoms of paralysis were a weakness in the lower limbs, so that at times, when walking, they almost gave way under her. This condition gradually increased, and in a few days she was quite unable to walk. The legs felt numb and heavy, as though they were made of lead, and she could not raise them from the bed. There was marked cutaneous hyperæsthesia, no muscular cramps, but there was intense muscular hyperalgia. No convulsive seizures; slight reflex spasms. The sphincters were never incompetent. There was no spinal deformity or rigidity of spinal muscles. There was some increased sensibility over the 11th and

12th dorsal and lumbar spines, and she complained of a dull, aching pain in this region. She was ordered a mixture of bichloride of mercury and iodide of potassium three times a day, dry cupping, and counter-irritation to the spine.

For some months there was no improvement. On the 20th of April the following note was made of her state: She has so far recovered that she can walk with the aid of a stick, and when lying upon her back in bed, she can move the limbs co-ordinately in any way, but she does so in a stiff and awkward manner. The sense of heaviness has completely passed off.

Condition of Lower Extremities.

1. Reflex excitation to tickling normal.
2. Temperature normal.
3. No automatic movements.
4. Cutaneous sense and sensibility normal.
5. No subjective sense of heaviness.
6. The muscular hyperalgia has given place to an impaired muscular sensibility.
7. No marked muscular atrophy.

Electric Condition of Lower Limbs.

Cutaneous perceptibility is not quite normal, but progressively increasing from the feet upwards. There is no muscular response to 20, 30, or even 40 cells Stohrer's continuous current.

Stohrer's Induced Current, 20 Cells to Spine.

Region.	Rate of Perception.
Cervical	1 sec.
2nd Dorsal	3 ,,
4th ,,	2 ,,
7th ,,	5 ,,
9th ,,	2 ,,
1st Lumbar	1 ,,
2nd ,,	1 ,,

The urine is now free from albumen. The usual objective signs of syphilis are nowhere visible, and the patient is becoming well nourished, and, in other respects, healthy. The induced current of low power to the spine, and cold douches, completed the cure. She was discharged in June, 1875, having been under treatment for nearly twelve months.

CASE VII.—*Syphilitic Paraplegia.*

S. J., æt. 56, admitted October 30th, 1875, was a woman of dark complexion, thin, and careworn features, and said that she had contracted syphilis about three years back. When I first saw her there were no objective signs of the disease, beyond a posterior synechia of *right* eye from syphilitic iritis, and a neuro-retinitis of the *left* eye. The following notes are abbreviated:

The paralysis commenced with a feeling of heaviness in the lower limbs, and do what she would she could not get them warm. Although the limbs were almost entirely devoid of ordinary sensation, they were agonisingly painful with (as she expressed it) 'a burning pain.' The legs at this time did not feel heavy like lead. She said, that when walking, the ground felt like india-rubber. Her memory had been failing, and she had been distracted with pain, sometimes to such an extent that she had reeled about, as though intoxicated. Had never had a fit. On admission, she complained of flying pains about the joints and bones, and of a feeling of deadness of the lower limbs, extending beyond the knee, and rather on the outer than the inner side of the thighs. Her power of progression was very limited, and she scuffed the ground as she went along. There was a tender spot on the ninth dorsal spine. No feeling of abdominal girth. She was ordered a mixture of bichloride of mercury and iodide of potassium, and in the course of three months, with galvanic and other treatment, she was discharged cured.

Concerning syphilitic disease of the spinal cord and its membranes, I cannot agree with the statements, made by some authors, that it does occur very many years after the primary infection. Judging from my own experience, it is rare to find a true paraplegia, unassociated with brain disease, seven years after the primary manifestations. From an analysis of seventeen cases coming under my care, I find, that three occurred during the secondary period; seven during, and co-existent with, the tertiary objective signs; four, three years after; two, five years; and only one after six years of the syphilitic infection.

We will now consider those forms of paralysis which arise from vascular syphilitic changes of the main arterial cerebral vessels, as described by Heubner, and which result in mal-nutrition, exu-

dation, hæmorrhage, softening, atrophy, and thrombosis. Here we find, undoubtedly, the most difficult task connected with the whole subject—so difficult, in fact, that one feels inclined to set it aside altogether, rather than to run the risk of drawing from it merely speculative and perchance false deductions. If we are not sure that our patient has syphilis, but if he present some objective signs of ancient syphilitic invasion—as an atrophied testicle, for instance, which we may be told was once hard and swollen—and if there be no vascular changes with increased arterial tension, or no signs indicative of renal disease, or ischæmia of the optic disc, or of an especial gouty habit of body, or other special predisposing cause, I think we may then fairly infer, that the cerebral degenerations are due to arterial disease, which has syphilis for its origin.

I have been carefully looking over a very large number of recorded cases of my own, and of others, some of which I have known to be the result of syphilis, and the rest due to vascular changes of other kinds of a most undoubted character; and I must say, that I cannot quite agree with all the signs and symptoms so specially laid down by Heubner in his very excellent article on 'Syphilis of the Brain,' in Dr. H. von Zeimssen's 'Cyclopædia of the Practice of Medicine' (I mean, of course, in regard to this especial part of the subject); yet I may say, that if we have no positive evidence, we are by inference permitted from a clinical, if not from a strictly logical point of view, to assume a syphilitic disease, even provided we have no objective sign of syphilis, seeing that the elements of other diseases are absent.

In a patient suffering from symptoms of brain disease where there is no clear syphilitic history, I think, that the facial expression and the difference between the real and apparent age are of great importance, and more particularly if there be no other notable cachexy. Moreover, the ophthalmoscope will also aid us in simplifying the means to diagnosis, especially in clearing up the question as to the existence of changes in the vessels from chronic renal disease, with or without atheroma, which of all others seem to me to be the most material and important. Of course, there is little difficulty thrown in our path, if the patient has not only the

history, but the signs of syphilis upon his person. Under such conditions, if he has an apoplectic seizure, or an attack of hemiplegia, with or without loss of consciousness, or paraplegia, or objective signs of a lesion of a cranial or spinal nerve, we shall then be, to a certain extent, sure that syphilis is at the bottom of it.

It must be apparent, that in the progressive, gradual, and even complete occlusion of one or more cerebral vessels we shall have a train of phenomena varying greatly in their character, course, and termination, and that the functions of some centres will be depressed, whilst others will become exalted, and such states will naturally depend upon the vessels involved and the area of their distribution. Heubner has considered all these conditions with great care, but he appears to have arrived at the conclusion, that changes from arterial syphilitic disease are rare in any other than the medium-sized vessels, which are distributed to the ganglia at the base of the brain. My own experience does not coincide with the singularity of this view, and I have found that the arteries of the pia mater, which serve to supply the grey matter of the cortex and the convolutions with blood, are equally liable to this form of degeneration, which leads to softening, infarcts, and cysts. In my own cases the peculiar form of headache has been worth observing. It is not essentially nocturnal or paroxysmal, but comes on with great severity for twenty-four or forty-eight hours, perhaps not oftener than once in three or four weeks, yet rarely in the interval leaving a perfect sense of freedom. Exacerbations may, however, be readily induced by undue fatigue, worry, or excitement. The *pain* too is of a kind different from other forms of headache; it is of a dull, heavy, aching character. It has no central point from which it radiates. It is usually diffused more or less over the whole of the forehead, and gives to the patient a hang-dog look; often the complaint is that the eyelids cannot be raised, they feel so heavy; and the whole of the vessels of one eye-ball may be congested, and not the other, or both may be similarly affected. There may be a ptosis of one eyelid, and in the course of twenty-four hours this may have passed off and given rise to a ptosis of the opposite eyelid. There may be an external squint of one

eye, and an internal squint of the opposite eye, and yet, in twenty four hours, muscular co-ordination be normal. There may be temporary diplopia and coloured vision, associated with other ocular troubles, as well as nausea, vomiting, constipation, deafness, and various noises of the ear, which may be associated with a persistently furred tongue, and which must not lead us into the error that the stomach is the seat of the derangement. Heaviness and lethargy, rather than drowsiness and somnolence, are to be noticed. The tongue may be divergent or tremulous, or the patient may not be able to protrude it beyond his teeth. The speech may be slow, hesitating, and even aphasic, with unilateral or bilateral facial spasm. Cramps and convulsive spasms of isolated or combined groups of muscles, with or without a local paresis, or an actual paralysis of one limb, or of one-half of the body, may arise and rapidly subside; and it is to be remembered that, as a rule, the subsidence of these signs and symptoms is rapid, whilst their invasion is comparatively slow. This is peculiar to syphilis; and, again, syphilitic paralysis may occur during the night, although the daytime, or early morning, seems to be associated with these manifestations. A man, free from syphilis, may go to bed, having overnight felt quite well, and find in the morning that he cannot move his arm or leg. This mode of attack is rarely the case where the lesion is due to syphilis. A syphilised patient, without premonitory warning of any especial kind, may have an epileptic fit, but he will not, without warning, fall into an apoplectic fit. This does not imply that he will not have a fit of apoplexy; but for some days, or it may be weeks, previously to this calamity, he will be heavy and lethargic, although he is not able to sleep; be restless, and all his doings and movements without any definite purpose; he may not eat unless requested to do so, or if he sits down to partake of a meal, he may rise before he has finished, or at dinner his knife, fork, or glass may suddenly fall from his hand, or his hand may shake so that he is unable to carry a glass to his mouth, or if he do so, it rattles against his teeth, and the fluid escapes at the corners of his mouth, of which he is, in a measure, unmindful; and, finally, he may neglect, and appear to be regardless of, the calls of Nature.

It is after symptoms such as these, that the man with syphilitic arterial changes, is usually found breathing stertorously and in a comatose apoplectic state. There may be subsequent convulsions, or there may not, and the comatose state may be slight, or it may be profound: the comatose condition is the more usual, and it resembles a deep stupor, out of which the patient may be roused by pinching or pricking, to a state of apparent subjective consciousness, which is only a grade, however, beyond the mere automatic. He may continue in this state for one or two weeks, or, as I have seen cases, for three weeks; and then, with returning consciousness, the paralysis disappears, the intellect brightens, and he may even for a time so far recover as to be able to attend to his business or professional pursuits, but after this there is rarely a return of the evanescent forms of paralysis previously noted. After an attack of this nature, when paralysis supervenes (and it is very rarely that it does not, sooner or later), it is usually persistent and permanent, and death may take place during an attack similar to that just noticed, or it may be preceded by a series of epileptiform seizures, ending in profound coma. I give the following interesting case from my note-book, as a typical one of syphilitic arterial disease:

CASE VIII.—*Case of Defect of Speech from Syphilitic Brain Disease, with fits of Partial Unconsciousness and Alternate Paralysis, sometimes of all the extremities, sometimes of the left leg only, but usually of the right.—Recovery.*

S. S., æt. 46, came under my care in August, 1876. He was a man of good physique and fairly healthy facial aspect. From his history, it appeared that for the last three years he had suffered from headache, that his memory had failed, and that upon two or three occasions he had had some kind of fit. I examined his body for traces of old syphilis, but none were found, except a hard nodular atrophied condition of the left testicle. The optic discs were quite healthy; the radial arteries soft and compressible; urine clear, of acid reaction, and free from either albumen or sugar. Sp. gr., ·1018. He said, that he had been under Dr. Elam's care at the hospital for paralysis, and had improved greatly. He had been ill for some time before he was paralysed; the paralysis commenced with gradual loss of power in the *right* arm,

then the *right* leg became weak and his speech affected; shortly after this the same condition of paralysis affected the *left* arm and the *left* leg. He became giddy, fell about, and forgot himself; his memory was so bad that he could not remember what he wanted to say, and his articulation was so defective, that he could not make himself understood at all. He said, that the power of movement returned in equal ratio with the memory and speech.

August 31st.—Since he has been in this asylum he has improved very much; the memory is now good. All the cranial nerves are normal except the ninth. There is very marked want of voluntary co-ordinating power over the tongue; when he tries to direct its movements, it is some time before he is able to do so, and then they are not tremulous, but spasmodic and jerky; there is perfect voluntary power over the lips, but no ataxy or tremor of the limbs. Beyond the defect of speech and slight imbecility, nothing of note appears to ail him.

September 10th.—Is not so well; he complains of a return of the pain in the head, is obtuse, memory very defective, walks as though he was fearful of falling, does not care to get out of bed, says that he sees double, and things look blue; fancies that he hears strange voices calling to him, says that some one is at the foot of the bed going to murder him. These exacerbations come on at night, but during the day he is very lethargic, and it is with some difficulty he can be roused to take nourishment. No control over sphincters.

16th.—I was called to him at 6.30 p.m., and found him sitting up in bed and screaming out 'Murder!' at the top of his voice in a very excited state; he tried to get out of bed, but fell upon the floor; although his eyes were wide open he took no heed, neither did he seem to know either myself or the nurse. Pinching made him more comprehensive than anything else, so that sensibility was not much interfered with. Soon after this, he became slightly comatose.

17th.—Has been quiet all night; is lying in bed with the eyes open. Pupils dilated, no apparent objective consciousness. Urine drawn off; bowels relieved by enema. Cold to the head; sinapism to calves of legs, and hot water to axilla and feet. Of the cranial nerves, the 1st, 2nd, 4th, 5th, and 6th are normal. There is palsy of the left 3rd, and right 7th; the 9th doubtful; there is right hemiplegia and paraplegia; he seems to exercise voluntary power over the left arm. Pulse 130; resp. 40; temp. in right axilla, 102·3; left, 101·6: evening, right, 102·4; left, 101·2.

18th.—Has been quiet all night, and is in all respects the same as yesterday. Urine drawn off.

19th. — His state of consciousness seems uncertain ; he appears to have lost voluntary power over the left arm : but the amount of voluntary power which he possesses is doubtful ; electric stimulus excites both voluntary and reflex movements ; the facial paralysis has disappeared ; resp., pulse, and temp. are now normal.

20th.—This morning he is conscious when roused, and makes an attempt to answer questions ; takes nourishment freely.

25th.—Is perfectly conscious and rational ; no *objective paralysis*, but a weakness of the *left* half of the body. He is now out of bed, and walks fairly well. The speech is much more distinct than before the seizure, and the movements of the tongue are co-ordinate ; no pain in the head, or giddiness. He was ordered a mixture of bromide of potassium, iodide of potassium, digitalis, and conium, to be taken three times a day. I kept him under observation for some months, although he repeatedly requested me to give him his discharge, saying that he was quite well.

This case is typical of vascular occlusion from arterial change, and of thrombosis producing general disturbance in the current of the blood, and also of cerebral shock. Dr. Heubner states, in speaking of these diseased vessels of the brain, that the resistance to the blood current in tubes thus narrowed increases considerably and proportionally to the length of the narrowed portion. Hence, a useless consumption of the momentum of the blood current, the consequences of which are intensified by the fact, that, with the diminution of the elastic force in the arterial wall, a subtraction takes place from the sum of the forces which tend to propel it. The blood therefore moves more slowly, and with less tension, in the network of the pia mater and in the brain capillaries.

Here, it seems to me, we have found the key to understanding the peculiar somnolent or drunken-like conditions, in which the cerebral functions are not lost but greatly interfered with.

CHAPTER III.

Diseases of the Sympathetic Nervous System.

We will now consider two other forms of syphilitic invasion of the nervous system, namely, one in which the sympathetic ganglia, and the other in which the peripheral nerves are involved.

Relative to the pathology of the sympathetic ganglia in syphilis, there is very little evidence at present to guide us. M. Pietrow has been the chief investigator of the sympathetic ganglia in constitutional syphilis; and from his observations it would seem that there is a more marked pigmentation and colloid degeneration of the protoplasm of the ganglion cells and a proliferation of the cells that form the capsules, and also a transformation of the interstitial cellular tissue into a more rigid and dense mass which compresses the nerve cells. If changes like these exist in, and arise from, constitutional syphilis—and we certainly have no reason whatever to doubt M. Pietrow's conclusions—we can the more readily find an explanation for the cause of many of those functional troubles, which we are now unwilling to place under the designation, neurose. Up to the present time, too little attention has been given to the pathological changes in sympathetic nerve centres, and great difference of opinion still exists as to the effect produced in the animal economy by such changes, as well as in their absolute existence. The names best known in this field of research, according to Eulenburg, are Claude Bernard, Virchow, Traube, Recklinghausen, Fournier, Wilks, etc. I believe that most of the ailments from vascular and trophic disturbances, as megrim

and other conditions which are in many cases vaguely termed hysteria, merely indicate an unstable condition of the sympathetic nervous system in persons who are essentially the offspring of syphilised progenitors. Pathology has shown us that the doctrines taught, even by recent observers, concerning functional nervous disorders are no longer tenable. I think it must be admitted that the time has passed for us to consider chorea and paralysis agitans as mere functional nerve disorders, but how far functional troubles are due to acquired and hereditary syphilis is certainly a question of considerable importance, and I am inclined to think that they are of greater prevalence than is generally admitted. Here we are, unfortunately, wanting in pathological proof, but the following cases, from a clinical point of view, are significant :

CASE IX.—*Vaso-motor Derangement—Recurring Storms of Sympathetic Symptoms—Absence of the ordinary signs of Hysteria—Menstruation Normal—Acquired Syphilis—Recovery.* [Abbreviated notes.]

L. B———, æt. 34, has been under my care for some years. There is no neurotic history. She is short of stature, but well developed; there is neither lateral nor angular curvature of the spine (but during the attacks there is general spinal hyperæsthesia). Menstruation is regular, and the uterus is, in all respects, normal. Has enjoyed excellent health until the past four years. When 26 years of age she contracted syphilis, and suffered from its effects for nearly twelve months. At the age of 29 she became so changed in character that her friends could not account for it; she was irritable, violent-tempered, and morose, and at the time of *her attacks* they seriously contemplated sending her to a lunatic asylum, as she was scarcely manageable. These attacks, the signs of which I shall briefly describe, were not periodic, neither were they associated with menstruation.

They were ushered in by increased irritability of temper, want of sleep, parched mouth, dry tremulous tongue covered with a thick whitish-brown fur, and loss of taste and smell, as well as visual derangement. Pupils widely dilated; congestion of optic discs, as well as of sclerotic and conjunctival vessels; redness of the ears and of the face, sometimes unilateral or bilateral. Formications over the face are at times localised, at others diffuse; no vomiting.

Constipation. Respiration hurried and panting, inability to take a deep breath. Pulse, 60; temperature very variable, occasionally reaching 105° Fahr. Associated with these were cardiac and epigastric depression, and she complained greatly of a sharp pain passing through the abdomen, as though the intestines were being torn out. The power to digest and assimilate was for the time in abeyance, and the intestines were usually distended with flatus. The head jerks about laterally from side to side. Has heavy hot perspirations and cold clammy sweats. The speech is jerky and syllabic. No objective paralysis or cramps of voluntary muscles. The urine is high-coloured, loaded with lithates, free from albumen. She usually remains in this state for a week, ten days, or a fortnight, then the tongue clears up, and, to use her own words, a load seems to be taken off her. After this, in the course of a few days, she is fairly well and getting about.

For some time I was much puzzled as to this woman's condition, and I certainly did not attribute the attacks as being in any way due to syphilis; on the contrary, I rather looked upon them as due to functional sympathetic depression inducing an hysterical or *abortive* epileptiform state, the cause of which I was at a loss to determine, until she came to me with rupial elevations all over the body. Anti-syphilitic remedies were prescribed and used persistently. This was nearly three years ago, and her health has remained remarkably good since.

CASE X.—*Vaso-motor Paresis—Sympathetic Depression—Chronic Syphilis.—Recovery.*

E. I., æt. 65, contracted syphilis when young, the remains of which are visible, such as depressions of the skull and cicatrices of the scalp. She ceased to menstruate at 47 years of age, has never had a fit either hysterical or epileptic. There are no especial signs of degenerative change. No arcus senilis; no abnormal arterial tension; no albumen in the urine. She says that for the past eight years she has suffered greatly from depression of spirits, and at times thinks that she is going out of her mind, and has a feeling as though blood was trickling over the eyes. There is no headache. The attributes of mind are normal. At times, if anyone speaks to her suddenly, it causes her to tremble from head to foot, and produces profuse perspiration with a sense of heat and burning, and hot flushes of the head and face. Says that she always feels better without food. After food she feels heavy and drowsy, and is distended with wind. When perfectly quiet she

says that there is not much the matter with her, but that when she becomes excited there is a burning heat going down the left side to the foot, and extending thence over the abdomen. After this, the sensation becomes one of fluttering, and the bowels take on a swaying to and fro movement (as she compared it), like a bubble of soap floating on the water. This account to some may appear ridiculous, but a careful survey of disease of the sympathetic nervous system will explain this and also a vast deal more. At first, the valerianates and remedies of a like nature were persevered in, with no good result. Anti-syphilitic remedies cured her.

CASE XI.—*Vaso-motor Paresis—Sympathetic Depression—Hypochondriasis—Syphilis—Recovery under Specific Treatment.*

C. G., æt. 33, a well-grown woman with no spinal distortion, good family history, says that she contracted syphilis at the age of 29, and since this has never been well or menstruated regularly. For the past twelve months, she has suffered more or less from unaccountable nervous symptoms, has dyspepsia after every meal, and when she first gets out of bed in the morning, the arms feel powerless for five or ten minutes. The sight becomes weak. There is violent palpitation of the heart, and she fancies that she will die suddenly. No organic disease can be detected. The urine is of normal gravity, free from albumen and sugar. Although she has never had a fit, fancies that she is going to have one. She suffers from periods of mental abstraction, and then suddenly becomes conscious to things around her, and wonders what she has been thinking about. At other times she shows signs and symptoms which are usually attributed to hysteria. Amongst others, there is the feeling as though cold water were trickling down the spine, or being poured upon the back of the head. A feeling also as of a flash of lightning striking across the eyes, and producing transitory blindness. The head feels too large, as though it would overbalance the body, and sometimes she feels as though she were made of cork. Flushings of the face and ears occur, as many as twenty times during the day, succeeded by coldness and numbness of the extremities, and clammy sweats. The treatment of this case consisted in the first place in the administration of bromide and iodide of potassium, and nervine tonics and stimulants with counter-irritation to the spine, and galvanism also, but no improvement took place until mercurial salivation was effected.

CASE XII.—*Vaso-motor Depression—Constant Vomiting—Incipient Mania—Syphilis—Recovery.*

S. T., æt. 27, of good family history, said that she had enjoyed excellent health, until she was 22 years of age. At that time she contracted syphilis, but did not suffer severely from it, but has never been well since. Menstruation normal.

At the age of 24 she was much worried, and suffered from excitement, with tremblings in the inside, which she was unable to explain correctly. They came on when she was suddenly spoken to, and were usually accompanied with flushings of the face, and a sense of burning on the palms of the hands and soles of the feet, which were bedewed with moisture. She is never free from headache, and a constant burning at the top of the head, with throbbing, and sounds of something 'going click.'

The attacks usually come on with violent agitation, thirst, dryness of the throat, intense burning pain, extending down the spine from the occiput to the left hypochondrium, feeling of heaviness about the heart, distension of the stomach and intestines, with flatus, general suffusion of eyes, ears, and face, furred tongue, offensive breath; respiration hurried and panting. Pulse and temperature very variable. The legs and feet are usually cold, and so painful that she cannot bear to have them touched. The bowels are constipated, and vomiting most persistent.

There is sometimes albumen and blood in the urine. This is not due to organic renal change, but to a paresis and want of tonicity in the renal vessels; for, as the attack passes off, the urine becomes perfectly normal. The optic discs are clear.

When I first saw her, she said that she had been suffering from these attacks every six weeks or two months, and at times she became violent, and almost lost her reason. Anti-syphilitic remedies were not at once adopted in this case, but measures were resorted to, in order to improve her general health and equalise and control vaso-motor energy and correct functional disturbance, but all to no purpose. Gentle, prolonged ptyalism cured her.

I have records of a considerable number of cases similar to these noted, in which at one time I took an especial interest, and where the etiology was obscure, unless it were referred to the sympathetic ganglia; and in a large number of these cases there was a decided syphilitic history, and they yielded only to appropriate treatment.

CHAPTER IV.

Disease of Peripheral Nerves and Neuralgia.

It is certainly questionable, if we have any reliable clinical evidence to guide us, concerning syphilitic changes in the peripheral spinal nerves. We have seen that syphilitic disease of the cranial nerves is not uncommon. Dr. Barlow gave an instance in the Path. Soc.'s 'Transactions,' 1877, and others have been recorded by Virchow, Leon Gros, Lancereaux, and Graefe. The case recorded by Dr. Barlow, the pathology of which is given in the article on 'Hereditary Syphilis' (p. 70), shows well the ordinary form of degeneration which is usually met with, and proves most clearly that the nerve substance may be the seat of a definite and distinct neoplasm. But it is from pressure, rather than from intrinsic inflammatory changes, that the peripheral nerves, even in syphilis, have been proved to undergo degeneration, or by a direct extension and infiltration into them of gummatous inflammations. In an article upon the subject, in Ziemssen's 'Cyclopædia of the Practice of Medicine,' Dr. Heubner says, that the nerves may be affected in various ways under the influence of syphilis. 'It may occur that the peripheral nerves, or their nuclei in the central nervous substance, or their roots, or the ganglia which are distributed along their course, are altered during the existence of constitutional syphilis in such a manner that grave functional disturbances are excited, although it has been as yet impossible to demonstrate the alterations in question by means of the knife or the microscope.' I would extend this observation of Heubner, and say that syphilis in

some persons so alters the normal attributes of the spinal nerves that their motorial vaso-motor and trophic action is so interfered with, that any external exciting cause is particularly liable to suddenly, or progressively, arrest their function. It has never been proved satisfactorily why an injury to the shoulder, in a young subject, should be followed by rapid atrophy of the deltoid rhomboid and scapular muscles, whilst in another subject, under similar conditions, no such consequence ensues, and the same remark holds good in reference to writer's cramp and palsies of the thenar and hypothenar eminences. Without entering into the argument of central or peripheral primary molecular disturbance, I can only say that I have cured such cases by the aid of iodide of potassium and mercury, when other treatment has failed. I mean, of course, where I have sought for, and found clear evidence of syphilis.

Dr. Brown-Séquard remarks (*Archives Scientific and Practical Medicine*, New York, January, 1873): 'How quickly atrophy may appear in muscles of which the nerves have not been injured, and through an influence exerted by neighbouring nerves.'

As far as the peripheral spinal, no less than the cranial, nerves are concerned, whenever, in fact, there is an arrest of function, I make myself sure, as far as it is possible by clinical evidence, that syphilis is not mixed up with it.

If a patient presented himself with an internal squint, and diplopia or ptosis, with a dilated pupil, and an external squint, or a partial or complete palsy of the facial nerve, which had come on gradually, without other cranial or spinal nerves being involved, our first idea would be that we had syphilis to deal with, and I am quite sure of this, that the surgeon would be acting wisely if, in the muscular and nerve degenerations resulting from injury, he first made himself certain whether or not he had to do with a syphilitic constitution. Mr. Erichsen, in his admirable work on 'Concussion of the Spine,' dismisses the question as to the part played by constitutional syphilis, in producing nervous disorder after railway and other accidents in a very summary manner. However, I am quite convinced that the subject is deserving of much more attention than he seems inclined to give to it. He says, 'that the paralysis

of a syphilitic patient may be traumatic, and not in any way dependent upon a syphilitic taint. Thus the ptosis, strabismus, and double vision, which are so common in the syphilitic forms of brain disease, are very rare after spinal concussion.' One can easily understand, why a palsy of the third nerve should not necessarily follow a concussion of the spine, although it may produce extreme sympathetic depression, but I maintain, that it is impossible for a syphilitic patient to receive an injury to the nervous system, either central or peripheral, without the constitutional taint playing its own part (and an important one, too) in the course of, or it may be the extension of, the disease.

In Dr. Mitchell's most excellent volume 'On Injuries of Nerves and their Consequences,' I have failed to find that this important element has been taken into consideration, but in speaking of trophic nerves, the idea must have suggested itself to him, for he says, 'we can only conclude from these facts,' referring to the power of repair in tissue, 'that a certain individuality of cell life controls the results, and that the cell life of one man so differs from that of another as thus to present us with varied phenomena under what seems to be equality of conditions.' If there be no objective signs of syphilis, we have little to guide us beyond the patient's history, and our own discriminating powers of observation. If there be a neuritis in the course of a mixed nerve causing atrophy of its substance, and of the muscles which it supplies, then there will be loss of the electric irritability and co-existent want of electro-muscular contractility. But it must be clearly seen that this is no test of syphilis, but merely indicates loss of the conducting power between the peripheral twigs and ganglionic centres. In disease of the anterior horns of the spinal cord, with resulting muscular atrophy, and in a hemiplegia from central disease, we know that electro-muscular contractility is rarely interfered with, and I cannot for my own part see in what way we are aided in our diagnosis, provided we find that only an isolated nerve, and its supply, are cut off from the main branch, or its point of origin; but, if under anti-syphilitic treatment the function is restored, and if in a short time, from some depressing cause, its neighbour is

similarly influenced, then in all probability we shall have good reason for believing that syphilis is present. The nocturnal character of the pain of the cerebral nerves in syphilis is a marked feature, and the same condition exists, but to a limited extent, in neuralgias of the spinal peripheral nerves. The following case is instructive in this respect.

CASE XIII.—*Syphilitic changes at the Base of the Brain, involving especially the Optic Nerve and Gasserian Ganglion.*

W. E., æt. 62, came under my care on the 10th June, 1876. He was of temperate habits, but had contracted syphilis when he was thirty-seven years of age, and suffered severely from it for years. Of late he had suffered from flying rheumatic pains in the muscles and joints. About seven years ago he lost the sight of the *left* eye. He knew nothing about it until he closed the *right* eye, and then found that the sight of the *left* had gone. At that time, he had not the affection of the face, which he now has. In the month of January, 1876, he got up at his usual time in the morning, and the wind was blowing very cold from the east, when he suddenly experienced a sensation over the *left* half of his face, as though pins and needles were pricking it. In a few minutes he became so giddy that he was scarcely able to support himself. He lost neither consciousness nor voluntary power. On the following day when he put the *right* hand into *hot* water it felt cold, and for the past six months whenever he washes the *left* side of the face with *cold* water it burns and gives him intolerable pain.

There is a *constant* feeling over the *left* side of the face, as though pins and needles were pricking it, but this is varied by sensations of a most unpleasant character. Sometimes it feels as though a red-hot iron were being pressed against the skin, at other times as though boiling water were being poured over it, or hail-stones were being driven against it, or that innumerable flies were tickling the left side of the nose. These strange sensations are a source of great trouble to him.

When I first saw him he looked careworn, and without questioning, it was apparent that his sight was imperfect. There was no objective paralysis. Upon ophthalmoscopic examination, there was found white atrophy of the *left* disc, and also advancing atrophy of the *right;* the line of separation, between the preserved and obscured halves of the field of vision, was vertical. The vision of the left eye was gone.

The urine was free from albumen and sugar, and of normal gravity.

Cranial Nerves.—1st, defective on the left side; 2nd, as noted; 3rd and 4th, normal; 5th normal on the right side. On the left there are marked synæsthesia, variations, and abnormalities, uncommon sensation, as noted, and slight decrease of electro-muscular contractility in the muscles supplied by the third division of the 5th on this side. At times he complains of stiffness about the muscles in mastication. 6th and 7th, normal; 8th, the taste on the *right* side of the mouth has always been natural, but on the *left*, he says it seems as though he had strong cheese or pepper there. There is constant accumulation of saliva in the mouth; no dysphagia or dysphonia. The chief points in this case, which is one of exceptional interest, are the right hemiopia and the neuralgia of the sensory divisions of the left fifth nerve, and the constant aching wearying pains, which are localised to the parts supplied by this nerve, greatly increasing towards night. It at once brought to my mind the words of Dr. Anstie, in his Lettsomian Lectures, 1866, 'On certain Painful Affections of the Fifth Nerve.' 'Supposing,' said Dr. Anstie, 'that *it were possible* that a patient should be affected with universal and equally violent neuralgia of all the branches of the fifth nerve, the situations in which the most important of these painful spots would be developed are —1st, the parietal; 2nd, the supra-orbital; 3rd, the trochlear; 4th, the palpebral; 5th, the ocular; 6th, the nasal; 7th, the infra-orbital; 8th, the malar; 9th, the superior labial; 10th, the mental; 11th, the auriculo-temporal.'

Now, these points, alluded to by Dr. Anstie, were all more or less affected in this patient, and he improved very considerably under the use of anti-syphilitic treatment, whilst other treatment had had no beneficial influence whatever upon him.

Case XIV.—*Neuralgia of the Sciatic Nerve—Atrophy of Right Buttock—Neurosal and Syphilitic History—Cure.*

F. B., æt. 42, came to me in March, 1876, complaining that she had been in indifferent health for years. Her mother was subject to fits, and her father died insane. Her grandfather fell from his horse, and died in a fit. Her grandmother was found dead in bed. Her nephew died in a fit, at the age of 18 years.

She married at the age of 21, and contracted syphilis from her

husband, and from that time her health began to fail. She had given birth to thirteen children, and miscarried four times. Only five of the children are living. Three died in convulsions before they were three months old; one died in fits at 7, and another in a fit at 16 years of age. She said that she had been subject to seizures affecting the top and back of the head, dimness of sight, twitchings about the mouth and eyes, with numbness and coldness about the extremities.

The uterine and ovarian functions were normal, the bowels acted regularly. She said, that for eighteen months before she consulted me she had been suffering severely from pain of the right hip running down the back of the leg; that it was always very much worse at night when in bed; that at times the limb felt numbed and cold, and that, then again, the prickings and shootings were indescribable. She stated that the doctors told her that she was nervous, and that when she got strong the pains would go away. I was inclined at first to look upon it as hysterical, but upon examining the limb I found such marked atrophy of the muscles and integument of the buttock, with diminished cutaneous and electro-muscular contractility, that I concluded there must be some pressure upon, or chronic interstitial inflammatory change in, the nerve itself. I satisfied myself, as far as I could, that the disease existed rather without than within the pelvis, and that there were no signs indicative of hip-joint disease. At times the muscular cramps were persistent and intolerable, and the movement of the limb gave her intense pain. Upon making pressure between the trochanter major and tuberosity of the ischium, and just a little below the pyriformis muscle, it gave her excruciating pain. I treated the case as a chronic syphilitic neuritis, first with leechings and hot chloral solutions to the seat of pain, and after these with flying blisters; and, lastly, with the induced galvanic current, which soon altered the condition of the atrophied muscles. Anti-syphilitic remedies were administered, and in two months she was quite well.

I quote these two cases, as indeed I could a large number of others, if it were necessary, to show how difficult it is sometimes to make a correct diagnosis in cases of peripheral nerve lesion, and how much more difficult it is to diagnose a specific from a common neurosis. I should say, never attempt the excision of a nerve until syphilitic remedies have been thoroughly tried.

CHAPTER V.

Treatment.

Of all diseases of the brain and nervous system, I may say, that there are not any which yield more readily and rapidly to appropriate treatment than those which are due to syphilis, or have syphilis for their origin.

In order, however, to form a safe opinion as to the curability, or otherwise, of our patient, we must first ascertain, not only the precise nature of the syphilitic lesion, and its location, but also the stage of the invasion of the brain and nervous structures. But, again, because we are sure that a paralysis is due to syphilis, to say that it will yield to specific measures, is stating that which is not borne out by practice, in a very large proportion of cases ; for this will greatly depend upon the means adopted, and according to the situation and degree of the disease.

A brain, once organically diseased, means a mind impaired for ever: its normal state is altered, and will never again regain its original condition. This may be easily exemplified, and become manifest in an infinite variety of ways, but which scarcely can come under the cognisance of an ordinary observer ; so that, in making a correct diagnosis, as well as prognosis, we see how extremely important it is carefully to consider all objective signs as well as subjective phenomena.

And, here I may say, that the physical and metaphysical, the volitional and automatic, are so intimately related, that it is absolutely necessary, in making a true diagnosis, to adopt such means

as will prove in what way, and to what extent, this relationship is interfered with.

It must be apparent, even to the novice, that if skill, as far as treatment is concerned, is to materially benefit our patients, it must be in that stage of the disease in which the least amount of arterial change has taken place in the structure of a part so complex as that of the brain. Proof is given of this observation on page 40 ("Syphilitic Hyperplasia of the Pia Mater"). Had the man, in the case there mentioned, continued without treatment for another month, there is no question that he would have become a hopeless lunatic.

As far as prognosis in cerebral disease is concerned, unless you have great experience, be very careful how you form an opinion; for the most unlooked-for complications may suddenly, and do not uncommonly, arise, and totally upset all previous calculations.

The most skilful and most successful physician is certainly he who fully appreciates when, where, and how to apply the remedies at his command.

Having made himself sure, as far as possible, that his patient is suffering from syphilitic disease of the brain and nervous system, and having made himself acquainted with the nature of the lesion as to its diffuseness, its stage, and localisation, and also with the age and constitutional condition of the patient, the physician will, if he be wise, before turning his attention to specific remedies, bring very carefully under notice every faculty and function of the patient's body. I need scarcely refer to the special faculties, for the clinicist who leaves these unnoted must be dreaming.

There is a state of syphilisation—and this refers no less to the brain than it does to the other organs—where mercury especially, and iodide of potassium, are as hurtful to the individual as opium would be in the coma of uræmia. I refer now to the syphilitic lardaceous changes. These are not unfrequently found co-existent with gummatous cerebral changes, great depression of the sympathetic and vaso-motor centres. The urine will be highly phosphatic, probably passed in large quantities, and of low specific gravity, and containing an excess of urea, slightly alkaline and albuminous, and yet the deposit give no evidence of organic

renal disease. There will be functional hepatic derangement, cardiac depression, probably swelling of the lower extremities, hypostatic congestion of the air-passages of the lungs, and of the brain itself.

I preface the administration of the bichloride of mercury in these cases by giving, for three or four weeks, the tincture of the perchloride of iron three times a day, and half a drachm of the comp. powder of scammony in the morning, twice a week. Thoroughly nutritious diet, in small quantities, ought to be repeatedly given, every two or three hours. This is almost the only case in which I would advise stimulants to be used, and then but cautiously. Brandy will be tolerated in small doses, to the extent of four ounces in the twenty-four hours, with the greatest possible advantage.

If the albumenoid changes are of a syphilitic character, we shall soon find a marked improvement. There will be increased tonicity of the vascular and lymphatic systems, congestions will be relieved, the secretion of urine will be diminished, the albumen will disappear, and a healthy tone will be established. Then iodide of potassium may be given with great success. But in these cases my practice is to give the bichloride of mercury with bark for a few weeks, and subsequently, the iodide of potassium.

This treatment of elimination and building up when we have associated blood changes, as in albumenoid syphilis, in which the patients present the symptoms and signs just described, will prove of the utmost value.

In reference to the advantage to be gained by the administration of alcohol in syphilitic softening of either brain or cord, I would quote the case of one of my hospital patients, a young fellow of 30 years of age, who suffered from softening and degeneration of the spinal cord. There was a clear history of syphilis, and it was supposed from his own account that the disease commenced as a syphilitic meningo-myelitis. Albumenoid, visceral, and cutaneous changes were evident.

When I first saw him he was utterly helpless, somnolent, and confused in intellect. I prescribed for him strychnine and bark,

and 8 oz. of brandy in the 24 hours. In a few weeks he improved most markedly. At the end of three months the intellect became clear, and he had perfect use of the upper limbs, and increased power in the lower. I then ordered him iodide of potassium with ammonia, citrate of iron, and strychnine, and reduced the brandy to 6 oz. in the 24 hours. He continued to improve, but in a few weeks after this he passed from my care, and then the stimulants were suddenly discontinued, and he died in three days.

This case made a very strong impression on my mind, because it proved that in the low and advanced forms of degenerative changes of the spinal cord and brain, associated with the blood changes of syphilis, alcohol under certain circumstances must still remain the backbone of our treatment. When softening of nerve substance has set in, if nutrition and vascular tonicity are not supported in every possible way, death results from nerve and vascular depression, cardiac syncope, and collapse.

I maintain that it is utterly useless to endeavour to be empirical in the treatment of diseased states. Yet there are many of the syphilographic school who would have us believe that in syphilis, no matter so long as it is syphilis, mercury or iodide of potassium is at once demanded. I must say that my own practice does not bear out this conclusion; but if there be one thing in therapeutics, of which I am more certain than any other, it is, that mercury is the antidote to syphilis. But the term syphilis, as bearing upon diseased states, has a much wider significance than it had some few years since. There are physicians who are rash enough to replace syphilisation by mercurialisation, and who check the tendency to ptyalism and salivation by astringent washes. I cannot agree with this mode of procedure; a slight soreness of the gums is no indication that the patient's system is intolerant of mercury, and that it ought not to be given. I do not withdraw mercury at once under these circumstances, although I may alter the preparation. It will be found that patients will take that inestimable, but now almost discarded, pill of Plummer's, when other forms of mercury cannot be borne; or the combination of grey powder with quinine will answer well when the iodide of mercury is not tolerated.

I have never found any special advantages from injections, inunctions, or mercurial baths. (My remarks apply to syphilis as it affects the brain and nervous system.)

In several cases in which gummatous inflammation of the membranes of the brain has been known to exist, I have with my hospital patients adopted a mercurial course by inunction, when they have been surrounded by the most favourable hygienic conditions, and all means have been adopted which are generally considered beneficial to this course; yet I cannot say that I have noticed any special advantage to arise from it. To this, however, I must offer one exception, namely, in the hereditary syphilis of children, in which I have found mercurial inunction and iodide of potassium baths to answer most admirably.

After considerable experience, and much attention given to this subject, I am inclined to give the preference to the old-fashioned blue-pill, either alone, or in combination with quinine or opium, or a suppository of grey powder, and the butter of the cocoa-nut passed well into the rectum night and morning. These preparations rarely do harm, are nearly always tolerated, and seldom produce serious constitutional disturbance.

If there be a tendency to ptyalism, the mouth from the first must be kept clean, and washed out well five or six times a day with a solution of chlorate of potash and tannin; or what answers better in some cases is tannin with biborate of soda. If the submaxillary glands become tender, or there is a feeling of stiffness about the jaws, or increased salivation, then mercury must be given up. If absolutely necessary that it should be gone on with, quinine, generous diet, and fresh air will often put the patient into a condition to tolerate mercury, when under other circumstances rapid ptyalism would ensue.

We appear at the present time to have arrived at a period in the history of the treatment of syphilis when it has been conveniently settled that mercury plays its part in the primary stage of this disease, and iodide of potassium in the later stages; but they who have had extended experience must be aware, how fallacious this line of argument is. Of course, no one ever thinks of giving iodide

of potassium to cure a syphilitic roseola, and according to the foregoing school no one would think of giving mercury to cure rupia; but this doctrine is utterly erroneous. I maintain that there are certain manifestations of disease in association with mal-assimilation, which we are pleased to call syphilitic, when iodide of potassium and a mercurial course, as before mentioned, are fraught with mischievous consequences; and I refer now more particularly to the iodide of potassium, the therapeutic magician which is to conquer syphilis in any of its stages.

Well, I must admit—and I regret having to do so—that this charmed drug has not possessed, in my hands, that illimitable potency which many have ascribed to it. I have used it in small and in excessive doses, over a wide area, and for varying periods of time, and have with considerable care noted its effect in both functional and organic disease, and it has been only in the minority of cases that I have traced good results to its immediate specific action.

We know that some patients are more intolerant of this drug than others are of mercury, though the same constitutional state of rebellion is not usually associated. They who cannot take iodide of potassium can, however, take mercury with impunity, and *vice versâ*.

In order that iodide of potassium may be well tolerated, and productive of benefit, the tongue must be clean, the appetite good, and the nutritive and assimilative processes in fair working order. If such conditions do not happen to exist, means must be taken to produce them, by functional remedial agents. I have often used the iodide of potassium bath with benefit, when I have known that the drug was required, and could not be taken by the mouth. The bath was prepared, by dissolving half an ounce of the bicarbonate of soda in three gallons of hot water, and into this the patient was placed, the skin having been previously thoroughly cleansed with a hot bath of soap and water. After the patients had been in the bath of soda for two minutes, a two-drachm solution of the iodide of potassium was added, and in this they remained for about ten minutes. When they came out, the body was gradu-

ally cooled down, and a cold douche administered. I have never seen iodism produced by this mode. In other cases, I have adopted an analogous but different course. The patients have had their skins thoroughly cleansed with soap and water, and a pill of five grains of the extract of jaborandi given to them. They were then wrapped in a blanket, which had been wrung out of a hot solution of soda and iodide of potassium, and in this they were kept for periods varying from thirty minutes to one, two, three, four, or even six hours.

In painful neurotic affections of the peripheral nerves, chloral may be added with great advantage to the solution of the iodide of potassium.

I cannot here particularise as to those cases which require any special form of specific treatment, but certain it is that by practice one gets to know that the mode of application of a remedy is often of equal importance with the remedy itself. I think that we may, perhaps, really look upon this as a biological law of great magnitude, but which is somewhat beyond our ken, and may compare it with that well-known chemical law of Isomerism, in which we find an identity of elements and of atomic proportion, with a difference in the amount combined in the compound molecule, and of its essential properties.

Besides the mere specific treatment of syphilitic disease of the brain and nervous system, we must not lose sight of secondary conditions, which are common, however, to diseases of the nervous system in general, nor of the hæmorrhages, thromboses, and softening, which results do, in a more or less degree, require the same preventive measures and remedial agencies. We know, that a syphilitic growth of the dura mater, and more particularly of the pia mater, and of the brain substance, is always associated with vascular hyperæmia. I am not now referring to the stage of thrombosis, which is near allied to incipient softening, and which does not require a depletive course, as we shall presently see, but I rather refer to a congestive stage, both of the brain and cord ; and here, if we pay attention to the signs and symptoms, previously laid

down under the head of diagnosis, our task will not be so difficult as it may at first sight appear.

In the stage of congestion it is important that local bleeding, either by the application of leeches, or the cupping-glass, should never be forgotten, provided, of course, that the symptoms of increased heat and cerebral blood-pressure are considerably augmented beyond the normal.

The stereotyped phrase, 'shave the head and apply ice,' should be remembered; but I prefer an evaporating, strong spirit lotion to ice, for physiological reasons. Local blood-letting over the seat of lesion, the complete removal of the hair, and evaporating lotions constantly applied, are the best and immediate treatment for congestions. Should the lesion be at the base, then cupping at the back of the neck, or the application of leeches to the mastoid part of the temporal bone, should be resorted to. The head and shoulders should be raised, but avoid putting the body into a constrained posture. There should, as far as possible, be perfect rest of mind and body. Quiet, and the absence of strong light and sound, must be strictly attended to, no matter whether there be apparent intolerance or not. The lower extremities should be kept warm, and mustard pediluvia used once in the twenty-four hours. All stimulants must be avoided, but the patient must be fed often. Solid meat diet, with bread and milk, may be given; for, be it remembered, that we have not here the functional pneumogastric depression to contend with, which we have in hæmorrhages, thromboses, and general cerebral hyperæmia, and that stimulating the gastric vessels by an assimilable food acts as a derivate to a local cerebral congestion rather than otherwise.

Particular attention must be paid to correcting an arrest of functions, whether hepatic, renal, or alvine, upon recognised principles, and one must not be led away by the fallacious doctrine, that a clean tongue indicates a cerebral lesion, or that a furred tongue is due to chylo-poietic derangements. Promote sleep by the use of chloral in one full dose, and equalise the action of the heart by the use of tinct. of digitalis, and of the vaso-motor system of nerves by ergot, aconite, and bromide of potassium.

If epileptiform seizures should arise, with a tendency to excitement or delirium, then a full dose of calomel should be given, or croton oil, to act upon the bowels. The bladder must be well looked after, and the iodide of potassium must be given every four or six hours in full doses. But in those cases, in which the disease has advanced a stage or two beyond this, and where we have thromboses, small hæmorrhages, and softening, with fits of somnolency, and objective signs of paralysis, we then find a different constitutional state, and a train of morbid phenomena varying very much from that which has just been noticed, and I cannot see in what way the local abstraction of blood would be advantageous; at all events, this is the mode of procedure which I should advise, and I should look upon the continuous application of the ice-bag as pretty certain death to the patient. We shall have cerebral depression with all its signs and symptoms to combat. The action of the pneumogastric nerve will be arrested; there may be vomiting, irregular action of the heart and of the lungs, and more or less cyanosis from this cause. There may also be attendant convulsive seizures. The skin may be dry and of normal temperature, or, on the other hand, it may be cold, clammy, and moist; the lower extremities, also, will be cold. The course of treatment here is obvious enough, and, to a certain extent, will be the reverse of that which is applicable to the condition we have been considering. Where peripheral nervous and vascular excitation is indicated, mustard plasters may be applied to the nape of the neck, the epigastrium, or the calves of the leg. The stomach cannot digest, so leave it alone. Stimulants must be given cautiously, and the limit of their administration must be regulated entirely by the patient's state. The organic system of nerves must be kept in action, until the wave of cerebral depression has been tided over. When this occurs, and reaction has commenced, perhaps a little more activity on the part of the medical attendant may be necessary, but do not interfere too hastily; guide, and be guided by, Nature's processes, if possible.

In several cases of this kind in which the patient could not swallow, I have averted the tendency to death by the application

of the continuous galvanic current to the calves of the legs. Cerebral depression has been by this means relieved, the legs have been moved voluntarily, nourishment has been swallowed, and the patient's life saved. The following case is an example of the benefit to be derived from this treatment.

CASE XV.—*Syphilitic Softening of Right Anterior and Posterior Central Convolutions, the adjacent Convolutions being more or less involved.—Left Hemiplegia, Cerebral Excitation, and arrest of Death by the Galvanic Current.*

Mary A—— was admitted into hospital under my care on the 3rd of February, 1876. She contracted syphilis at the age of 27, and had suffered severely from its effects; but beyond this no clear history was obtainable. She stated that two years before I saw her, she had had severe pain in the head, and a series of epileptic seizures, and had gradually lost some (her own statement) use of the left side.

Shortly after her admission, on February 16th, at 10 a.m., she was seized rather suddenly in the middle of the day, with clonic convulsions of the left half of the body, including the face; the eyes were drawn to the *left*, with *right* opisthotonos; no marked loss of consciousness, however, but complete loss of voluntary power and sensation of the *left* side. Both motion and sensation of the *right* side were impaired sympathetically. At 3.30 p.m., she was quite unconscious, the convulsions of the *left* side being more marked and persistent. At 6 p.m., was in the same state; she could not be roused, neither could reflex movements be induced; the eyelids were well raised, and the pupils dilated; resp., 14, shallow and sighing; pulse, 166; no muscular rigidity or contrac tion of limbs.

17th.—Quite unconscious, clonic spasms of left side, hiccough. There is neither sensibility nor voluntary power of movement in any part of the body; there is hyper-reflex excitability of the right cerebral motor area. For instance, when the left side of the face is tickled, clonic convulsive movements are excited, not of the left half of the face alone, but of the entire half of the body; the pupils are now minutely contracted. Pulse, 170; resp., 30. An hour after this I found her in a dying state, coma was profound, and breathing stertorous. After putting the various points of clinical evidence together, I came to the conclusion that she was dying from cerebral depression (rather than compression) due to cortical

hæmorrhages, and I resolved to stimulate the brain through the peripheral nerves by the galvanic current, as I had previously done, with some success in other cases. The following shows the reaction. Strohrer's continuous current was used.

Facial muscles respond equally well on both sides to 10 cells :

Upper extremities { to 20 cells in 20 sec., right. / to 28 cells in 25 sec., left.

Lower extremities { to 20 cells instantly, right. / to 30 cells instantly, left.

Immediately after the galvanisation she was aroused to seeming consciousness, performed *quasi* voluntary movements, and swallowed nourishment.

It is of great, one might well say, of *vital* interest, to recall to our mind the fact, that before the galvanisation her cerebro-spinal system was inanimate. Now we find the following to be the condition :

Before the Galvanisation.	*After the Galvanisation.*
Pupils contracted.	Pupils widely dilated.
Profound coma.	Volitional consciousness.
Stertorous breathing.	Breathing not stertorous.
Pulse 170, small and fluttering.	Pulse 120, fairly good volume.
No reflex action.	Reflex action of *right* foot only.
Sensation completely in abeyance to pricking and pinching.	Sensation completely in abeyance to pricking and pinching.

Brandy and milk were administered. The urine was drawn off to 37 oz., and one drop of croton oil was given.

6.40 p.m.—Is conscious ; knows every one, and swallows freely, but has no voluntary power of the extremities, save of the right arm. The brain, however, is not sufficiently active to receive impressions, to generate ideas, or to produce co-ordinate movements—for instance, when asked to close her eyes or protrude the tongue, there is no response.

18th.—Has passed a quiet night, and taken nourishment—the special senses of sight and hearing are now in good working order. There is voluntary and co-ordinate movement of the *right* limbs, and partially so of the *left*. There is now, relatively, greater loss of motor power than of sensation on the *left* side.

19th.—Quite conscious and reasonable. 1st nerve normal. 2nd. Says her sight is better than before the attack—both discs

hazy, veins look large. 3rd and 4th. Normal. 5th. Anæsthesia of *left* half of face. 7th. Palsy of *right* facial muscles. 8th. No taste on the left half of the tongue. Respiration and pulse normal.

Temperature not taken. After this she got about, as she had done previously to the attack—a *left* hemiplegia only remaining.

About five months after this, on July 29th, she was seized with clonic convulsions of the *left* half of the body. Coma and stertorous breathing supervened, and she died. Galvanisation was not, on this occasion, resorted to.

The *post-mortem* examination was made with care, and the following notes were taken: There was hypostatic congestion at the base of the right lung only. The heart and valves were healthy. The aorta was not atheromatous. The liver was hardened, and patches of cicatricial thickening were found over the surface of the right lobe. The secreting structure of the kidneys was healthy, but the calyces were enormously dilated, the bladder hypertrophied.

Upon removing the dura mater, which had not adhered to the skull, it was found to be connected with the arachnoid and pia mater, and the substance of the central convolutions of the parietal lobe of the *right* hemisphere. It was much thickened, of a yellowish colour, and in connection with it the brain substance was softened, and also of a yellow colour.

Upon slicing off the hemispheres, the substance of the central ovale was seen to be remarkably pale, and nothing more was noted until the central ganglia were exposed. Then it was found that the *right* optic thalamus and corpus striatum had undergone atrophy; the former much more so than the latter. Yet upon section, there was no appearance to the naked eye of old standing or recent hæmorrhages, but a slight softening existed. The *right* crus was similarly affected. The *left* side of the brain was healthy. The arteries were uniformly thickened, not atheromatous. They were not examined microscopically. The pathology of this case is interesting enough, but it is only from a therapeutic point of view that I have here brought it forward. In looking it over from the beginning to the end, one is convinced, so far as one can be, that had not galvanism been applied, this woman must have died from cerebral depression and cardiac and pulmonary asthenia.

For my own part, judging from past experience, I am greatly inclined to advocate the employment of the galvanic current in any case in which we have a comatose condition with impending death, provided we are not sure of the existence of extensive hæmorrhage: *and I have little doubt that there are many persons who die comatose*

simply from cerebral depression inhibiting the automatic, cardiac, and pulmonary plexuses, and so inducing a condition of asthenia incompatible with vitality.

We will now consider a few other points in connection with treatment.

We have seen that iodide of potassium and mercury are almost, but not entirely, essential to resolve and promote the absorption of syphilitic inflammatory products. There are, however, some further conditions which we must not lose sight of. Hygienic measures in reference to mind and body are of the utmost importance, and anything which weakens the general tone must be at once altered. The mind must be relieved from all anxiety at any cost—over-study and close application to business are sure to be followed by serious consequences if persisted in. All tendency to fatigue must be shunned. The passion for sexual intercourse must not be indulged. Regular hours for eating, drinking, sleeping, etc., are as necessary as a plain, wholesome, and generous diet. The various functions ought not to be neglected. The morning cold baths, and the Turkish bath, should be used, but with extreme caution.

The circulation should not be interfered with by any undue excitement or depression, and the least headache should be regarded with suspicion, *and receive immediate attention.* Smoking should be strictly prohibited, unless under very exceptional circumstances.

With regard to the administration of alcohol, it would be unwise to lay down any absolute rule; in this matter we must be guided by our patient's constitutional condition. There are some states of progressive softening of the brain and spinal cord, similar to the one which I have noted, in which alcohol is indispensable to maintain digestive functional power and body heat, but in the more common classes of nervous diseases which may be called functional, and which are due, most probably, to vaso-motor disturbance, every form of alcohol ought to be given up.

There are, however, even here some few exceptions; and when such exist, if stimulant must be resorted to, I know of no more

wholesome wine than that of St. Raphael; it is rich in tannin and astringent principles, and contains a fair and equal percentage of alcohol. From four to six ounces may be taken with food during the day without exercising anything more than a tonic influence upon the nervous system.

It is of great advantage to keep the feet warm, by the use of cork soles and thick boots. The bowels should be kept open with a dose of Friedrichshall, or Hunyadi Jànos water, in the morning. Gentle horse and carriage exercise will be serviceable, to engender sufficient buoyancy of the animal spirits, and to promote normal functional activity. Change of air and scene may be necessary, but where it can be avoided let the patient be kept from Continental hotel life.

In the neuralgias of the fifth nerve apply hot solution of the hydrate of chloral (see paper by author 'On the Outward Application of Chloral for the Relief of Pain,' *Med. Examiner*).

The hypodermic injection of morphia is especially valuable for the dull wearying aching pains and muscular cramps of the extremities, which are associated with advancing sclerosis. Friction is of value in muscular atony, and the galvanic current may be used.

The value also of strychnine under such circumstances must not be forgotten, but the chief point of all others in treatment, is to make one's self sure of the exact conditions which are present. If this be not done, treatment will be worse than useless—it will be hurtful.

CHAPTER VI.

Hereditary Syphilis.

Concerning the heredity of syphilis, I think that no practitioner, at the present day, is inclined to doubt that syphilis can be conveyed to the fœtus, either through the male germ, or from the mother, at any period during pregnancy, or at any stage of the disease. Yet it is of interest to note, that the existence of substantive changes in the brain and nervous system, resulting from a transmitted taint, was not fully appreciated until within the last few years. In fact, the first case duly recorded in this country was by Dr. Barlow, in the Pathological Society's 'Transactions' for 1877. Graefe some years ago described the case of a child, less than two years old, in which a syphilitic new formation was found on two cerebral nerves (*Archiv. für Ophthal. I. Bd.* 1 *Abth.*), and Dr. Hughlings Jackson drew the attention of the profession to this subject in the *Journal of Mental Science*, 1875. The first clear case which came under my own observation was in the year 1874, and is here reported. It is, doubtless, a thoroughly genuine one of gummata of the brain and nerves, from congenital syphilis. Probably, before long, thanks to the investigations of Heubner, it will be found that many of the conditions which are now recognised as scrofulous are really due to albumenoid or protoplasmic nutritive changes, the result of arterio-capillary constriction which originated in syphilis. In due time, evidence will probably be forthcoming to show that these changes also occur in the lymphatic system, and that they are co-existent with the primitive states of fœtal life. If pathology is not leading us astray, our deductions at the present

time are of the greatest value and importance. The signs of hereditary syphilis, apart from the manner in which it invades the nervous system, have been so carefully studied and elucidated by Mr. Hutchinson, that it seems mere repetition either to examine or question them. There can be no doubt that his observations are usually received by the profession as conclusive evidence of the existence of the hereditary poison. Yet it has often occurred to me, in the examination of a large number of children, many of whom I have known to be syphilised, that, if we confine ourselves merely to the consideration of the cupped incisor teeth of the upper jaw, and an interstitial inflammation of the cornea, we shall not always be using our judgment aright, and we shall, probably, make an incorrect diagnosis. I certainly maintain, that we are not in a position to state that dental irregularity, apart from notching, means scrofula; whilst, on the other hand, I have no reason to doubt that the especial signs referred to by Mr. Hutchinson are indicative of syphilis.

I have seen the so-called scrofulous development of the head and jaw, irregular and regular notched teeth, to be the essential outcome of hereditary syphilis, and I have likewise seen them when no syphilitic taint could be detected; and this I know to have been the experience of a very large number of observers.

No one assuredly will be so presumptuous as to say that there are no cases to be found in which it it is not a matter of questionable certainty as to whether the condition be one of scrofula or of syphilis. How often do we see this uncertainty verified, in daily practice, by the result of treatment? Our little patients have all the signs indicative of scrofula; they are wasted, ill-developed, rickety, with enlarged abdomen, large cranial development, pinched features, prominent under jaw, thick lips, irregular teeth, some notched, others serrated, squat nose, corneal opacities, congestion of the coats of the eye, and retinal exudations, hair fine and scant, ears large, spine distorted, ulcerations of the skin and mucous membrane, intermittent diarrhœa, and enlarged cervical glands; but withal the intellect may be clear.

I put the question: Do we invariably find that these patients

improve upon the administration of so-called anti-scrofulous treatment, such, for instance, as cod-liver oil, the various preparations of steel, the dilute mineral acids, and chlorate of potash? I cannot say from my own experience that this has been the case. Here I would remark that a small quantity of grey powder every night, with iodide of potassium during the day, acts like a charm; indeed, but get the mischievous effect of taint subdued, and the normal nutritive processes rehabilitated, and then the cod-liver oil and steel not only will do an infinite amount of good, but they will effect an absolute cure. Such being the case, I will go a step farther, and candidly avow that, in my own opinion, scrofula is essentially the outcome of syphilis; and I believe that such has been the opinion of many other observers. M. Ricord and Mr. Erasmus Wilson have put forward a similar view. If we take the history of syphilis from the earliest time up to the present day, and allow ourselves to be guided by general facts, and if we be not blind to the evidence which pathology gives, and if, again, we be not too sceptical with regard to the deductions which may be drawn from the effects of treatment, I feel convinced that the growing weight of proof will be found in favour of this view.

Should there be a point in pathology of greater interest than any other, it is not so much the difference in structure between gummatous, scrofulous, or amyloid growths, as the association which often exists between them and their prime factor, syphilis. In the discussion on syphilis at the Pathological Society of London, in 1876, Sir James Paget, during his remarks, said: 'I would not venture to call the disease that may occur in a scrofulous person become syphilitic a hybrid one—and yet, perhaps, the term is not altogether wrong—but at least, I would call it a mixed disease, and hold that syphilis, inserted in a scrofulous person, will in its tertiary form produce signs which it may be very hard to distinguish from scrofula—signs in which the characters of scrofula and of syphilis are mingled, and (what is very important) which require that the treatment of scrofula should be combined with the treatment of syphilis, in order to produce a fully successful result.' After this statement, which does not, I must admit, support my

opinion, except in an indirect way—that is, provided it be true that a scrofulous person contracts syphilis, and that in the later stages of the disease such person suffers from a hybrid or mixed disease, which is neither scrofula nor syphilis, but which partakes alike of both—I would ask, what effect does this hybrid condition produce upon the offspring of the parents so infected? Do we get scrofula mingled with syphilis, or syphilis mingled with scrofula? or have we, on the other hand, a distinct and novel entity established? which I conclude we must have, if the words of Sir James Paget be correct. At any rate, it must be extremely difficult to say what condition may result from this hybridity, which is presumably the result of syphilis engrafted upon scrofula.

These three kinds of growth, Gumma, Scrofula, and Amyloidea, are more intimately associated in their nature than those of any other kind, and are the result of low inflammatory exudation changes, guided by a specific agency. They may be said to be a perversion of Nature's nutritive laws and selective capacity; and we can, I think, fairly well comprehend how in children, particularly in those born of intemperate parents, and the subjects of syphilis, we find a state of tissue—that is, of mucous nerve and other vascular textures—which is not normal, and in which the controlling power of the vascular and trophic nerves is first at fault; and then, secondly, a state in which the blood participates, resulting in every form of low inflammatory change, which may, of course, determine the abnormal growths which we meet with in the teeth, the eyes, the skin, nates, and viscera. In the last volume of the Pathological Society's 'Transactions,' 1877, I was much interested on finding a case ot congenital syphilis (the one to which I have previously referred, as reported by Dr. Barlow), involving the cranial nerves and cerebral arteries. Dr. B. frankly states, that the syphilitic nature of the disease was not diagnosed during life, but that tubercle was suspected. The case was that of a child, a boy aged fifteen months, and we are led to conclude that the little patient had no other signs of syphilis beyond those stated in the paper, namely, a sore bottom and frequent discharge from the nose. However, at the *post-mortem* examination made by Dr.

Barlow and Dr. Lees, evidences of syphilitic infiltration were abundant in the nerves and vessels. To quote Dr. Barlow's words: 'The nerves were very extraordinary. Both thirds at their superficial origin were swollen out into small conical tumours. There were also swellings in the fourth, fifth, sixth, seventh, and eighth pairs, causing considerable broadening of these nerves. There was very little difference on the two sides in bulk, though I presume there must have been a different amount of change in the two facial nerves for example, from the clinical differences which were observed. I have examined microscopically the third and fifth on one side. The first thing that struck one was the almost entire atrophy ot the nerve cylinders. Here and there, in some of the sections, were round bodies resembling corpora amylacea (altered myalin?). There was a most abundant infiltration of new cells with very fine stroma. This new growth was by no means most abundant in the interfunicular areolar tissue. It was, in fact, less abundant there than in the interfuniculi themselves, though it is to be noted that in the funiculi generally there was more of it at the periphery than in the centre.' Dr. Barlow then goes on to describe the changes in the vessels, which resembled those first described by Prof. Heubner, and to which I shall again refer when speaking of the pathology of my own case. I have rather lengthily referred to the pathology of this case, because it is certainly of some interest from a clinical, and of great importance from a pathological, point of view; and it is rendered most complete by some well-executed microscopic drawings. The following case is of more extended pathological interest.

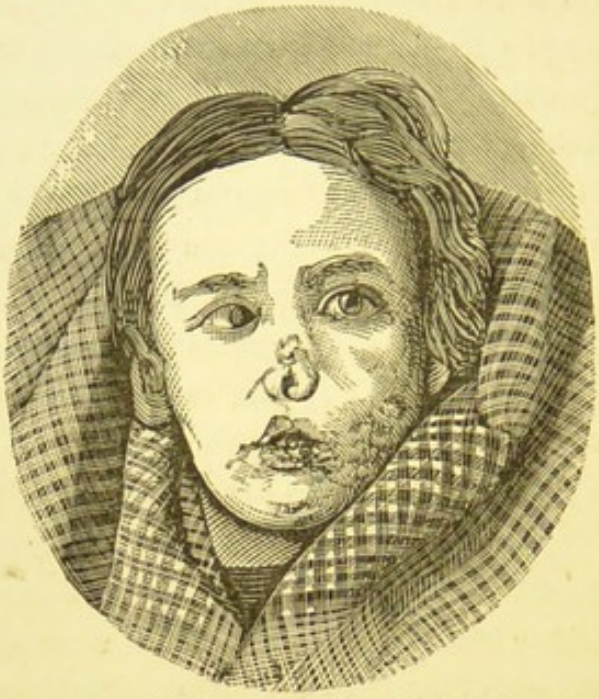
Case XVI.

G. D., a fairly-well nourished girl, æt. 12, was admitted into hospital under my care, November, 1874. She was one of four living children, none of whom were healthy. The father was a strong healthy man; he contracted syphilis when young. The mother was said to have died of phthisis, and to have had several miscarriages; she gave birth to seven children. The history is as follows: When a baby her health was delicate, and continued so until she was five years of age, when her eyes became inflamed, and there was an offensive discharge from her nostrils. She was then

placed under treatment, and her health improved. In the year 1872, she had a fit, and was unconscious for four hours. When consciousness returned, she was violently sick.

The next thing which ailed her was an ulceration about the alæ of the nose, resembling a tubercular syphilide. The ulcers were deep, of rapid formation, and attended with pain.

Around the ulcerated surfaces, there were numerous papular or tubercular elevations causing an indurated condition of the skin,



This woodcut shows very well the palsy of the *right* sixth and of the *left* seventh nerves, and the scars about the nose, with deformity.

the whole being of a reddish colour and shading off into the surrounding cuticle. The discharge was extremely offensive, and crustations were rapidly shed and reformed. After the ulceration had completely invaded and destroyed the soft structures at the tip of the nose, cicatrisation set in, and the ulcerative process in this respect was completely stopped.* After, and almost coincident with the healing of the nose (and this is an extremely interesting point), she began to suffer from severe pains in the head, which became worse towards night; she described them as dull and aching; they were confined more particularly to the sides and back of the head. Then followed a series of epileptic seizures,

* See case by the author in Clinical Society's 'Transactions,' vol. x., Case xxxviii., 'On a Fatal Case of Syphilis contracted from the Hereditary Form of the Disease.'

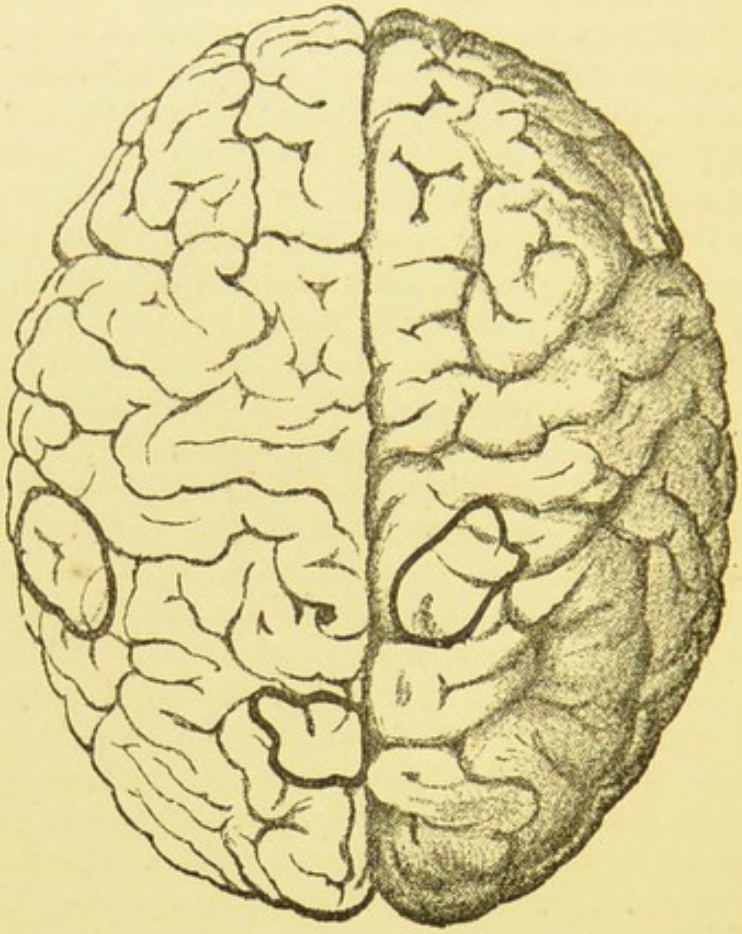
which were associated with mental and visual derangement. Upon one occasion she went into a room without any fire, and persisted in saying that it was full of smoke. At the time that she came permanently under my care, her facial expression might be called hideous.

In the first place there was deformity of the nose and complete absence of the sense of smell, an offensive discharge coming from the nostrils. 2. There was double vision, and, upon ophthalmoscopic examination, the discs were seen to be hazy, and their margins ill-defined; the arteries were contracted, and the veins seemed of normal size. There was a paleness, with some pigment spots upon the choroid. The left eye was remarkably immobile, the pupil dilated, and the whole of the globe was partially anæsthetic, the conjunctival and sclerotic vessels were intensely congested and dilated from vaso-motor paresis. The cornea was slightly opaque, not centrally, but toward the upper half. The third and fourth nerves of the right eye were not involved. There was marked anæsthesia of the left half of the face, and hyperæsthesia of the right half. The right sixth nerve was palsied. The left seventh nerve was completely palsied from disease of its trunk, and all the signs of this condition were present. The bulbar nerves were not involved beyond those just mentioned. There was no absolute muscular palsy or paralysis of the extremities beyond a feeling of weakness. The voice was weak, but the vocal cords acted freely; the teeth were regular, and presented none of the appearances usually attributed to hereditary syphilis. There was otorrhœa, with sanguinolent discharge from both ears. For days together she would lie in a state of partial stupor, apparently careless of all about her. At other times she was so giddy, that she was unable to walk across the ward without reeling, and then again she would have a series of epileptic seizures; these were associated with screaming and violence, not preceding the fit, but afterwards, as consciousness was returning. The aura commenced in the left arm and ended in the tongue, as though a number of needles were pricking it. During the violence of the fit, there was the most rigid muscular spasm; the right side was more convulsed than the left. Towards the close of her life she became aphasic, and said 'Yes' or 'No' to everything. At this time there was a partial paralysis of the right side. The sphincters were competent, but the normal mental attributes were wanting. Urine free from albumen and sugar. She died during an epileptic fit.

The *post-mortem* examination was made some eighteen hours after death. Upon removing the skull it was found to be of

normal thickness and free from erosion. The dura mater was easily removed from the surface of the anterior lobes, but, when the parietal lobes were reached, strong adhesions were found to exist in each cerebral hemisphere.

On the right side the growth was about the size of a shilling, and occupied the upper part of the superior parietal lobule. On the left side two distinct growths were found, one of which was seated upon the postero-parietal lobule, and the other upon the gyrus



This woodcut shows the seats of the gummata as found in the brain upon the superior parietal lobule, the postero-parietal lobule, and upon the gyrus supra-marginalis.

supra-marginalis. These growths were of like character, of a pinkish tinge, and firmly adherent to the dura mater, of which they appeared to form part, and from which they originated. They did not dip deeply into the brain substance, for their thickness was not greater than that of a two-shilling piece.

Upon microscopic examination, they were seen to be made up of the elements of a gumma without apparently having undergone any degeneration. In addition to these growths, the surface of the brain, in contiguity to them, had undergone softening, and was

of a yellowish-grey colour; the pia mater generally was deeply injected, and there was chronic arachnitis with effusion.

When the base of the brain was exposed, the vessels were seen to have an appearance similar to what we find from acquired syphilis. These were thickened, of a whitish colour, and semi-opaque; they remained open and gaping when cut through, like what one sees in atheroma and advanced fibrosis.

But upon microscopical examination the change which they had undergone was found to be quite dissimilar from either, and corresponded exactly with Heubner's description, which is now so well known and fully recognised. The lumen of the vessels was seen in some places to be nearly occluded by an accumulation of spindle-shaped cells between the tunica fenestra and the epithelial lining; and interspersed with these, but particularly in the muscular and adventitious coats, were to be seen an enormous quantity of a round-celled growth, which in many parts seemed to actually replace the normal structures. The nerves were not examined microscopically, but the left, fifth and seventh nerves were thickened, swollen, and of a tough but gelatinous character.

I have no doubt that if these nerves had been examined under the microscope, they would have presented the same appearance as those which have been described by Dr. Barlow. I regret very much also that the lenticular ganglion of the left orbit was not examined, as we might have found some changes to account for the peculiar features presented by the left eyeball. Nothing abnormal was detected in the thorax. Upon opening the abdomen the liver was seen to be considerably enlarged. It weighed six pounds eight ounces, and from its position must have exercised some upward pressure upon the contents of the thorax. It was pale, and gave the mahogany red reaction with iodine indicative of amyloid infiltration. The kidneys were large, pale and amyloid. The mesenteric glands were of normal size and appearance. I have given this case somewhat in detail because it is unique, and with the exception of Dr. Barlow's, none other has been reported in this country.

The question we have first to consider is: Was this child the subject of hereditary syphilis or not? We have only direct proof of this from the history of the case. Suffice it to say that the mother had several miscarriages, that all the children, and this one in particular, were extremely delicate, and if we had no further evidence than the pathology, it would be quite enough to set our minds at rest. It will, I am sure, occur to some physicians that if

these lumps in the brain, and the changes in the cerebral vessels, were really due to syphilis, why should there have been a large amyloid liver, and a similar condition of the kidneys, when gumma might have existed. Again, how much more likely is it for scrofulous masses in the brain to be associated with amyloid viscera than with gummatous growths.

But universal gummatous degenerations are rather the exception than the rule, in advanced syphilis, and especially in broken-down constitutions. This does not substantiate the doctrine of want of symmetry, which Mr. Hutchinson wished to establish as a sign to indicate that syphilitic manifestations, in the tertiary period, are not due to a blood disease, neither do I in any way wish it to do so; for, as long as there is anything in blood or tissue, let it be syphilis or its sequelæ, so long have we a general constitutional condition to deal with, and not a purely local manifestation. A weak point, however, may exist, or what, in other words, may be understood as the susceptibility of an organ from hereditary or constitutional predisposition, and on which syphilis, like any other blood poison, exerts a determining and specific action. Hence, we may find the brain to be the seat of syphilitic change in some; the lungs, the heart, the liver, the spleen, or kidneys in others; and I can only repeat the statement, expressed elsewhere, that the poison of syphilis, when found to have germinated in the nerves or nervous centres, is not, as a rule, associated with a reciprocity of kindred action in the thoracic and abdominal viscera. The reverse of this is the case in nodular, periosteal and cario-osteal syphilitic manifestations, and we may say, that amyloid fibroid or gummatous visceral changes are always more or less associated with them.

The next example of hereditary syphilis is one, which claims for itself an especial consideration.

Case XVII.

At the beginning of last year, I was consulted by a lady concerning her child, a little boy of 15 months old; he had been under medical care, and had taken steel wine, cod-liver oil, chemical food, raw meat, and such like. He was one of seven children, the rest of whom were healthy, but the teeth of all were

irregular, but not notched. At birth, this child did not snuffle, but two months after it was covered with some eruption. Beyond this, it grew proportionate to its age, until it was nine months old. At this time the teeth began to make their way through the gums, and then commenced a series of epileptic seizures. The child now lost flesh, its power of assimilating nourishment almost completely failed, and general functional derangement of necessity ensued. When he first came under my care, the most noteworthy feature was the excessive cranial development, with want of closure of the anterior fontanelle. Some five or six teeth were just visible. The hair was scant and fine, the eyes clear, and there was no sign whatever of ocular structural defect, except some haziness around the margins of the optic discs. There was a marked want of co-ordinating power in the ocular muscles, but the features were not so stunted as one often finds them to be, the gums were not spongy, the voice was weak and croaking, and there was that constant movement of the lips upon each other, with dribbling of saliva, which is somewhat indicative of micro-cephalic disease. Automatic co-ordinate movements of the upper limbs were performed, but not of the lower, and there was no power to stand or even to sit up in bed, and electro-muscular contractibility was normal. There was no spinal or thoracic distortion. The respirations were regular, but the deepness of certain inspirations, equivalent to a yawn, was noticeable. The spleen was considerably enlarged, but not so the liver. The bowels acted very irregularly, sometimes relaxed, at others constipated. The evacuations were acid, unhealthy, and of a pale colour. From the examination it was evident that the child had hydrocephalus, but it was not quite clear as to its origin. Yet the following evidence, and the result of treatment, will, I hope, supply any missing link.

I have stated that the child was the last of seven, the others being quite healthy and free from any of the usual signs of syphilitic taint. Some months previous to the birth of this last child, the parents met with serious pecuniary reverses, and were reduced from a position of affluence to one of almost poverty; and great mental depression on the part of the mother was the result. The father contracted syphilis when he was a young man. At the time of my first seeing this child the mother was complaining of not having been well for a long while. She often suffered from sore throat and nocturnal headache. One thing, however, was quite conclusive to my mind of the existence of syphilitic taint, and that was the well-marked bi-lateral psoriasis of the tongue. Upon this evidence I commenced to treat both mother and child energetically

and thoroughly for syphilis. For the former I prescribed 1-12th gr. of bi-chloride of mercury with half a grain of sulphate of iron, and one grain of extract of nux vomica in the form of a pill, to be taken three times a day. These were continued for three months, when her health was completely restored. For the child I ordered the mercurial ointment to be rubbed into the axillary, sub-maxillary, and Scarpa's spaces every night, and a hot bath of iodide of potassium and common salt to be used every other morning, and in which the child was to be completely immersed. Cod-liver oil was given. I had used a similar treatment to this in several cases with success where I had suspected syphilis, but in the case here quoted, its specific action was so progressively marked, that any suspicion I might have entertained as to the etiology of the hydrocephalus was completely set aside. In three weeks the spleen was reduced to its normal size, the bowels acted regularly, the evacuations were natural in colour and consistence, the child retained its food (which, by the way, was ordered to be of the most simple character), the convulsive fits with the startings at night had ceased, and the child, much to the mother's delight, was in a fair way for recovery.

The treatment was continued for three months, persistently, and at the end of that time the more important features of the disease had subsided; the head had not increased in size, but the body had, in proportion to the child's age, and the outlines of the optic discs were clear. Automatic and voluntary acts were performed co-ordinately in both arms and legs, several fresh teeth appeared, which were normal in type and regularity, the child could walk unaided, and the vocal resonance was normal. I saw this child very recently, it was then over two years old, and there was no return of the brain symptoms. The faculty of speech was backward, but becoming gradually developed, and he bids, as far as I can judge, to be a well-conditioned and intelligent being.

With regard to this case, I feel confident that no form of treatment but that adopted could have saved the child from becoming a helpless hydrocephalic monstrosity, and what I have especially to urge is: That we are quite unable in many cases to gain the slightest clue, either from signs, symptoms, or history, that our little patients are the subjects of syphilis; and when such is the case, I maintain, that it is our positive duty, no matter how far emaciation has advanced, not to neglect the thorough and complete use of anti-syphilitic remedies. I will add another case, to which I would direct attention.

Case XVIII.

A little boy, aged seven years, came under my care. His father had been a soldier, but died, it was said, of phthisis. His mother was a fair, strong, healthy-looking woman, who stoutly denied having any syphilitic taint. However, she complained of failing sight; sometimes objects would look double, at others she could scarcely see at all. Upon ophthalmoscopic examination, there were the remains of syphilitic retino-choroiditis, with black pigmentary patches to be seen. She also consulted Mr. Liebrich and Mr. Hogg, both of whom prescribed anti-syphilitic remedies; and the question came into my mind, how far her child's diseased condition arose from syphilis. To be very brief, his state was as follows: He was a delicate child from his birth; was not known to have snuffled; he was late in teething, walking, and talking. At four years old he was covered with an eruption upon the skin, and soon after this there was a discharge from both ears, associated with epileptic convulsions. When I first saw him, there was angular curvature of the spine in the dorsal region with multiple sinuses, and discharge from both ears, an interstitial keratitis of both eyes, very irregular, ill-developed teeth, without notching, enlarged submaxiliary glands, and great emaciation. The liver and spleen were large and amyloid. The head was well-formed, and the facial expression not indicative of either syphilis or scrofula. Yet we have a clear enough proof of syphilis, though under ordinary circumstances we should have designated the boy's condition as scrofulous. He certainly improved most under anti-syphilitic treatment, and my opinion is, that it was a case of syphilis; but I am sorry to say, that of this I have no further proof, as the child died rather suddenly of erysipelas, and no *post-mortem* examination was made.

It is satisfactory to find, that within the last few years our knowledge of diseased states by pathological investigation—I mean more particularly in reference to their intrinsic nature—has become more widely extended, and established upon a more solid basis than before existed; and if we compare the noteworthy discussions, which have been held on the pathology of tubercle, cancer, and syphilis, I think that no one can contemplate the vast collection of facts which has been brought forward, without feeling convinced that the rapid strides which have been made concerning the nature

and results of syphilis far outbalance, and are of much greater practical importance, than those of either cancer or tubercle.

It is to the future, however, that we have to look for the development of these investigations which are as yet, comparatively speaking, but mere embryonic germs; and I am sure, that even the greatest sceptic must feel proud of the grand position which pathology is beginning to hold in this country, and must wish every success to those who devote themselves to the study and extension of this department of medical knowledge.

CHAPTER VII.

Syphilitic Epilepsy.

In the present vague nomenclature of nervous affections, and especially of the term which heads this chapter, it is almost impossible to give a clear and intelligible definition of that which is now clinically demonstrable to us as epilepsy. But for all practical purposes we are inclined to build up our diagnosis upon the broad though ill-defined basis, which has received the sanction and support of most European authorities.

An impaired function, either sensory, motor, or of the two combined, cannot, strictly speaking, unless there be an impairment of volitional consciousness, be called epilepsy. The attributes of mind—thought, memory, and perception—are the essential factors of consciousness, and of the conscious Ego. A temporary departure from these states renders the individual, according to the degrec and suddenness of the attack, an epileptic, and more or less automatic in his movements.

The subjective signs and symptoms of epilepsy—whether they be made up of a simple, or a compound elementary derangement of the special faculties, sight, smell, hearing, taste, or touch—do not constitute epilepsy, for the reason that they do not interfere with consciousness proper—by this I mean 'reasoning consciousness.' The truism that all mental states have their parallel physical states is well borne out in the varying phases of epilepsy; but a lesion of the spinal cord, or even of the medulla oblongata, below the conjoint reflex cerebral vaso-motor and inhibitory

centres of the encephalon, cannot produce any condition which would fairly be embraced by the term epilepsy. But as we proceed from the medulla as a centre to the convolutional cortex, we shall find that an alteration in any part of this nervous mass, interrupting its stability or correlative integrity, will engender an epilepsy.

If experience serve us well, and if we are to understand an epilepsy to be what is here stated, I think that we are right in concluding that there is no part of the brain which cannot of itself be the seat, from which an epileptiform seizure may be generated. And I would here state as my opinion, that whenever we have a profound epileptic seizure, with bilateral convulsive movements of sudden invasion and speedy departure, leaving the patient free to act voluntarily (a condition, by the way, which perverts the normal functional activity of every nerve-centre in the body), then we find a true and proper epilepsy, whose seat is the medulla oblongata and pons, and of this all other forms are merely types and gradations. Such was the view of Shroeder van der Kolk, and is still held, I believe, by Reynolds, Echiverria, Nothnagel, and possibly by the majority of observers.

I do not know of any field of research more replete with interest of the highest order from an anatomical, pathological, physiological, and psychological point of view, than that which has been so carefully and studiously followed out by Dr. Hughlings Jackson and Dr. Wilks, in order to develop the idea which they alone in this country have promulgated, in reference to epilepsy ; and did I entirely agree with the doctrine which they expound, I should find little difficulty in drawing up a psycho-physiological scale of syphilitic epilepsy based upon sensory motor phenomena, and the result of the functional and organic impairment of those highest centres which are designated as the anatomical substrata of consciousness. But judging of epilepsy proper, from one anatomical standpoint previously noted, I can only say from what I have seen (and my field of observation has not been a limited one), that syphilitic epilepsy proper is an extremely rare affection, as the result of acquired syphilitic disease. On the other hand,

believing, as I do, that syphilis in its hereditary form produces an unstable and defective evolution of the nervous centres to a degree far beyond any other agency, I should hold that primary idiopathic epilepsies are more due to hereditary syphilis than they are to any other cause; and that in treating of epilepsy from acquired syphilis, which we choose to designate as such for convenience-sake, we shall, in fact, be only dealing with the petit mal of Trousseau, and the epileptoid seizures of Hughlings Jackson.

Doubtless in the experience of others the grand mal may have occurred, as the result of acquired syphilis; but, as I have said before, it is unquestionably rare, and is almost invariably associated with gummatous tumours or vascular changes of the pons or medulla. Does a brain epileptic (subjective epilepsy) constitute an individual epileptic (objective epilepsy)? I should say not. If it be so, there is no living being that is not an epileptic. Yet this is essentially the theory upon this subject of some writers, who would lead us to understand that, as every organ of the body has its special attributes or functions, simple, definite, compound, complicated, associated or combined, whether of the purely reflex automatic or of the higher sensorial centres, consequently any departure therefrom must be epilepsy. If this be true, the world is one mass of epileptics. The endeavour to draw a plumb-line, with mathematical precision, between relative psychical and physical states, is to try to do what is entirely beyond our power. The attempt, in past ages, to transmute the baser into the higher metals, was an act of equally worthy merit. Advanced biologists would have us believe, that nothing more is required than a master-mind, to unravel the tangled mass of scientific knowledge, and to show us that the natural laws of the universe are only biological exponents, originating, developing, and decaying, by a mere process of rule of thumb. The comparative anatomist traces, with his scalpel and microscope, the gradual developments of textural transformations from the monad to man, and, in his 'mind's' eye, he sees a spontaneity in the evolutionary processes, without a break from the purely automatic to the reasoning, the intellectual, and responsible being. Nothing in sooth, seems clearer than this, to his individual reasoning.

In fact, the scientific mind has of late years been swamped with psycho-physiological evidence of the functions of the brain and nervous system, which, although considered tenable to-day, are to-morrow scattered far and wide, leaving a barren but still fertile soil for new hypotheses and investigations.

I think I have pretty clearly shown in my writings on the pathology of syphilitic disease of the brain,* that in the great majority of cases syphilis attacks the membranes and the surface of the convolutions of the hemispheres. Several typical cases have been given by way of example, so that we can have no insuperable difficulty to surmount in trying to elucidate certain forms of evidence, direct and indirect, which will help to lead us to a correct estimate of the nature and causation of the epileptoid paroxysm which has a syphilitic origin.

Some authors have laid particular stress upon the shrill cry which precedes an epileptic seizure in syphilised persons. This point, in conjunction with others, may be borne in mind, but it will be found of slight relative importance in assisting us to form our diagnosis. M. Fournier, whose lectures on epilepsy at the Louvain in Paris, in 1875, received considerable attention, sums up his views on epilepsy as a symptom of syphilitic cerebral disease in the following manner:

'1. Absence of the shrill cry which usually announces the outbreak of an epileptiform paroxysm.

'2. Occurrence of paralytic symptoms immediately succeeding the fit.

'3. Incomplete or unilateral character of the paroxysm—thus there may be no loss of consciousness during the seizure, or only one-half of the body may be convulsed, and so on.

'4. The constant occurrence during the intervals between the attacks of cererbal symptoms in one form or another gradually increasing in severity.

'The previous history of the patient, as well as the age at which the disease first manifests itself, furnish most important data regarding the diagnosis, whilst the result of specific treatment should be taken into account.

* *Medical Press and Circular*, 1877-78.

'Epilepsy showing itself in an adult over thirty years of age, previously in good health, may, in nine cases out of ten, be looked upon as syphilitic.'

These deductions might very well have been taken, from the clinical history and pathology of cases, which have come under my own care, and to which I have drawn the attention of the profession.

I would here remark, that it is only by the most careful investigation of the details, that we can ever be in a position to state that an epileptic fit is due to syphilis; and we must bear in mind the observation of Dr. Sieveking, in his work on epilepsy; namely, 'that several of the diseases, which are commonly regarded as residing mainly in the nervous system, move into one another, and that the boundaries by which they would appear to be circumscribed by nosologists, are by no means so uniformly to be traced.'

It must be, I think, clearly understood, that acquired syphilis does not predispose a stable brain and nervous system to attacks of epilepsy, petit mal, or epileptoid seizures, unless under two conditions—namely, first from absolute organic change in the nervous substance (vessels included), and secondly where albumenoid syphilis has so impaired the vaso-motor centres and vascular functions of repletion, exchange, and repair that the blood becomes not only attenuated, but loaded with effete products. Perhaps, however, this latter statement is open to question, for, on looking over my records of several such cases of genuine epilepsy, I find, that the history has been connected with habits of drunkenness and debauchery—thus rendering a stable brain very unstable. On the other hand, I have found in unstable brains and nervous systems, in which there has been an hereditary predisposition to neuroses and epilepsy, that acquired syphilis has in the secondary stages, and for some years subsequently, actually relieved the patient from the epileptogenous tendency, which, however, in the later stages of the disease has returned with tenfold virulence. And I would here allude to another cause of epilepsy the result of syphilis. A man may meet with an injury to his head from an

accident more or less severe, and, should he be the subject of syphilis, it is quite probable that he will during the inflammatory process suffer from true epilepsy, which had he not been syphilised would not have occurred. I have met with several such cases; and what is more, the epileptic habit has become confirmed and been transmitted to the offspring. Such points, as these, are points of fact for observation, and supply undeniable evidence to guide us in our mode of treatment.

We know that idiopathic epilepsy is much more general in infancy, in childhood, at the age of puberty, and in advancing life, than it is between twenty-five and forty-five years of age, so that it is only reasonable to infer that, should a man in the prime of life be seized suddenly with epilepsy without any hereditary or predisposing cause save that of syphilis, syphilis should be its origin. When this is the case I always look upon it as one of the gravest and most serious manifestations, and, in all probability, as merely the exponent, either of commencing, or it may be of advanced, cerebral degeneration, which has escaped recognition.

The interference with associated volitional sensori-motor and intellectual co-ordinate processes is always the precursor, either of an epileptoid or epileptic seizure of syphilitic origin. The somnolence of cerebral depression and the molecular inertia of the sensorial centres of uræmic epilepsy, differ essentially from the sudden collapse of the integrity and stability of the sensori-volitional co-ordinating forces, which engender the storm of a true idiopathic epileptic seizure. The exuberance of animal spirits, and the high tension which are often found before a seizure, in the confirmed epileptic, have not, in my own experience, existed where the malady had its origin in syphilis; and the epileptic seizures of infancy and youth when carried into old age must be looked upon from an essentially different pathological, if not physiological, standpoint.

In plain language, then, there is no single intrinsic element or sign, either subjective or objective, in connection with true epileptic seizures, which will enable us to say that an attack is due to syphilis. But when our observations are extended to what may

be termed the epileptoid series (sensori-motor functional derangements arising chiefly from organic causes), then, we have opened to us an illimitable field of investigation.

It would be going over ground previously trodden to treat of the varying signs, which accompany cortical degenerations of the convolutions, with their attendant mental and physical disturbances, for they have been fully detailed in my published cases on the pathology of syphilis. And in these we find phenomena which combined can only be considered, in the light of cumulative evidence, to constitute a type upon which anything like a definite diagnosis can in any possible way be founded.

In the consideration of cerebral epilepsy associated with epileptoid involuntary muscular movements, we are certainly in a position, through our studies of psychology and its bearings upon physiology and pathology, to state with a fair amount of accuracy, whether the condition with which we have to deal arises from the disturbance in the reflex vaso-motor, or inhibitory cerebral centres; or whether, on the other hand, it is due to an intrinsic neurosis, or to some organic change, either in the heart, the blood-vessels, the neuroglia, or the nerve-cells.

In enabling us to draw deductions, with a fair share of accuracy, from a biological calculus so concrete as that of the brain, we must admit that much light has been thrown upon the subject and great aid given by the high-class researches of Dupuy, Hitzig, Brown-Séquard, Charcot, Ferrier, Jackson, Broadbent, Darwin, Huxley, Spencer, Bain, and other labourers in the same field of science; and that much has been done since the writings of Gall and Spurzheim, to elucidate more completely certain evolutionary processes, and problems of gross motor functional areas; and yet, our knowledge of the higher functions of the brain, in reference to their exact nature, their origin, and the part they play, is as crude as was that of those observers.

As far as pathological proof goes, there can be little doubt that in the majority of cases epileptoid seizures (whether they are or are not associated with mental defects) are due to convolutional functional irritability resulting from actual organic change.

In true epilepsy the reverse obtains, and the convolutionary functions are merely inhibited, not locally, but in most cases suddenly and completely, and the brain cells after the check is withdrawn rapidly regain their normal functional activity. In watching carefully a series of convulsionaries (I use the term to indicate those who are the subjects of any involuntary muscular movements) one is astonished at the varying features to which different conditions of the brain give rise. It is one thing to build up the volitional from the automatic. But it is another thing to see a highly wrought brain, with a human perfectibility of instinctive faculty, gradually losing power of thought and will, and those attributes of a reasoning creature, of which man is the archetype of all created beings.

If it were possible for us to build up and destroy at will the several functions even of gross individualities and types of brain species, what a grand unveiling and unravelling would there be, and what eagerness on the part of scientific men to make and complete a work which is now and ever will remain a cosmic biological puzzle! It would be better to continue in our present stage of ignorance, than to assume with some wild brains of this nineteenth century that we have all light and all knowledge of a subject so complicated and so profound.

Every thoughtful brain plays a part towards the unveiling of the mystery, but the illimitability of nature will never receive definition from those whose ideas of biology extend no farther than the scientific workshop.

What a discovery, says one, So-and-so has made; he has found out that there is force in a ray of light; that the rheophore of a battery applied to definite parts of the brain will cause a monkey to blink, wink, or squint; to dance, hop, skip, or jump, to phonate a falsetto, or contralto; that a decapitated frog will swim with its head upon its back under certain stimulus—that the movements of the heart are controlled by the pneumogastric nerve, and that certain mental aberrations known as melancholia, dementia, delusions, illusions, and so on, can be engendered at will by those drugs which determine vaso-motor action. What advances science

is making! Quite so. The wars even of the elements must soon succumb to the control of man, and nothing will remain for him to do but to devise means, whereby he may walk upon the seas, float in the atmosphere, and propel himself at will a hundred miles an hour. And even were all this realised, where would man be? Just as far from the solution of the mystery as ever.

Should anyone wish to make himself acquainted, with a broad common-sense, and comprehensive view of the relationship between psychology, physiology, and physical pathology of the brain, he would do well to study the writings of Hughlings Jackson on epilepsy. And not merely to read, but carefully to digest them, for they show an anatomical consideration of the relation between the physical and metaphysical, from a purely clinical aspect, without a knowledge of which, I maintain that reasonings and comparisons, upon the great question of cerebral biology, are simply abortive, unsound, and unphilosophical.

The question of the existence of subjective epileptoid inherent brain states, is made manifest to the physician through compulsory mental agencies. We test for the development of this subjective phenomenon, with as much accuracy as the mere physicists or medical rubber would test for the calibre or strength of a muscle by the dynamometer or galvanic current, in order to generate a given amount of volitional as distinct from automatic force. A muscle or a group of muscles, when subject to automatic movement, responds purposely as far as the automatism of the spinal centre is concerned. But when volition is brought to bear upon them under certain states of irritability, convulsive movement and tremor defy volitional central controlling power, and we have a 'spinal epilepsy' as the result, so that I would put it thus: Subjective epileptic cerebral states bear the same relationship to mind that volitional muscular movements do to the automatism of the spinal cord, in the production of spinal epilepsy. Yet, considering the co-relative integrity between the two, we can trace with a fair amount of precision the beginning and the ending of either in distinct grades or strata until a profound epileptic sensori-motor fit is engendered. Hence a vague nosology has arisen, and we

find the different terms in daily use—as catalepsy, chorea, hysterical epilepsy, hysterical mania, epileptic mania, and so on.

In making a diagnosis as to whether an epilepsy is syphilitic or not, we have first to consider one of the most important divisions of epilepsy, namely, the division between that class of epileptics in which the mind between the seizures is unaffected, as we find to have been the case with men of the greatest courage and mental power (Cæsar, Napoleon, Petrarch, Pio Nono, and many others); and the other class in which there is more or less mental derangement between the attacks. I am quite convinced that syphilitic epilepsies belong essentially to the latter. The mental disturbances may be of the slightest possible degree, or they may be of a more exalted and definite type.

As we have noticed in writing of 'The general paralysis of the insane,'* we find that during the epileptic attacks of syphilised patients there is, for the most part, an utter inability to develop the higher mental faculties—to reason—to think—to act with purpose. There is no power to co-ordinate those intellectual processes, so necessary for the generation of ideas. But this becomes still more apparent when another factor is brought into play, namely, volitional muscular movements of the highest and most complex kind, and the movements which are the exponents of articulate language. This is very easily demonstrated by causing the patient to go through a multiplication-table; mind and muscle work co-ordinately up to a certain point, but when volition is brought to bear upon mind, memory is lost, articulation becomes a mere jumble, and we have a temporary state of aphœmia, aphasia, and agraphia—in fact, an epileptoid seizure. The epileptogenous zone exists within the brain, and not without it.

In such cases as these, which certainly belong to the group of convolutional epilepsies, I have been enabled to induce a seizure at will. But there are other signs of commencing mental disturbance which are perhaps of greater importance than those just mentioned, for this reason that they may be easily lost sight of or not recognised at all. I refer to changes in character and dis-

* *Medical Press and Circular*, 1877-78.

position, either slight or profound. As Nothnagel says, 'The patients become gloomy, out of humour, depressed or violent and irritable, nervous, distrustful, easily angered. Or the disposition is changeable, often without any appreciable reason.'

It is in cases of this nature that our prognosis must be extremely guarded, and the most careful treatment compulsorily enjoined. To make use of the words of Griesinger, 'The memory decreases, the imagination grows dull, the fancy loses its richness of colouring, its intensity and warmth, and the spirit becomes withered. Do not let me be understood to infer that all cases, such as are here indicated, belong essentially to the class of syphilitic epilepsies. I merely go so far as to say that it is from these, and I might almost say from these alone, that we find epilepsy the result of syphilitic constitutional disease, associated with more or less diffuse arterial changes.

On the other hand, as we well know, a definite and distinct neoplasm of syphilitic origin may exist, and give rise to epileptoid seizures without interchange of mental disturbance; but this is exceptional. Again, I have seen some few cases of marked syphilitic origin where sensory manifestations appear to have been alone implicated, and where the mind has been quite free between the attacks, and patients have recovered under anti-syphilitic treatment, though during sleep they have been subject to decided epileptic seizures. No writer seems to lay so much stress upon this point as Trousseau. Minor epileptoid seizures may occur during the day, and confirmed seizures take place alone during sleep. I well remember the case of a man, aged 43, who was sent into hospital and placed under my care, and who was said to be suffering from kidney disease. The urine was highly albuminous, plentiful in quantity and phosphatic, but no signs of organic renal change could be found.

He was somewhat pale, and, as the nurse expressed it, 'very strange.' His legs and arms bore scars of old syphilitic ulcerations, and he stated that he was syphilised when a young man. One night he got out of bed and deliberately took the poker from the grate, began smashing the windows in the lavatory, and ended

by inflicting severe scalp wounds upon several men who tried to restrain him. When he was seized and disarmed, he denied having any knowledge of what he had done. The next night he was watched, and, almost at the same hour, he had a confirmed epileptic seizure, after which, he was proceeding to go through again the performance of the previous night, but was of course checked. He denied any knowledge of ever having had a fit of any sort. Prolonged anti-syphilitic treatment cured him. Cases somewhat similar to this could be detailed in numbers.

The following case of sensory abortive epilepsy, of apparently syphilitic origin, is extremely interesting.

Case XIX.

C. A., a man of literary attainments, thirty-three years of age, came under my care for what he termed 'strange sensations.' He was a highly intellectual man, of temperate habits, and had contracted syphilis when young, and he was inclined to think that he had never got rid of it, but that previously to this he had enjoyed excellent health. At the age of twenty-nine, he began to suffer from attacks of headache, vomiting, and a sense of numbness of the entire *right* half of the body, but consciousness was scarcely if at all interfered with, neither was voluntary power. The fit commenced with dimness of sight, leading to total blindness of the right eye—there was diplopia during the seizure, but, immediately preceding it, there was hemiopia (no retinal change). There were no formications, but the right half of the tongue became numb, as well as the parts supplied by the sensory division of the nerve and pharyngeal plexus. Taste and smell were both lost on this side, and saliva flowed freely from the mouth. Then the tips of the fingers of the right hand became numb, and rapidly the whole of the right half of the body became involved. This condition usually lasted for twenty or thirty minutes; the numbness departed, inversely to its arrival, and left the tongue last. Between these attacks he said that he felt all right, except that he was a little confused in his mind. At times the attacks are succeeded by vomiting, at others by severe purging and abdominal cramps. The right half of the body, during the fit, is colder and paler than the left, and at ordinary times there is slight impairment on the side of tactile sensibility, and of the special senses. He denied ever having had a fit, neither had he found his tongue bitten, or his body

bruised when he awoke in the morning, but the pillow was always wet with saliva. I had him watched carefully at night, and there was no doubt whatever about his being the subject of epilepsy during sleep, but of this he was quite unconscious. I ought to have stated that during the seizure he was unable to swallow or take a deep breath, and felt as though 'his heart was in his mouth.'

This case of abortive epilepsy of syphilitic origin, with hemi-anæsthesia, if it had occurred in a woman, would have been relegated to the uterus or ovary, and be termed hysterical or ovarian, or relegated to a tumour of the centrum-ovale, involving the opti-thalamus. Iodide of potassium, in two-scruple doses, every other night, with Donovan's solution three times a day, cured him.

From records of 274 cases of epileptiform seizures of an undoubted syphilitic origin, I will here, very briefly, summarise my observations :

The age of the patient is an important guide. Should a man or woman be attacked by epilepsy between thirty and forty years of age, without having any hereditary predisposition, or a previous seizure, then a syphilitic cause may be apprehended. And, apart from this, provided that between the attacks there is more or less mental derangement, our basis for a diagnosis is greatly simplified, and it is even more so, if there be a paresis more or less profound, localised, or unilateral, but gradually passing off after the epileptiform seizure. The reflex processes are rarely if ever completely absent. The iris may contract under the influence of a strong light; the lips close when the conjunctiva is tickled, and a state of subconsciousness, rather than of profound coma, is a prominent feature from first to last.

The stages of the attack are ill-defined, and merge the one into the other. The universal tonic spasm, with thotonism, rarely presents itself. Pallor, rather than cyanosis, is the facial exponent, and the duration of the fit is protracted sometimes to many hours, with intervals of wandering, delirium, and excitement. Foaming at the mouth is less common, in these cases, than a profuse flow of saliva, and all sorts of cries are associated with the seizure; but

they are rarely so exalted as Romberg expresses them, 'Shrill and terrifying to man and beast.'

And lastly, in reference to albumen in the urine. I have given considerable attention to this point, and I have failed to find it present in any but a few of the cases; but epileptoid seizures, associated with albumenoid syphilis, and a plentiful secretion of phosphatic albuminous urine, are not uncommon.

CHAPTER VIII.

Pathology.

The inflammations resulting from the morbific agency of the virus of syphilis are distinguished by their own especial and peculiar characteristic features, and are evinced by their localisation, their distribution, and their course. We might more appropriately than in any other forms of inflammation, designate these as disturbances of nutrition. Mr. Hutchinson says 'that so peculiar are the products of syphilis that one is almost inclined to speak of new growths rather than inflammation. From beginning to end, from the chancre to the latest tertiary gumma, the tendency to cell growths is most remarkable, and the production of a solid palpable mass, often very firm, is a characteristic feature.' The gumma is a specific product of syphilis, and according to Virchow, may be either hyperplastic or heteroplastic. Its descriptive features are well represented by Rindfleisch. He says, 'Its specific anatomical character does not reside in any marked deviation of the gummatous tissue from the familiar types of inflammatory growth, but rather in the circumscription of a more or less spheroidal nodule in the midst of a larger deposit of newly-formed embryonic tissue, a nodule which differs from the embryonic tissues round it, in the farther course of its metamorphoses.

For while the latter undergo conversion into fibroid tissue, forming a cicatrix characterised by a tendency to extreme contraction, the former retaining the circular form of its cells, and occasionally producing an anastomotic network of corpuscles, materially

undergoes a necroid transformation of its intercellular substance. The cells grow fatty, and their place is taken by round or stellate aggregations of fat granules, which appear to be capable of lasting as such for long periods of time. The final result is a yellowish white-rounded nodule of a soft and elastic consistency, embedded in a deposit of newly-formed connective tissue. This is the specific tumour of syphilis, the 'Tophus or Gumma Syphiliticum.' *We constantly observe in some cases these syphiloma to have peculiar and essential properties*, namely, rapid development, and equally rapid absorption, either with or without medication, and non-tendency to suppuration. Now, the essential gross pathological features of syphilitic lesions of the nervous system include :

a. The inflammatory thickening of the membranes of the brain, spinal cord and nerves. This thickening may originate in the lining membrane of the osseous system, with which these structures come into contact.

b. The invasions of the neuroglia, or connective tissue, by a diffuse form of gummatous infiltration, which may be the result, primarily, of disease of the circulatory system, or alterations of the fluids circulating within the vascular channels of the nervous tissue. This latter condition gives rise to albumino-fibroid changes—more especially in the white nerve substance, and is often associated with a low form of inflammation of the membranes.

c. The appearance of syphilomatous masses, which masses often occur singly, but may be numerous. Their seat may be over the surface of the hemispheres, and I have usually found them in the upper convolutions of the anterior lobes, or they may occur at the base. At any rate, they are to be seen almost invariably at the cortex, and closely united with the membranes. They extend into the surrounding tissue, which is generally found to be softened, hypervascular, and of a faint yellow colour. When examined they present the appearance which has been previously noted, and the nerve cells and vessels give evidence, under the microscope, of the usual degenerations consequent upon vascular occlusion.

In reference to syphilitic disease of the vessels of the brain, Dr. Heubner, of Leipzig, has published some very interesting and im-

portant results of his investigations, which are original. He divides these results into three stages. The first details the anatomical appearances ; the second the organisation of the new formations ; and the third treats of the degeneration of these formations. In the first the peculiar feature appears to be the aggregation of small cells or nuclei, which are observed lying under the normal lining layer of epithelium ; and between it and the membrana fenestra, the tumour continues to grow, arranging itself around the lumen and narrowing it, but itself becoming compressed to form an eccentric layer, so that it is long before complete obliteration occurs, and thrombosis is rare on account of the obstruction. He goes on, however, to state, that in the third stage of the affection the artery may be completely occluded, by the nuclear proliferation, and the cells disappear from the inner layers of the new formation. The cells of the muscular coat atrophy and disappear, and in place of the circular fibres, there is only a network of elastic fibres enclosing detritus—even this becomes absorbed, and in the place of the artery, is left a slender fibrous thread, which is torn by the slightest manipulation. Such a condition as this, by interfering with the normal tension of the vessels, alters in a great measure the proper functional activity of the brain, and, by retarding the blood supply, causes defective nutrition and oxygenation, as well as probable retention of waste products, in the lymphatic spaces. It is very easy to understand, that the existence of this pathological change may give rise to all forms of impairment of brain power. Dr. Heubner draws his own clinical conclusions, which certainly deserve very favourable consideration.

Admitting that we have three definite stages of syphilis, which follow each other in their mysterious actions upon the human body, it is a question of some pathological interest to ascertain whether syphilis affects the nervous system in any other than that which is known as the tertiary gummatous, or tertiary stage of sequelæ. We have sufficient evidence to prove, that anomalies can exist in the manifestations of these so-called periods or stages, and for this reason, and this alone, I maintain that it is impossible to be geometrically precise in our statements ; but this much can be affirmed,

that a true gumma of the brain has never been found co-existent with true syphilitic roseola. Yet, on the other hand, I have found hyperplasia and adhesion of the membranes in five cases, in which I have had the good fortune to obtain *post-mortem* examinations, whilst the eruption has been freely diffused over the surface of the body. From these cases and others, which I have seen in my own practice, I am willing to support a doctrine that a syphilitic inflammation (hyperplasia) does often exist in the membranes of the brain, during the *second* stage of syphilis; and that gummata are not found in the brain during this period, but that they co-exist with the true tertiary stage; although, be it remembered, that gummata in the liver, spleen, heart, and testes have been found in the secondary stage, and duly recorded by many observers.

It is impossible for us to say, with any degree of certainty that can be of practical value, or, at the least, of scientific importance, at what period after inoculation, lesions of the nervous system, if they occur at all, may with some probability be anticipated. Independently altogether of the weight of pathological evidence, in favour of syphilitic disease of the membranes of the brain, in the secondary stage, we are to some extent supported inferentially, by the objective signs, which we know do exist not unfrequently in structures, which are of somewhat similar histological texture, markedly those of the eye, the iris, the hyaloid, the retina, and the choroid. The same changes occur in the tunica vaginalis, testes, and the serous envelope of the liver.

Mr. Hutchinson says, that he suspects that the little tumours seen in the iris and choroid are analogous in all respects to gummata, but I think that this is questionable. Dr. Hughlings Jackson and Dr. Buzzard have each recorded cases of paralysis, which have originated at the same time with the secondary stage of syphilis, and which they consider to be caused by the agency of the syphilitic virus, but I believe the credit of first pointing out the association of nervous affections with the early stages of syphilis is due (as Zeissel states) to Dr. Krone of Hamburg.

The following abridged notes, taken from my case-book, are

illustrative of syphilitic lesions of the membranes of the brain during the secondary stage of syphilis.

CASE XX.—*Syphilitic Cerebro-Spinal Meningitis.*

A. G., æt. 19, was admitted into the Central London Sick Asylum, on Nov. 3, 1875, and died on the 10th of the same month. She was a prostitute, and had contracted syphilis about two months previous to her admission. The body was covered with syphilitic roseola, and in addition, the extremities were so painful, that she could not bear anything to touch them. There was muscular hyperalgia, and cutaneous hyperæsthesia, but the dull aching pains, with feelings of heaviness in the limbs, which always became aggravated intensely towards night, were exceedingly typical. The attack commenced gradually, and not suddenly, and with rigour, as in ordinary cerebro-spinal meningitis; there was marked prostration, and inability to keep the head erect. The pain in the back of the head and down the spine was agonising, and the slightest movement of the body, but especially of the head, produced the utmost torture. *There was no rigidity of the muscles of the neck, or tonic spasm to draw the head out of the median line.* There was palsy of the external rectus of both eye-balls, and slight ptosis of each eye-lid; the pupils were widely dilated, but there was no intolerance of light, and what seemed peculiar, the temperature never rose above 100°. Urine sp. gr. 1,010, free from blood or albumen. Twenty-four hours before her death the pulse rose to 160, but the temperature was *normal.*

At the *post-mortem* examination, upon the removal of the brain, it was found that the membranes covering the pons, the anterior part of the medulla, and the inferior vermiform process of the cerebellum, were converted into a gelatinous-looking mass of fibro-corpuscular material of low organisation, but beyond this localised change the membranes and substance of the brain were of normal appearance, save a commencing softening of those parts contiguous to the inflammatory changes.

CASE XXI.—*Secondary Syphilis—Cerebro-spinal Meningitis.*

M. A., æt. 27, a stout vivacious-looking woman of dark complexion, was admitted into the Central London Sick Asylnm on the evening of the 10th of June, 1875. She stated that she was of intemperate habits, and that she had been leading an irregular life for many years. About two months before she came under my care, she had contracted syphilis, and when I first saw her, she

was covered with a syphilitic roseola, and the throat was much ulcerated. She complained of intense aching pains, and feelings of heaviness in all the limbs, which became aggravated towards night. She was quite unable to walk. Her legs became (as she expressed it) excessively weak and shaky, and in a short time the lower limbs were numb and almost immovable. On the following day the upper limbs became similarly affected, and the thoracic muscles were so involved, that a deep inspiration was impossible. There was cutaneous hyperæsthesia of the whole body, and severe muscular hyperalgia, besides dull aching pains confined almost entirely to the occipital region, and transient dimness of vision with diplopia. The intellect was generally clear, but at times there was a passing mental confusion. There was no spasm or rigidity of the muscles of the neck, no intolerance of light, but at times there was persistent vomiting. The temperature ranged in this case from 99° to 104°, but was notably variable. The sensibility of the lower limbs was fugitive, erratic, and obscure. At one minute, she seemed to appreciate the sense of touch, and almost directly after, it disappeared. Her condition remained the same as described, until the 4th of July. At this time, the pulse and respirations increased in frequency, there were spasmodic twitchings of the limbs and facial muscles, and the paralysis of the intercostal and thoracic muscles markedly increased. A low form of muttering delirium set in, and she died on the 7th of July.

At the *post-mortem* examination, on the removal of the calvarium the dura mater was found to be healthy, but over the convolutions of the hemispheres the arachnoid and pia mater were seen to be partially adherent. I say partially, because they could be dissected from each other with some degree of force, and appeared to be united by an ill-organised inflammatory exudation.

At the base of the brain the condition of the membranes was somewhat different to that over the hemispheres. Here, as in the case before noted, was a mass of fibro-corpuscular material of a softish colloidal appearance, which, to my mind, was evidently the result of a specific inflammatory change.

CASE XXII.—'*Syphilitic epilepsy — Albumino-fibroid syphilitic changes—Albuminuria—Convergent squint—Pseudo-right hemiplegia, more of sensation than of motion.*

The interest of this case consists in its being essentially syphilitic. The roseola eruption over the body was fading, becoming copper-coloured and desquamating. There were several baggy circum-

scribed swellings over the scalp, and the hair came off plentifully. The patient had several epileptic seizures, and at times her reason was slightly affected.

M. A., æt. 26, was admitted into the Central London Sick Asylum, September 14th, 1876. She stated, that she had contracted syphilis four months previous to her admission, and that she had rash and sore throat about three months after. Before this, her health was excellent. There was no history of fits. At this time her appearance was peculiar. She had a heavy expression of countenance. The face looked bloated, and the skin was of a dusky, earthy colour. When spoken to she became confused, and articulation was hesitating and jactatory; there was no giddiness; her sight would become dim, things would look double, and showers of stars appeared to fall before the eyes.

On ophthalmoscopic examination, the right disc was found to be fairly clear, but the vessels were enlarged, and tortuous and dark spots of extravasation covered the choroid. The left disc was hazy, the arteries small, and the veins large and sinuous; there were petechial extravasations of the choroid, a marked convergent squint, and migratory ptosis. She complained of occasional dull aching pain at the back of the head; had vomiting, but not obstinate. She remarked that she felt strange. There was irritation around the waist, and extending down the legs, as though something was creeping over the skin: had fancies that she had committed some crime, and that she wanted to do something dreadful.

After she had been in the building a fortnight she had three epileptic seizures, with loss of consciousness; they came on suddenly, without any apparent warning. The first was ushered in with moaning, the second with screaming, and the third without either. In each fit, the convulsive movements were confined to the *right* extremities and *left* facial muscles. After the fits, there was marked want of feeling in the *right* half of the body, but no especial impairment of motion. The urine was scanty and albuminous.

The treatment consisted in the administration of iodide of potassium, extract of jaborandi, and compound powder of scammony. At the end of a month, she discharged herself from the building, saying that she felt quite well.

All the objective signs of paralysis had disappeared, as well as the subjective symptoms of which she complained. A week afterwards I heard of her death, and the following is an account of the *post-mortem* examination:

A well-nourished body, free from scars; the muscular tissue of good healthy colour. The skull was removed with difficulty, on account of the adhesions between it and the dura mater, especially over the frontal lobes, but rather more so on the left than on the right side; there, the inner table of the skull was uneven and eroded, and some rather firm adhesions existed, between the dura mater and the other membranes at this part. But other adhesions existed, between the pia mater and the arachnoid, which were not of so firm a character. At the base of the brain, and especially over the pons and the medulla, there were signs of old meningitis. The brain tissue was quite free from any inflammatory growth, was compact, and gave a feeling of hardness rather than otherwise. The motor ganglia were carefully examined, but no disease could be detected. It was observed, however, that the vessels at the base were extremely pale, and remained gaping when cut through.

Their walls had a semi-translucent, hyaloid appearance. The nerves had a pinkish tinge. Upon opening the thorax, the right lung was found to be bound down to the chest wall by pleuritic adhesions. The lung itself was not consolidated, in the usual acceptation of the term, and although it floated upon water, yet it gave evidence of a partial obliteration of the air cells with fibroid proliferation. The general colour of the lung was a dark purplish-red, but here and there were patches of a bright red, showing recent inflammation. The bronchial tubes and vessels were especially dilated, and the latter were translucent and patulous, like the vessels of the brain.

Left Lung.—Here the structure was very different to that of the right, it crepitated freely between the fingers, except at the lowermost part of basal lobe, where was seen the same sort of creeping inflammatory change that was noted in the right lung.

Upon opening the pericardium, it was found to be without fluid, but over the cardiac surface there was a layer of thick, gluey, hyperplastic material, evidently the result of the specific inflammation. The heart was small and fat, the muscular tissue of good colour. The valves and endocardium were healthy. The abdominal viscera gave evidence of lardaceous changes. The liver was larger than normal, and, when cut into, it was observed, that in the right lobe there were several isolated patches (some six or seven) of a very much lighter colour than the surrounding texture, which was likewise very pale.

The spleen was so granular, soft, and pultaceous, that it could scarcely be removed from the body. The kidneys were amyloid. There can be no doubt, that the changes here noted were the result

of a specific syphilitic inflammation. It was one of those cases, where the secondary stage is rapidly merging into the tertiary, and when this is the case, judging from my own experience, serious visceral complications rapidly and surely follow.

CASE XXIII.—*The following is an abstract from the notes of a case which I brought before the notice of the Medical Society of London in* 1873.

M. C., æt. 26, was a stout healthy-looking woman, and the youngest of eight children, all of whom, except herself, were dead. Had been leading an irregular life, and for the past three months had given herself up to intemperate habits. Two months before her present illness, she became infected with the syphilitic poison, resulting in ulceration of the throat, secondary eruption, and dull aching pains of the lower limbs. On February 16th, 1873, the legs became heavy, numb, and immovable, and in a few days the arms became similarly affected. When admitted into the Central London Sick Asylum under my care, there was more or less paralysis of all the extremities, with muscular hyperalgia and cutaneous hyperæsthesia.

There was dull aching pain in the occipital region. The intellect was clear, countenance cheerful, voice husky, and some deafness with each ear. She complained of pain upon pressure over the spinous processes of the lower cervical and upper dorsal vertebræ, extending over the scapulæ.

The further clinical notes, which were taken up to the time of her death, are of interest, only as far as the pathological changes were concerned.

At the *post-mortem* examination the dura mater was found to be healthy, and upon removing the brain and its membranes it weighed 43 oz. The sub-arachnoid space was full of fluid, yet, over the surface of the hemispheres, there was no inflammatory change.

Upon exposing the base of the brain to view, it gave at once the characteristic smell and appearance of gangrene. Over the under-surface of the anterior lobes, as well as over the middle and posterior, the arachnoid membrane was thickened and of a semi-opaque appearance; but in the immediately central line, over the parts forming the floor of the third ventricle, and on either side, in connection with the middle lobes, pons variola, portio dura, and medulla oblongata, it was thickened, opaque, fibrillated, and matted together with the pia mater.

Over the surface of the lobes of the cerebellum, on each side of the medulla, the membranes were stinking and of a dirty green colour. Upon their removal, the brain substance was found to be softened to the depth of a quarter of an inch, and presented the same characteristic features. The right and left crûs werecon-siderably disorganised. The arteries forming the circle of Willis, as well as the anterior inferior cerebellar arteries, were firmly bound down by inflammation.

The cord with its membranes, when removed, weighed fifteen drachms. Upon slitting up and reflecting the dura mater, its surface was found coated with a layer of lymphoid corpuscular material. It gave out, like the brain, a stinking odour, and presented a greenish colour. The arachnoid and pia mater could not be separated; they were adherent to the substance of the cord.

These four cases I have noticed, because they are undoubtedly instances of localised syphilitic inflammation of the nervous system, occurring during the secondary stage. The pathology proves this beyond question or doubt. Other cases, also, in the second stage, which in my practice have yielded to treatment, have been detailed under the heading of 'Diagnosis,' as well as the specific neuralgias.

The pathological products of tertiary syphilis, as they involve the skull, the brain, the cord, and the membranes, are now well known, and require no second-hand interpretation on my part. It can safely be said, that the effects of syphilis on the nervous system may be recognised with a precision and exactness which the other viscera cannot equally claim.

Patients may have multiple gumma in the substance of the heart, lungs, liver, spleen, or intestines, which have not been diagnosed during life, and the existence of them might never have been known, but for *post-mortem* investigation. This is rarely the case, when such changes exist in the brain. We have seen, that syphilitic specific inflammations usually arise in the fibrous structures, and in that portion which is continuous with the vessels.

Rindfleisch states, that the adventitia of the vessels are the proper matrix of the syphiloma. How far this statement is absolutely true, is uncertain, for Heubner, as we have shown, asserts that the syphilitic degeneration of cerebral vessels originates under the normal

lining layer of epithelium, and between it and the membrana fenestra. Yet, it is perhaps of more interest, if not of greater importance, to note, that the share taken by the proper nervous elements in these pathological changes which affect the nervous system, is extremely limited.

Dr. Moxon tersely says, that 'syphilis attacks the surface of the brain and the membranes; it attacks them in limited spots, and spreads slowly. The morbid changes are, on the one hand, adhesion of the membranes to each other, and to the surface of the brain, by means of an adventitious material of firm consistence and yellow colour, which may be called lymph, but is harder, tougher, and more opaque. This exudation may be found at any part of the surface; it invades and destroys the grey matter, interferes with the supply of blood, and when it occupies the membranes at the base of the brain, surrounds and involves the nerves of the intercranial part of their course.'

In the examinations which I have made of the brain after death (over 1,000) I have been surprised to find, in how small a number, this disease appeared to originate in the under layer of the periosteum of the endocranium. I think that this, perhaps, may be accounted for by the fact, that when a gumma of the inner table of the skull does arise, the clinical features, as evidenced by pain, etc., are so marked (for these manifestations usually occur with the existence of external gummata), that remedial measures are adopted early, and so promote absorption before the membranes of the brain become involved.

The following abridged notes of cases will serve to demonstrate the usual features of gross syphilitic disease of the brain and cord, in what may be designated its tertiary stage:

CASE XXIV.—*Syphiloma of the Membranes and of Brain Substance involving the Inferior Frontal Convolution of the Right Hemisphere —Migratory Pseudo Left Hemiplegia—History of Injury to Right Frontal Eminence of Twenty-two Years' Standing. He contracted Syphilis seven and a half years ago.*

B. C., æt. 51, a man of fair complexion, was admitted into the Central London Sick Asylum, August 5th, 1874, and died

October 12th, 1874. There was an old cicatrix over the right frontal eminence, the size of half-a-crown, which was the result of a gun accident that took place twenty-eight years ago. It appears that the barrel of the gun burst, and that a splinter of iron struck him on the forehead; he went into the Leeds Infirmary, but did not remain long; when he left he was quite well, and continued so. Twenty years afterwards he contracted syphilis, and since that time he has suffered from an ulcerated sore throat and other symptoms of the disease. Twelve months before he came under my care, his health commenced to fail. He suffered from intense neuralgic pains, which came on regularly at night. After this, his memory became affected, and he would have attacks of *petit-mal*, and reel about whilst walking, as though he were intoxicated; then followed a weakness of the left arm, which was soon felt in the leg. Motion and sensation were equally involved. At times he could move the limbs fairly well, and on September 10th the following note was made:

'Walks with a reeling gait; memory obtuse; says that it is much better if he keeps perfectly quiet, but if irritated or excited, his ideas become confused, and he is unable to think of words by which to express his thoughts.'

1st Nerve.—The sense of smell is partially obliterated.

2nd Nerve.—Vision of *right* eye normal; has completely lost the sight of the *left* eye from a sudden inflammatory attack twelve months ago, but the ocular muscles are not paralysed.

5th Nerve.—There is general numbness of the *left* half of scalp, face, and buccal mucous membrane, with *hyperalgia*. No defect of swallowing or of speech; the tongue is slightly divergent to the *left*. The *left* hemiplegia is less marked than upon admission.

After this note was made, he complained greatly of a fixed pain over the *left* side of the head and *left* ear. Treatment availed him little. He had a quasi-epileptic seizure, with rigid spasms of both upper extremities, and clonic convulsion of *right* side. Shortly after this he died.

Post-mortem Examination.—Brain weighed 53 ounces. Upon examining the internal table of the skull no fracture was found; it was adherent to the dura mater, to the other membranes, and to the brain substance of the *right* inferior frontal convolution by an abnormal growth, which penetrated some way into the frontal lobe. The grey matter was disintegrated, and mingled with the softened surrounding nerve tissue, *débris* of vessels, and small hæmorrhages. The arachnoid membrane covering the surface of the hemispheres was opaque, and beneath it and the pia mater of the *right* side was

a layer of colloidal sanguinolent material. On the *left* side, over the frontal lobe, the dura mater was much thickened, and contained within its structure numerous nodular bodies, varying in size from a pin's head to a small pea, but here no adhesion had taken place between it and the arachnoid. The same kind of growth was found to exist on both sides of the superior longitudinal sinus. Of the central ganglia no especial change was apparent, with the exception of the *right* half of the pons, where the membranes were thickened, and adherent to its substance. The tumours, upon section, were found to be made up of highly corpusculated embryonic tissue. The viscera were free from gummata.

This case is of some interest, as apparently exemplifying how 'residues of disease' are often more prone to become the seats of degenerative changes and inflammatory products than healthy normal tissue.

The man, as stated, met with a gun accident and severely injured his skull, many years previous to his being infected with syphilis; yet, when the poison finally determined to settle down and propagate itself somewhere, it chose the weak points in the man's body, namely, the cranium and membranes of the brain.

We know that tertiary syphilitic changes are not, as a rule, distinguished by symmetrical manifestations, yet the dura mater here was the seat of gummata over both anterior lobes.

CASE XXV.—*Syphilis of Spinal Cord in Dorsal Region, involving Antero-lateral Columns.*

S. W., æt. 40, was admitted into the Central London Sick Asylum, July 17, 1873, died August 12, 1874. She was a woman of fair complexion, well nourished, with no specially marked cachexy. She contracted syphilis in 1870, and suffered more or less from it until she became paralysed. Her habits were intemperate. For some time before the paralysis came on, she had suffered severely from nocturnal pains down the spine (neuralgic pains), and a feeling as of electricity running down the limbs; had cramps in the calves of the legs, and involuntary startings, just as she was going to sleep; and even if the toes touched the ground suddenly, sometimes the legs remained so strongly flexed, that she was unable to exercise any voluntary control over them. At other times sensation appeared to be more influenced than motion, the feet became cold and numb, so that she did not feel when they

were pressed upon. This was succeeded by intolerable dull aching pain until they were warm, and then she became easier. Both legs were affected in much the same way, but it was interesting to note that sometimes one limb would be much hotter than the other, and when in this state it would be less paretic, and *vice versâ;* but the especial features, though variable, were :

1st. Painful and hyperæsthetic state of the spine, extending from the second dorsal spine to the sacrum, but more particularly over the spinous processes of the 9th and 10th dorsal vertebræ.

2nd. Cutaneous hyperæsthesia, and intense muscular and general hyperalgia.

3rd. Subjective sense of heaviness, as though the limbs were wooden.

4th. Reflex excito-motor irritability of the cord greatly increased both to touch and the galvanic current (variable).

5th. Automatic spasms very severe.

6th. Temperature usually below normal.

7th. No marked muscular atrophy or fibrillations.

8th. Muscular power (when lying in bed) co-ordinate, not associated with tremor.

9th. Vaso-motor nerves easily stimulated.

10th. Very defective power of locomotion ; but no throwing upwards of the feet, and implantation of the heels as in loco-motor ataxy, or dragging of the toes as in muscular atrophy.

11th. No derangement of anal sphincter.

12th. Occasional retention of urine, and subsequent incontinence.

13th. Urine acid, clear, free from albumen.

The limbs remained in the same state as just described for some time.

About two months previous to her death the want of motor power gradually increased, and the pain decreased almost in equal ratio. She became of necessity more helpless, and could not move in bed without the aid of her arms. The following note was made on August 1st :

Has only sufficient voluntary power to draw up the legs, which feel heavy, like lead. The special senses are good, but at times her memory fails, and the speech becomes thick. Cutaneous hyperæsthesia and muscular hyperalgia have left the limbs, and sensation is normal. The bladder is extremely irritable, and incontinent.

A short time after this severe diarrhœa set in, from which, with the exhaustion from want of rest owing to the persistent reflex movements of the lower limbs, she died.

Post-mortem examination gave no evidence of gross lesion of the

brain or medulla oblongata. When the spinal cord was removed, and before the membranes were cut, it was evident that a growth existed beneath the dura mater. The cord was found to be anæmic in the cervical and upper dorsal regions, but from the seventh pair of dorsal nerves, the membranes were adherent to each other, and to the cord over the anterior and lateral columns, but quite free over the posterior. Upon section a growth was seen, about an inch in extent longitudinally, and a quarter of an inch in thickness, invading the structures just named. There was no softening or hyper-vascularity as seen usually in gummata of the brain (the patient died prior to the degenerative stage). A section under the microscope gave good evidence as to the nature of the growth, which was composed of an enormous proliferation of small cells undergoing granulation change, as well as a large increase in the fibrous connective tissue structure. Here and there were seen lumps of amorphous material, of no especial organisation, surrounded by zones of fibrous tissue.

The whole of the anterior root zones and outer borders of anterior cornua of grey matter were seen to be invaded by this hyperplastic growth, and the anterior portion of the lateral columns were undergoing a similar change, so that it was evident that the morbid condition arose most probably in the membranes, and gradually made its way amongst the proper nerve structures of the cord from without to within. In parts the nerve cells were completely obliterated, and some were seen to be undergoing atrophic fuscous and pigmentary degenerations. The vessels were not so much involved, excepting those in immediate relation with the gumma, where their coats were separated by cellular proliferation and granular material.

I considered this case at the time to be one of considerable interest, and that it bore out with some precision, in its clinical and pathological aspects, the physiological views of Brown-Séquard. For instance, we had hyperæsthesia of the limbs, with marked functional automatic activity of the spinal cord, arising doubtless from congestion of the grey matter and antero-lateral columns. The grey matter, as it became invaded, so became functionally diseased, and we had transitory and migratory impairment of sensibility, sensation, and temperature. The posterior grey matter and columns were unhealthy, and to this may be attributed the imperfect power of co-ordination. But considering the amount of disease in

the periphery of the anterior horns of grey matter, one would have expected an equivalent of muscular atrophy, but this was not the case, owing, in all probability, to the unstable dynamic condition of the grey matter of the cord generally. Localised disease of the spinal cord, similar to that found in this case, is rare, and gives to this case an especial interest, as the proof of physiological experiment would have been upset, if the patient had survived for a sufficient length of time to permit of degenerative metamorphoses and softening of surrounding parts.

CASE XXVI.—*Syphilitic Aphasia.—Syphiloma involving Post-third of Inferior (Left Frontal) Convolution, and Lower Two-thirds of Anterior and Posterior Central Convolutions.*

A. P., æt. 36, was admitted into the Central London Sick Asylum, Highgate, on November 3, 1875, and died in the spring of the following year. She contracted syphilis from her husband when twenty-nine years of age, and since that time had had several miscarriages. The attack of syphilis was severe, and was succeeded by a large nummular gumma of the tongue, which yielded rapidly to treatment; and for two years before the paralysis came on, her health had apparently become sound. At that time, however, family matters distressed her. She became nervous, anxious, and irritable, and would suddenly find the *right* leg to give way, as she was walking downstairs. Her ideas would become confused, and she would often get into a passion, when articulation became impossible. This was followed by a fit of sobbing, and, not till then, did the power of speech return. It was succeeded by defective co-ordinating power in the *right* arm, so that writing was difficult; but, coincident with this, the speech was faulty, and she could not roll the letter 'R.' In attendance, also, upon the derangement of speech, was defective co-relation of motor ideation. She could write fairly well before her seizure, and was intelligent, but now she wrote as follows: 'I feel very weak and nerves—my head is very bad.' She would lose hold of a cup which she might be carrying, and not be aware of it, till some few seconds after. There was want of voluntary co-ordinating power, both of leg and arm, sometimes existing in both together; at times, in one limb only, with inability to articulate freely, as well as a dull, aching pain in the head, not unfrequently extending to the limbs. These were the chief signs exhibited by her for some time. The cranial nerves were not markedly involved, but occasionally there was

slight evidence of a *right* facial palsy, and involuntary twitchings of the muscles of this side of the face. On the 10th of January she had a quasi-epileptic fit, with irregular movements of the *right* facial muscles and *right* extremities; but this attack was of short duration.

Three months before her death I was called to her, and found her in a condition of sub-consciousness, with bilateral twitching of facial muscles, and rigid spastic condition of the *right* arm. She was quite sensible to pricking and pinching on the *left* side of the body, but on the *right* side there was complete loss of voluntary, but not apparently of automatic, power. When the attack had spent itself, she became partially comatose for over thirty hours, and when consciousness returned there was found to be complete absence of speech, as well as perfect *right* hemiplegia: no control over sphincters.

A month after this attack, the following observations were made, and but little attention was paid to the case, beyond the question of the relation of mind to language and the power of articulation. The *right* hemiplegia was persistent until her death, except some slight power which she regained in the *right* leg. The *right* arm remained permanently flexed, the forearm upon the arm, and the fingers into the palm of the hand. No cranial nerves were directly involved. The drowsy, heavy facial aspect, which had existed previous to the complete hemiplegia, had now given way to a bright and intellectual expression, but the condition of aphasia was complete, and her language was limited to 'Don't know,' from first to last. In the same way that the hemiplegia was persistent, so in like manner was the state of aphasia also persistent.

I should here like to make a few remarks upon the clinical aspect of aphasia, as presented to my own observation. In the first place, there cannot be a doubt that the inferior frontal convolution of the *left* hemisphere is the seat of the function and faculty of articulate language. Mere ataxy of speech is one thing, and aphasia another; but the two are often confounded together, and serious mistakes are the result. I divide that condition, which we know by the term aphasia, into three stages. The first occurs immediately after the attack of *right* hemiplegia, when there is confusion of intellect, amnesia, and loss of the faculty of language. This means where an aphasiac will say, for instance, 'Yes' for 'No,' or 'No' for 'Yes,' in answer to all questions which may be

put to him, without any self-knowledge of his loss of power for words, and when the brain-cells are not sufficiently receptive to build up a reasoning faculty through the combined senses of sight and hearing. If, in this stage, the patient be asked to close the eyes or protrude the tongue, the response, if any, is a vacant stare, or 'Yes' or 'No,' as the case may be. Here, then, we have a condition of amnesia, as well as loss of reasoning power, through the morbid state of the perceptive faculties, which ought normally to be in co-respondence with the outer world. Yet the patient under these circumstances will be conscious of his own wants, and endeavour to make these known to others: 'sub-mental reflex cerebral consciousness.'

In the second stage we have a dulled brain regaining molecular activity, but the faculty of language has not improved, although reasoning power is returning. The patients will still say, 'Don't know,' or 'Haish,' or 'Two, four, six, eight, ten,' or 'Don't, dow, dow, ditto, do,' or some other words devoid of any definite ideal meaning, and look vacant and unintelligent if asked a question. But now the faculties of sight and hearing are beginning to act upon an impressionable medium, and the brain is similar to that of an animal endowed with merely an instinctive faculty. You can train a dog to bring your bird or your slippers, but you must show the creature by signs what you wish him to do; and so it is with an aphasiac in this stage. You tell your patient to sit down or stand up, close the eyes, protrude the tongue, or touch the nose. Yet all is blank. Then you show him by signs, what you wish him to do, and his countenance beams with receptive pleasure, and voluntary co-ordinate acts immediately follow. These are, however, only the outcome of a reflex mechanism, and as unstable as the physical state of brain-cell which gave them origin. *In this stage, the man is an irresponsible being.*

It is in the third stage, that we have the true aphasiac, when the brain has regained its normal activity, and reasoning power is evidenced by act and gesture, if not by language. If now the patient be asked to rise or sit down, etc., he does it at once, without sign or token, and he now, for the first time, becomes aware of

his inability to express his ideas in intelligible and appropriate language. These are the features which characterised the patient whose case we now have under observation. The following note was made on February 10th:

She still says 'Don't know' to every question that is put to her. The special senses are excellent. She appears to be mindful of the past, and conscious of the present. It is unfortunate, that she is unable to give one an exact idea of her mental state, but I am inclined to think, that if she could only express her thoughts by language, she would be found fairly intelligent. Some time after this, she suffered from persistent diarrhœa, became comatose, and died in a few hours.

Post-mortem Examination.—The dura mater was normal, but imbedded in its substance, and just to the left of the longitudinal sinus, were two irregularly-shaped bony plates. The arachnoid membrane was opaque and distended with fluid. At the base of the brain this membrane was much thickened, fibrillated, and bound down the vessels and nerves; the former gave no evidence of plugging or atheromatous change. There were two growths, one involving the grey matter and substance of the post part of the inferior frontal convolution, and the other involving the lower two-thirds of the anterior and posterior central convolutions. Over these tracts, the tumours had replaced almost in its entirety the grey matter. There was considerable softening of the white nerve substance adjacent to these bodies. The microscope revealed the usual characteristic of a gumma, and the spinal cord gave evidence of a sclerosis of the right lateral column.

CASE XXVII.—*Syphiloma of Upper Third of Posterior-Central and Postero-Parietal Convolution of Right Hemisphere—Migratory Ptosis of Right Eyelid—Rigid Flexion of Left Arm, and Extension of Left Leg.*

S. S., æt. 34, was a pale, thin, ill-nourished man. He stated that his health had been good for the best part of his life, but that for the past ten years, he would get out of sorts whenever he was over-fatigued; his occupation was that of a clerk, and not unfrequently his mode of living was somewhat precarious. At times, his tongue became sore at the sides, the throat ulcerated, and migratory pains were experienced over the head, clavicles, sternum, and ribs; his voice was nasal, and at one time he had an offensive discharge from the nose. At the age of twenty-two, he had a sore

on the penis, which healed in a few days, and was not, as far as his memory served him, succeeded by a secondary eruption, neither did he feel constitutionally affected, until three years after. He never had been treated for syphilis. Says, that his family were remarkably strong, healthy, country people, and all lived to a good old age. For some six months previous to the advent of the paralysis, his health had been visibly on the decline, so much so, that he was unable to follow his employment for any length of time. His friends accused him of growing lazy, and indifferent to those about him. One day, he was found lying upon the pavement in a partially conscious state, and could not remember his home or where he lived. At another time, he was taken to the police station, and supposed to be drunk and incapable. He said, that at times he rallied in the most wonderful way, and felt as well and as intelligent as ever, but that the next day he was altogether wrong.

He came under my care on June 13th, and died in the following November, 1875. It was in the month of March, previous to my seeing him, that he awoke in the morning and felt the *left* leg, as he called it, quite dead, as well as a numbness and tingling in the *left* arm. He could not open the *right* eye, but during the day all these symptoms passed off, and he felt nothing more of them for nearly a month. During this time, if he began to write he got on well enough for a line or two, when he failed to make a straight stroke, and the arm shook violently, so that he had the greatest difficulty in controlling it. In May he became visibly paralysed, but it came on so very gradually that he thought it to be due to weakness; and from his treatment, such seems to have been the opinion also of his medical attendant. However, the paralysis increased. When I first saw him, three months after, the *left* forearm was rigidly flexed upon the arm, and what is not usual, the extensors of the forearm were markedly palsied, so that the hand fell, from dropping of the wrist, as in lead poisoning, and the fingers on the ulnar side of the hand were rigidly flexed into the palm. The leg was extended and immovable, no anæsthesia, the intellect clear and the speech perfect. As time went on, the speech became ataxic, and when he was at all excited, there was complete absence of co-ordination between the facial, labial, and lingual muscles, so that articulation became a mere jumble of syllables. His memory failed, and other psychical phenomena presented themselves, until he became in a measure demented. The urine was of normal gravity, free from albumen and of acid reaction. Eventually the sphincter became incompetent, and he died very slowly, with

occasional convulsive movements of bilateral facial muscles, and *right* and *left* extremities.

Post-mortem Examination.—Upon removing the calvarium, the dura mater was not adherent to the skull. It was slightly adherent to the arachnoid over the parietal convolutions (see Fig. 1), and contained within its fibres a solid tumour the size of a small walnut. This had compressed the brain substance of the parietal convolutions of the hemisphere (right) to such an extent that they were scarcely definable. The grey matter had become absorbed, and the surrounding white substance was much softened, so that

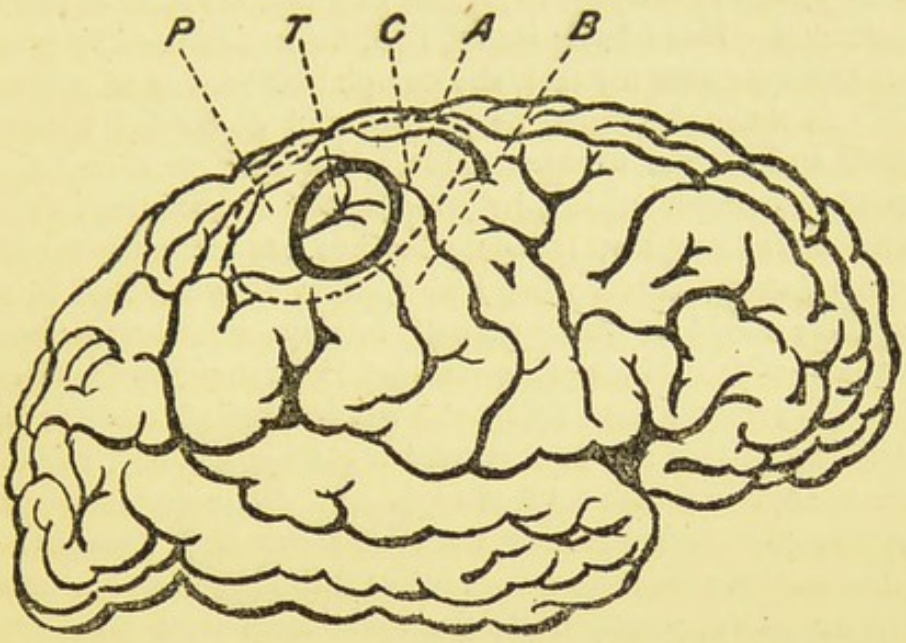


FIG. 1.—RIGHT HEMISPHERE.

A. Anterior Central Convolution. B. Posterior Central Convolution. C. Sulcus Centralis. P. Posterior Parietal Lobule. T. The Syphiloma. The dotted lines around tumour indicate Ferrier's centres for complex movements of the arm and leg, I should say more especially the latter.

the adjacent convolutions were implicated in the degenerative changes. There was chronic arachnitis, with effusion over the whole of the cerebral surface. The arteries were not essentially atheromatous; recent soft thrombi were found in the anterior cerebral vessels, and the substance of the *right* hemisphere, though showing no more absolute gross change than that first mentioned, was not so firm as the *left* hemisphere, which was comparatively healthy. Upon section, the tumour was found to be made up of a yellowish homogeneous material, varying in consistence, and apparently consisting of cheesy masses, imbedded in a softer gelatinoid

matrix. Hardened sections showed it to be composed of a highly corpuscular parenchymatous growth, more or less vascular in patches, and of granular material.

CASE XXVIII.—*Syphilitic Melancholia—Dementia—Syphiloma of Right Hemisphere, involving Postero-parietal Lobule and first Occipital Convolution—Syphilitic Degeneration of Cerebral Vessels —Left Hemiplegia.*

M. B., æt. 38, was admitted into the Central London Sick Asylum, September 10, 1874, and died April 12, 1875. She contracted syphilis in the year 1870, and had suffered more or less from it ever since. Her friends stated, that, for twelve months previous to her coming under my care, she complained greatly of pain in the head. At times she would be morose and depressed, then again excited, and almost unmanageable. On one occasion, she attempted to commit suicide, by jumping out of a window.

When I first saw her, the countenance was extremely typical of the mental state. Perception and volition were affected in equal ratio. She would sit gazing vacantly into space for hours together, and it was with difficulty that she could be roused to feed herself. She would not take food unless she was compelled, and she would remain like a living automaton, neither eating, drinking, nor taking notice of anyone unless excited to do so. The countenance was heavy, the complexion muddy, the eyelids drooping, the eyes lustreless, the mouth partly open, with saliva dribbling from the corners; special senses apparently dull; the optic discs were hazy, arteries small, veins large, the choroid injected and pigmentated. She walks co-ordinately, does not totter or falter, but locomotion is performed with slowness and apparent doubt of her own power. There is neither general, local, nor volitional tremor, and it must be remembered that ideation is almost lost. Articulation is perfect, as far as it goes. There is marked decrease both of muscular and cutaneous sensibility, but no objective paralysis of cranial or spinal nerves. Now and again she seems insensible to the involuntary discharge both of urine and fæces. Urine: gr. 1010, high-coloured, loaded with lithates, but free from albumen. Pulse regular, with slightly increased tension. Temperature usually below the normal. Her condition progressed unfavourably. About two months before her death I noticed that she was partially hemiplegic upon the *left* side of the body, more of the leg than of the arm, and more of motion than of sensation. The paralysis increased until it became complete, with fixed contraction

of both the arm and leg; and what was rather remarkable, though not unusual, about a fortnight before she died her brain became much more perceptive, and a dawn of reasoning power evidenced itself. It was only transitory and of short duration, for she gradually sank, becoming more obtuse day by day.

The *post-mortem* examination showed the condition of the brain to be as follows: The internal surface of the cranium was free from any morbid change, and also the dura mater. The sinuses were more or less engorged with blood. In connection with the arachnoid and pia mater was a morbid growth, which extended deeply into the brain substance of the postero-parietal lobule and first occipital convolution of the *right* hemisphere, giving rise to considerable adjacent softening, hæmorrhage, and blood-staining.

The whole of the *right* centrum ovale was hypervascular, and studded with small bleeding points when cut through. The *right* corpus striatum was also discoloured, and softened in patches. The *left* hemisphere was of normal appearance and consistence. The convolutions over both hemispheres were shrunken, but particularly those of the *right*. There was also an appreciable difference between the grey matter, which was softer and more hypervascular in the convolutions of the latter than of the former.

Under the microscope the grey matter of the *right* convolutional surfaces was remarkable for the large number of vessels brought into view, to the exclusion of the normal cellular elements. The latter had undergone considerable atrophic change, and were, in a measure, replaced by a hyperplasia of connective tissue corpuscles.

As to the vessels, they were diseased, and gave the characteristic appearances usual to such condition: viz., dilatation, waviness, and irregularity of outline; thickening, destruction, and separation of the tunics, which were seen to be crowded by a multiplication of small nucleated corpuscles: perivascular spaces existed.

It would have been of some interest, to have noticed the cellular degeneration in the several layers of the grey matter, but in this case it was forgotten; and I do not think that it is of so much importance, as in some other forms of cerebral degeneration, which have been noted, especially in the general paralysis of the insane, where it becomes a point of the highest significance, and one which hitherto has not received such an amount of investigation as the subject deserves. Up to the present time we are more indebted to the researches of Drs. Herbert Major, Batty Tuke, and Ringrose Atkins than to any other observers in this country.

I cannot, for my own part, see any reason whatever to doubt the purely syphilitic origin of the disease, which existed in the brain

of this woman. Although of intemperate habits, she was healthy, until syphilis commenced its destructive work. In my opinion, if she had not been a drunkard, she would not have had the diffuse change in the structure of the brain, and possibly the gummatous mass would not have had an existence.

A careful examination of the viscera showed sclerosis, but nothing more. There were pleuritic adhesions. The heart was normal in size, but rather flabby; valves healthy; liver contracted and hardened; spleen the same; kidneys small, contracted, and granular.

CASE XXIX.—*Syphilomatous Growth of Tentorium Cerebelli and of the Sinuses entering into the Formation of the Torcular Herophili —No marked objective Paralysis.*

This case is of unusual interest, pathologically, physiologically, and clinically, and, so far as I can ascertain, no similar condition has been recorded.

W. W., æt. 39, was admitted into the Central London Sick Asylum on November 16, 1874, and died November 1, 1875. He contracted syphilis when a young man, but suffered little from it at the time. For many years the state of his health had been indifferent, and for the past eighteen months he had been unable to follow any occupation. There is no history of fits. It appears that he was compelled to give up work on account of the severe shooting pains affecting the skull, but more particularly the frontal bones. At this time his sight began to fail, and when he attempted to read, the letters looked double: straight lines appeared to be curved, and ran into each other. The smell, also, was impaired, and offensive matter made its way from the nostrils. The power of locomotion was interfered with from sensoro-volitional derangement; he felt confused, and stopped short from attacks of *petit-mal*, and would reel and fall unless supported. The bowels were obstinately confined, and he vomited after nearly every meal. In addition, he suffered from otalgia, with intermittent otorrhœa. When I first saw him, the above signs and symptoms were well marked. He was pale, and over the right frontal eminence was a cicatrix, the result of previous ulceration, which had given exit to some necrosed bone, and prevented the movement of the occipito-frontalis muscle on this side, and gave one the idea that the supra-orbital and facial nerves might have been centrally affected. But this was not the case. The ophthalmoscope showed a hazy outline

of the optic discs, the veins were exceedingly large, and the arteries small; in fact, there existed a neuro-retinitis, going on to atrophy. *There was no objective paralysis of cranial or spinal nerves.*

The special senses of smell, sight, and hearing were impaired, from localised disease in these organs. Cutaneous sensation and sensibility were everywhere normal, and the muscles responded readily to the galvanic current. The sphincters were unaffected. There were no formications, no tremor, and no automatic or reflex convulsive movements. He complained of the head feeling heavy, so that at times he was unable to raise it from the pillow. But one of the especial features of the case was the association of signs and symptoms, such as cessation of discharge from the ear, followed by intense headache, persistent vomiting, and obstinate constipation. These attacks were paroxysmal, and lasted for eight or ten days. At other times he was tolerably well. The intellect was rarely affected, but the memory was variable. The pulse, temperature, and respirations were normal. He died after a prolonged attack of persistent vomiting. These attacks came on with the slightest movement of the head, as well as after taking nourishment. There was also bilateral rigid spasm of the muscles of the neck.

Post-mortem Examination. — The cranium * was unusually thick, compact, and heavy; its outer surface was covered with nodular elevations; the inner surface was free from any outgrowths. The dura mater was easily reflected from the surface of the anterior lobes, but it was almost impossible to remove the posterior part of the falx cerebri where it was continuous with the tentorium, and bound down to it by an adventitious growth. There were strong adhesions between the latter and the cerebellar and occipital lobes, but more particularly between the upper surface of the lateral lobes of the cerebellum and the under surface of the post convolutions of the parietal lobes. In addition to this, the growth had invaded and secluded all the sinuses, in relation with the torcular herophili, except the two occipital. It had also invaded the whole of the tentorium cerebelli, but more on the left than on the right side. It presented the same appearances throughout, had a yellowish colour, was of firm and elastic texture, and under the microscope it was seen to be made up of wavy, connective tissue, infiltrated with round cellular elements.

When one considers the apparently serious nature of the occlu-

* Shown at Pathological Society of London, Nov. 16, 1875, and then forwarded to the College of Surgeons.

sion of the large sinuses, it seems wonderful that the cerebral circulation was not more objectively interfered with; yet, as we have seen, there was not one single iota of evidence in proof of this important impediment to the return of the venous blood to the right side of the heart; neither do I think, that we should have had any of the attendant phenomena, as vomiting and *petit-mal*, were it not that the cerebellum was involved.

There were no very objective signs, however, of cerebellar disease. For instance, there was no inco-ordination of the muscles of the eyeballs, oscillation, or nystagmus, but there was evident want of balancing power, or ability to maintain the equilibrium. I think that negative signs, like those in this case, indicate much in cerebral physiology, viz., that certain parts of the brain must be involved, in order to obtain definite effects. This is of great moment, and does more, perhaps, to clear up abstruse points, as to what are the motor functional centres of the brain, than direct experiment upon definite convolutions.

In this case, for instance, none of the centres for direct volitional movements were diseased; hence we found, that during life we had no motor paralysis, beyond the want of co-ordination in the muscles of the lower limbs from the direct injury to the cerebellum.

CASE XXX.—*Syphiloma involving the Cortex of the Superior and Middle Frontal Convolutions of the Left Hemisphere—Alternate Pseudo-hemiplegia, first of Left and then of Right side (Cross Paralysis, but not due to Disease of the Crura or Pons Varolii) —Hallucinations, etc.—Dementia.*

This case has some important points about it, and is well worth recording. It shows clearly the migratory and stealthy action of syphilitic changes, which are so subtle in their development, and so erratic in their mode of procedure. It was evident that a growth existed, or that pressure was exercised in the *left* cerebral hemisphere, yet it was followed by a *left* hemiplegia. This would accord very nearly with Dr. Brown-Séquard's recently attempted demonstrations, and I must say that in this case, although absolutely in opposition to my usual experience, I am inclined to the

belief that this patient had a paralysis on the same side of the body as the brain lesion, and which was due to it, and I regret that my practice in cerebral physiology and pathology has not been so extensive, as to allow me to clear up the following question, with anything like definition, namely: Has the periphery of the cortex, which covers certain convolutions, conducting fibres, which do not enter into the decussation at the anterior pyramids, but travel along independently of them, and by an indirect channel? I have for a long time, from clinical experience alone, entertained such a view, but I have great pleasure in stating here that both my knowledge and belief are in direct contradiction to those, who maintain that a complete paralysis of one half of the body can result from a gross lesion (hæmorrhage, for example) of the centrum ovale, or of the mass of a convolution of the motor centres, or tracts in the brain of the same side of the body. Yet I shall detail a few cases, where there has been slight peripheral cortical compression (not irritation), and which has given rise to an ill-defined paralysis of the extremities on the same side.

M. W., æt. 60, was admitted November 10th, and died in the month of May following. She was a strongly-built woman. She stated, that when between forty and fifty years of age, she contracted syphilis, and that she suffered from sore throat, but quite recovered, and had good health until a month previous to her coming under my care. About this time she wanted proper food, became much reduced in health, and had an attack of what she termed erysipelas, which was soon succeeded by violent neuralgic pain over the *left* half of scalp, face, neck, and upper extremity (nothing relieved these pains like a hot solution of chloral). The whole of the *left* half of the forehead was considerably enlarged, extremely painful and boggy, which was attributed to inflammation of the periosteum and the bone. There was no objective paralysis, excepting that the *left* arm felt heavy, and was not so responsive to voluntary movements as the *right*.

The countenance was dull, heavy, and dejected; her memory failed as well as reasoning power, and she talked of doing the most improbable things. It was two months, after she came under my care, that the paralysis became evident, yet a weakness of the *left* limbs had been gradually coming on. When she was getting out of bed on February 4th, 1875, she found that she was unable to

use either the *left* leg or *left* arm, but power to move them was by no means absolutely lost, and sensation was little affected. It is interesting to note, that from this time the acute pain in the head gradually became of a dull aching character, and then permanently ceased. When spoken to about herself, she complained of having an empty space in the *left* side.

On April 10th it was noted, that there was marked *right* facial and general paralysis of the *right* half of the body. The paralysis of the *left* side had now passed off, leaving an intense hyperalgia. Urine was acid, gravity 1012, no albumen.

On April 30th she was much weaker in every way, although she possessed voluntary power over all the limbs. The speech was un-

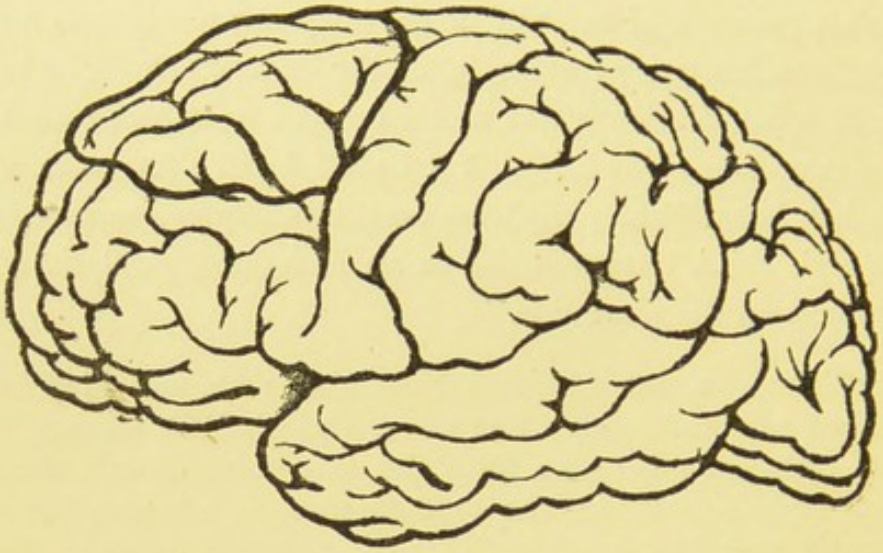


FIG. 2.—Showing outline of growth of convolutions of left anterior lobe.

affected; no control over sphincter. The temperature of the two sides of the body was now about equal, but at one time, the temperature of the *left* side exceeded that of the *right*, by more than two degrees. There were neither convulsive movements, tremors, nor contractions from first to last. She died from exhaustive diarrhœa.

Post-mortem Examination.—Upon removing the scalp, the frontal bone was found to be devoid of periosteum and carious. The same condition was observed of the internal table.

The dura mater was adherent to the skull over the *left* anterior lobe, where it presented a yellowish appearance and was much thickened. It was also firmly adherent to the first and second frontal convolutions of the *left* side (as shown in Fig. 2). Upon

making a section through the grey matter of these convolutions, it was seen to be almost entirely replaced by the growth, which had evidently taken its origin in the endosteal layer of the cranium, the surrounding substance was purplish in colour, and softening (although not advanced) had commenced.

There was general opacity of the arachnoid over the hemisphere, with a considerable amount of fluid, and the vessels at the base were atheromatous. The brain substance otherwise was quite normal in appearance.

The capsule of the liver towards the free border of the lobes was thickened and opaque. There was evident sclerosis of the visceral parenchyma.

If clinical and pathological deduction, in reference to the motor and physiological functions of the brain, be of the value which I have always supposed them to be, this case must stand prominently forward as an example, and also as a proof of the value of experimental research, because we have here a slowly-growing tumour, gradually giving rise to an objective paralysis, according to the brain substance invaded.

We know that the anterior lobes, as well as the anterior portion of the frontal convolution, are without the domain of the recognised motor area, but within that of intelligence. The growth took a course upwards and backwards, involving the anterior part of the anterior central convolution, and to it, succeeded the *right* hemiplegia, but no aphasia. And for what reason? Because, the third inferior frontal convolution was in no way implicated. To say the least, this is negative evidence in favour of M. Broca's well-ascertained facts, that the speech centre is in the third *left* frontal convolution.

CASE XXXI.—*Progressive Right Hemiplegia—Right Facial Palsy—Very sensible Atrophy of the Muscles of the Upper Extremity and Thorax, with Muscular Fibrillations on the Right Side—Hemikinesis with marked Muscular Hypertrophy of the Muscles of the Extremities and the trunk of the Left side—Atrophy of the Muscles of the left half of Tongue, the Pillars of the Fauces, and Vocal Muscles of this, the Left Side.*

J. C., æt. 29, was by occupation a lawyer's clerk. His health was excellent, until about five years before he came under my care.

There was no history of either paralysis or fits in the family. At the age of 24 he not only contracted syphilis, but became gay and dissolute in his habits ; and four years after he experienced a want of normal power over the *right* arm, and this increased gradually, so that this extremity was almost powerless, before the *right* leg became affected, six months after.

When I first saw him, the following notes were made : Is lying upon his back, quite helpless and unable to perform one single movement co-ordinately ; his reason is only to a slight extent impaired, but it cannot be defined with anything like precision.

Beginning with the cranial nerves, we find : 1. The sense of smell to be normal. 2. Sight good, no diplopia, ophthalmoscope shows an atrophic change around the margin of *left* disc. 3. Ptosis of *left* and *right* eyelid, very marked of the former, but slight of the latter, and a similar state exists in reference to a divergent squint. The muscles of the *left* eye are generally less co-ordinate than those of the *right*, the *left* pupil being more contracted. 4, 5. The motor branch of the fifth nerve is only slightly involved, neither is sensation to any great extent. 6, 7. There is marked palsy of *right* facial muscles, rather more pronounced, than that usually attendant upon convolutional disease of the opposite hemisphere. The auditory nerve is affected on the *left* side, where, be it remembered, the third nerve is chiefly involved, and not at all on the *right*, where the facial palsy exists. 8. The glosso-pharyngeal nerve is decidedly involved upon the *left* side. But the fauces generally are devoid of common sensation and reflex excito-motion. The left palato-glossus and palato-pharyngeus act very imperfectly, and form a kind of curtain on this side. The *left* vocal cord does not act so freely as the *right*. Respiration and deglutition are affected. At times the breathing becomes hurried and almost panting, and the act of swallowing is considerably interfered with, from involvement of the pharyngeal plexus. 9. It is somewhat interesting to note, how far the hypo-glossal nerve is affected ; I mean whether it be indirectly, or partially involved, at its centre of origin. The tongue is protruded and pushed well over to the *right* side, but its *left* half has undergone considerable *atrophy*. This is in striking contrast with the muscles of the *left* half of the body, which we have noted to be considerably hypertrophied. The speech is drawling and jactatory. There is no aphasia. Of the *right* extremities, the arm is completely powerless, he cannot even move the fingers, but sensation is only slightly affected. Electro-muscular contractility is increased. The muscles of the trunk on the *right* side are in like manner atrophied, both those of the thorax

and the abdomen. The *right* leg is in the same state of paralysis as the arm, but the former is rigidly extended, while the latter is flexed and the fingers well contracted into the palm. Electro-muscular contractility normal. The *left* half of the trunk and *left* extremities present a marked contrast to the *right;* for instead of the shrunken, passive, immovable limbs, they are seen to be greatly increased in size, the muscles standing out in bold relief, and far beyond their normal development; they are in a state of continuous passive movement, which simulates that of chorea more than the spasmodic jerkings as described by Saltorini, or those which have been noticed by some other observers under the name of atheosis. Rest of posture does not alter them, but they cease during sleep. Now and again he has controlling, but not co-ordinating, power over them, and like other inco-ordinate muscular spasms, they are always increased when ideation is brought to bear upon voluntary motor acts; even the effort to speak increases their force considerably. It is interesting to compare also the intrinsic muscular fibrillations of the *right* half of the body with the gliding snake-like muscular movements of the *left* half of the body, each condition having its physiological and pathological significance. He often complains of severe nocturnal pain over the *left* brow, as well as in the tempero-sphenoidal regions.

From these signs it was inferred that he was suffering from a cerebral growth, which, from the history, was considered to be of a syphilitic character, and that in all probability it existed in the *left* half of the pons varolii, and *left* half of the fourth ventricle, involving by degenerative change the optic and striate bodies, internal capsule, and *right* half of the pons and crus.

Antisyphilitic remedies were tried for nearly six months, and with some good result; he regained some power in the *right* leg, and the movements of the *left* arm decreased, so that he could carry a cup to his mouth, and sensation became normal all over the body.

Beyond this, however, he never got better, and on the day of his death the following note was made:

Has been gradually losing power for the past six months, but for the past fortnight he has become so weak, that the voice was scarcely audible, and swallowing extremely difficult. Sphincters incompetent, bed-sores upon buttocks, no convulsions, no loss of consciousness until within an hour of his death. For some time he has suffered from attacks of prostration, difficult breathing, partially stertorous, with profuse sweating and flushing upon the *right* half of the forehead and face, and divergent squint and com-

plete ptosis of the *left* eye. In all other respects his physical condition up to the time of his death, corresponded to the notes previously made.

The inability to obtain a *post-mortem* examination in this case is greatly to be deplored, as in its clinical and other aspects it presented a series of phenomena of unusual interest and pathological importance.

CASE XXXII.—*Syphilitic Disease of Left Cerebral Hemisphere, more particularly of Third Frontal Convolution—Peculiar Amnæsic Aphasia—Slight Dementia—Hyaloid Arterial Change.*

This case is especially interesting for the reason that for a long while there were no objective signs of paralysis except in those muscles whose co-ordinate movements were necessary to articulation, and these only became manifest, when the will was exercised to demand their definite harmonious association. Although there was some paralysis of the muscles of the tongue, the want of voluntary power over this member was slight, when compared with the muscular movements engendered through the facial nerve, so that any attempts on his part, to co-ordinate the labials, to whistle, or to blow, were abortive in a great measure. He was what might be termed passively emotional; when he became actively excited, he would laugh and cry alternately. The speech was rather of the drawling, hesitating character, than of the stuttering, jabbering kind which we shall notice in the following case. He worked about the ward, doing everything that he was told automatically, but with perfect good humour, and *apparent* freedom of will. It was only when he *endeavoured* to think and to exercise reasoning power, that his mind, through the faults of language, gave evidence of weakness, which was clearly due to some gross lesion, as we shall find in going through the case.

F. B., æt. 43, came under my care on the 21st July, 1876, and died on February 3rd, 1877. His ordinary facial aspect gave no indication of his cerebral state, either physical or mental; the muscular development and general *physique* were excellent; he was never known to have had a fit; he often complained of great pain

over the forehead, which was always worse at night, and attended with increase of temperature. He was slightly demented, and the faculty of language was faulty. The articulation was slow and hesitating, the vocal cords acted freely, but the mucous membrane covering them was nodular, and old cicatrices were visible on the posterior wall of the pharynx. These parts were remarkable for their want of reflex excitability and common sensation. He contracted syphilis at the age of thirty, but it does not appear to have given him much trouble. His general health was good until he was forty years of age, when he became nervous and depressed, and sometimes when he went out for a walk, he was unable to find his way home. Upon one or two occasions he staggered, and felt giddy, but this condition was rare. His wife states, that one morning when he got out of bed, he was unable to speak for some hours, and from that time his speech was more or less affected.

In September, 1876, he first felt the *right* arm become weak, said he felt ill, that the *right* arm and leg ached very much, and from that time the loss of power gradually increased in the muscles of this half of the body. In the following January the *right* hemiplegia was complete, with confirmed aphasia. The loss of power was greater than the loss of sensibility; there was *hyperæsthesia* and intense *hyperalgia* of the arm. In a short time after this, the *left* leg became paralysed, but the *left* upper extremity remained normal. The whole of the head was covered with psoriasis. On the 1st of February the temperature was recorded for a week as follows:

	Morning.		Evening.	
	Right.	Left.	Right.	Left.
Feb. 1.—	103	102·2	103·2	101·8
,, 2.—	101·6	101·6	103	101·4
,, 3.—	101·8	101·4	101	101
,, 4.—	101·8	101·6	102·2	101·4
,, 5.—	101·6	101·6	101·6	101
,, 6.—	101·2	101·6	103·6	102·4
,, 7.—	101·8	102	101·5	101·8

Subsequent observations proved the rule—that the paralysed limb is invariably hotter than the non-paralysed, no matter what is the cerebral lesion, which gives origin to it. His general bodily health was now fast failing. On the 12th February he became unconscious, and died comatose.

At the *post-mortem* examination, the skull was found to be free from disease. The brain weighed fifty-two ounces. The arteries at the base were not atheromatous, but pale, patulous, and hyaloid.

There was chronic inflammation of the membranes over both hemispheres, but more particularly over the *left*. The dura mater was found to be firmly adherent to the substance of the third frontal convolution of the *left* side, by reason of a growth, which was connected with its inner surface, and of the size of a small hen's egg. The growth had destroyed the brain substance, not only of this convolution, but also of the island of Riel, and exercised considerable pressure upon the corpus striatum. There was considerable softening of surrounding brain tissue. On the *right* side there was a patch of hæmorrhagic softening in the centre of the corpus striatum, but both optic thalami were free from any gross change. The tumour itself was, more or less, intimately blended with the surrounding textures, and, upon section, was seen to be of a pinkish-grey colour, somewhat vascular, with a central focus of soft mucoid degeneration. At the circumference its structure was firm and elastic. Under the microscope, it was seen to be made up of amorphous and granular masses, a proliferation of fibrous tissue, and a multiplication of small nucleated cells. The vessels external to, and about the mass, showed the existence of minute aneurismal dilatations (which have been described by MM. Charcot and Bouchard), with peri-arterial sclerosis. In some parts, the lumen of the vessels was almost obliterated, by detritus and cell proliferation; in other parts the proper tunics appeared to be nearly replaced, by connective tissue and nucleated cell growths; whilst in other parts where true sacculations existed, the coats were formed mainly of elongated cell growths, devoid of muscular or connective tissue elements. The nerve cells had undergone pigmentary atrophic degeneration, and minute hæmorrhages were numerous.

CASE XXXIII.—*Syphilitic Disease of Cerebral Vessels; Convolutional Degeneration of both Anterior Lobes, but more particularly of the Left—Marked Volitional Tremor, especially of the Labial Muscles—Progressive General Paralysis—Quasi-epileptic Seizures—Dementia.*

This case is one of that series which comes under the title of general paralysis of the insane. I have had *twelve* such under my care during the past four years; in *seven* of these, there was a distinct syphilitic history; and in *five*, absolute syphilitic manifestations. In none, was there marked atheroma of vessels or increased arterial tension. These cases were all males between thirty and

forty years of age. In *five*, the paresis was coincident with mental derangement. In *four*, the paresis existed before the memory was observed to fail; and in *three*, mental alienation of a melancholic kind was noted, previous to muscular inco-ordination. In *five* cases, there was a large amount of albumen in the urine, and, what is interesting to note, each of these improved greatly under treatment, and in direct ratio as the albumen decreased. *In all*, the paralysis first affected the muscles of *articulation* and *expression*, especially the *labial* muscles. In *seven*, there was decided epileptic seizure, with unconsciousness; and in *five*, the epileptic seizures were not so pronounced, but simulated an intense state of sensorial hysteria, accompanied with deep emotional depression, and vocal manifestations (howling, barking, and groaning). In *four* cases, the *aura* foreshadowing these seizures commenced in the tongue, as though innumerable pins were pricking it. In other cases, it always commenced in the foot, or hand, of the side which was most paretic.

It will be found, if care be taken in diagnosis, that one-half of the body is invariably more paretic than the other. In ten, out of the twelve cases recounted, there was more decided paresis of the *right* half, than of the *left* half, of the body. Only two were drunkards; the rest had been steady, well-conducted men, and all of them really athletic in their young days.

J. D., æt. 33, came under my care on the 4th of October, 1876, and died on the 1st of October of the following year. He was a man of good *physique*, rather dark complexion, and quite free from any sign of premature degenerative change. Yet from mere facial expression alone it was conjectured that there was a weakness of intellect from cerebral disease, which became apparent immediately ideation and volition were called into action. There was a decided neurotic history in his family, but as far as he himself was concerned, there was no evidence even of a neurosis, until his present illness came on. He contracted syphilis at the age of 22, without experiencing any severe constitutional effects; he was married, and the father of three children. For some months previous to the paralysis his sexual desire was excessive, *but actual virility was almost effete.* Until he was twenty-eight years of age, he was intelligent, industrious, even-

tempered, and of a quiet amiable disposition, and was noted for his powers of physical endurance; he could walk twenty miles without feeling fatigued, and could throw a cricket-ball over 100 yards. The first indication, of the approach of the disease, was referable to the change in his moral nature; he became perverse and irritable, and decidedly emotional—and as his wife said, the least thing would upset him; he would laugh and cry alternately from the slightest cause, and at these times the emotions would produce such a revulsion in the co-ordinating motor centres that the lips particularly, but his whole frame generally, became violently agitated. This instability of mind and its attributes preceded in this case any other objective signs, but only for a very short period —*and I am inclined to believe that in the most incipient stage of the general paralysis of the insane, it will be found that defects of ideation and volition are coincidently involved, and on this account, I think, that the progressive degenerations also are perfectly metrical and synchronous, in their psychical and volitional manifestations.*

He suffered from severe headaches, which were sometimes accompanied with vomiting, and always with constipation. When in this state, he was depressed and inanimate; there was increased heat of head, with intolerance of light and migratory ptosis of both eye-lids more marked in the *left* than in the *right;* the secretion of urine would be scanty, and the temperature, which was usually below the normal, would rise one or even two degrees.

Attacks like these occurred for the most part, every three or four weeks. When he was at his best, the temperature and secretory functions were normal. He first had a fit with unconsciousness, in June, 1876; and a few months after this, he came under my care in what might be called the second stage of the disease. There was defective reasoning power, and want of voluntary muscular co-ordination; mere automatic movements were performed with some degree of exactness, and contrasted strongly with defective volition. When spoken to, he usually said 'yes' or 'no,' with a tremulous articulation. This form of tremor, in association with purposive ideo-volitional speech, is merely an exaggerated condition of the statement, which has just been made, relative to automatic and voluntary acts in general, and the following remark of the nurse was practical and explanatory. She said that he would go to her and speak a few sentences clearly and distinctly, and then the tremor of the lips commenced, but more particularly was this the case, when she put a question to him for an answer. He then became confused, and his words were a mere jabbering. I have often noticed this with considerable interest. He could go through

the letters of the alphabet, and repeat a few words of one syllable with some degree of articulation, and so, in like manner, with the numerals until these became made up of more than one syllable, and then his difficulties increased with the number of syllables, so that where he had to make a combined effort to think and to speak, the whole of the facial muscles were brought into the most incoordinate spasmodic action, which gave to the face a grotesque appearance; it almost amounted to an explosive action before the muscles had regained their original tranquillity. How very different is this from the ordinary speech ataxy and aphasia from localised brain lesions, as well as from the imperfect articulation arising from disease of the pons varolii or of the bulbar nerves! Yet, upon a little reflection, it is quite easy to comprehend why the localisation of the function of articulate language presented a subject for so much discussion and difference of opinion amongst such learned men of the French school as Bouillaud, Velpeau, Gratiolet, Broca, and others, and we can now understand the reason why such differences ever existed, and explain them upon a psycho-physiological basis—thanks to the associated outcome of clinical and pathological work. In the *British Medical Journal* for June 19, 1875, will be found an article by Auguste Voisin, M.D., Médecin de la Salpêtrière à Paris, entitled 'Analysis and Pathological Physiology of the Troubles of Speech in the General Paralysis of the Insane,' explaining most clearly by pathological research how by certain lesions these various troubles are engendered. He says that the troubles of speech, in general paralysis, are of various orders, and bear different denominations. They are termed stuttering, drawling, hesitation, jabbering, stammering, and quavering.

These denominations are too often confounded, in the observations of general paralysis, and indifferently employed. The intimate causes of these symptoms do not seem to me, to be sufficiently known. I will here speak of the analysis and pathological physiology of the modifications of language. The faculty of language infers soundness (1) of the cortical substance of the anterior lobes of the brain—the seat of intellect; (2) of the nervous fibres, which pass from the cortical substance to the bulb, and which serve as conductors of the will; (3) of the bulb and the intra-bulbous nucleus of nerves animating the muscles, which are called into play during speech; (4) of the nerves animating the muscles; (5) of the muscles themselves.

The participation of these various organs is indispensable to the regular exercise of speech. It is not, indeed, enough for the movements of the muscles of tongue, pharynx, glottis, and face

to be rightly co-ordinated ; it is necessary that there be a sound intellect, a knowledge and memory of words, and that the voluntary excitement be easily transmitted to the nerves, which proceed from the medulla oblongata ; every restraint on the action of the organs which presides over these functions, will disturb speech. Upon the whole, patients who suffer from general paralysis present troubles of speaking, the etiology of which is multiple.

The causes of stuttering, of hesitation, of drawling, in speech, originate in the brain because they are morbid phenomena, involving disturbance of the intellect, of the will, and of the memory of words. The causes of jabbering, stammering, and quavering in speaking, have their origin in the medulla oblongata ; they are symptoms, corresponding with disturbance of automatic and involuntary co-ordination. The first order of the troubles of speaking is determined by the infiltration of the cortical substance of the frontal convolutions, and of the island of Riel with blastema, and by the production of embryoplastic nuclei—first in the vessels, next in the nervous substance, among fibres conducting the will, and by the ulterior organisation of these embryoplastic nuclei into fibrillary tissue. The second order of symptoms is occasioned by the infiltration of blastema and by the multiplication of embryoplastic nuclei in the vascular sheaths of the perivascular spaces ; next amidst the nerve fibres of the bulb, and by necrobiotic alterations of the cells of the original nuclei of the nerves of the medulla, and especially of the facial. After this, we trust, clear and interesting delineation of the pathology of the troubles of speech, we will resume the thread of our clinical observations. We found, that one of the chief features in the first and second stages of this disease in our patient was the want of voluntary co-ordinating power, and especially of ideo-volitional co-ordinating power. There were no particular illusions or hallucinations, and his delusions were referable more to his personal physical strength than to anything else. He would often state, that he could run, or walk, with any man in the ward, when he could scarcely go the length of twenty yards without stumbling.

It is interesting to note that, although the muscular development was good, and the electro-motor response was normal, yet the dynamographic manifestations showed that there was a marked inability on the part of the muscles to maintain their definite contractile power, and so again in raising weights. When lying upon his back he could raise forty pounds in weight with either leg. But this power was the engenderment of a primary molecular impulse, for upon second trial the legs would shake violently, and

voluntary power was almost completely lost. This muscular fatigue is pathognomonic. The loss of reasoning power as the case progressed was in advance of the disturbance of normal motor acts, for it was only some three months before his death that he gave any objective evidence of failure of automatic power, and with this the general health began to decline, his appetite failed, he lost flesh rapidly, his mode of progression became more slow and purposeless, and the attacks of epilepsy became more frequent; his urine was sometimes retained, and at other times the sphincters were incompetent. He would commit acts of indecency towards the close of his existence, which were clearly indicative of his rapidly failing mental powers. The urine was qualitatively, but not quantitatively examined. It was usually limpid, of a specific gravity varying from 1016 to 1020, always of an acid reaction, and free from albumen. It would appear from an article by Dr. J. Merson, in the 'West Riding Lunatic Asylum Medical Reports, 1874,' entitled 'The Urinology of General Paralysis,' that there is an increase in the quantity of urea, and that the chlorides and phosphates are notably diminished. From the great labour which this paper must have given the author, and the care bestowed upon the examinations, I should think that the statements were exact, conclusive, and of the greatest practical value. Our patient, for a week previous to his death, was partially unconscious, and frequently convulsed, delirious, and excitable. There was a decided paresis of the right over the left half of the body.

At the *post-mortem* examination made twenty-four hours after death there was scarcely any cadaveric rigidity. The skull was of normal thickness, and not adherent to the dura mater. This membrane was natural, and the veins and sinuses were free from plugging. The arachnoid membrane was opaque throughout, and the sac was distended with fluid. The pia mater was rather anæmic than hypervascular. When the brain was removed it weighed forty-seven ounces, and gave evidence of softening. There was general convolutional flattening and thinning of the grey matter. This was especially seen to exist in the convolutions of the frontal lobes, but more particularly in those of the left hemisphere, where they were shrunken and wrinkled, and it was evident that these lobes were especially and almost exceptionally the seats of disease. Upon section through the frontal convolutions, particularly the first and second, the grey matter was scarcely appreciable, and the white matter in continuity was softened, but free from hæmorrhagic staining. The brain substance of the central ovale was pale but firm, and the other parts gave no evidence of any gross lesion.

The vessels were free from atheroma. Upon section, they remained patulous, and their walls were thin, semi-translucent, and hyaloid. I am indebted to my friend, Mr. W. H. Kesteven, for the microscopic examination of the brain, and of the vessels. He found miliary and fuscous pigmentary degeneration throughout the nerve cells of the frontal convolutions, which was more marked at the border line between the grey and white matter, but the pathological changes found in the vessels were of the greatest moment, inasmuch as they afforded a rational explanation of the vascular origin of the cerebral degeneration.

A microscopic section* through a capillary vessel of the second left frontal convolution, showed that the coats were separated, and in some parts almost obliterated, by an aggregation of small cell or nuclear growths. This invasion was seen to involve the inner rather than the outer tunics of the vessel, and this is the point upon which Heubner lays so much stress, and which he considers to be especially diagnostic of the syphilitic origin of these changes. Upon further examination of other vessels these morbid products were to be seen in different stages of development. In some parts the lumen of the vessel was partially obliterated by the diffuse small cell-growths proliferated from the normal epithelium of the lining membrane, whilst, in other parts, vessels were seen whose coats had been more or less destroyed by these adventitious products, and appeared to be nearly made up by a network of elastic and connective tissue fibres. I have detailed this case with observations at some length, because in its consideration are embodied several questions of considerable pathological and psychological importance. For instance—What class of mental troubles can we ascribe, either directly or indirectly, to syphilis as the cause? I should say, that syphilis, by the diffuse changes which it is known to instigate in the small vessels of the brain, is the cause, of at least two-thirds, of the general paralysis, which leads to dementia, as we meet with it in this country, and, next to this, in causing a like effect, may be placed melancholia, which is, however, as far as my own observation serves, more due to the degenerative changes resulting from alcohol than from syphilis. Lastly—Are we quite

* See opposite page.

satisfied with the doctrine of Dr. Heubner, in respect to these vascular changes, as being the result of syphilitic influence? The

Microscopical appearance of a small vessel of left frontal convolution.

doctrine, certainly, seems to carry with it considerable weight, but as yet it has not been sufficiently investigated by pathologists in

this country, although there can be no question concerning its value. Dr. Heubner points out that this syphilitic degeneration differs, essentially, from atheromatous degeneration in its duration, anatomical appearances, and mode of termination. He says, that, whilst atheroma attacks the greater and middle arteries, syphilis attacks the middle and smaller ones; and that, whilst atheroma attacks any or all of the arteries of the body, syphilis attacks only the smaller vessels of the brain. For my own part, I am not at all inclined to agree with those observers who speak of syphilitic disease of the main arterial trunks. There is little doubt that the chief factors here, are the poisons of alcohol, gout, and rheumatism, or of these combined, but not of syphilis. Therefore, if we have well-marked degenerative changes in the small vessels of the brain, which differ from atheroma on the one hand, and from the hypertrophy and connective tissue-changes of Bright's disease, on the other, we may (and especially with a syphilitic history to guide us) come to a fairly rational conclusion, that they are essentially the outcome of syphilis.

CHAPTER IX.

On Ataxia and the Pre-Ataxic or Curative Stage of Locomotor Ataxia.

THERE can be no doubt, unless we have contrary proof of the most absolute and positive kind, that irregularity of movements and disturbances of volition, either in the creation of ideas or in the performance of co-ordinate muscular acts, are, in a very large majority of cases, due essentially to some syphilitic affection of the nervous centres, either hereditary or acquired. With this fact the physician is becoming every day of his life more familiar, and it is a misfortune of the most serious nature to the patient when these symptoms and signs of inco-ordination of movement are treated as mere trifles, and thought to be due merely to fatigue, or to stomach or liver derangement. I have no hesitation in saying that every case of locomotor ataxia is curable, provided it be treated sufficiently early and in the most energetic manner. This observation, which is of great import, will cause physicians both of the past as well as of the present day to shake their heads and reject a statement which hitherto has been considered untenable. So persistently has it been held that locomotor ataxia is an incurable disease that we can scarcely refer to a text-book on medicine* where we do not find this to be stated without any qualification. I hope that I shall, in the fol-

* Sir Thomas Watson says ('Lectures on the Principles and Practice of Physic,' vol. i., p. 700): 'The treatment of this disorder must in the main be that which is indicated in all disorders that are incurable.'

lowing pages, prove that this doctrine is erroneous, and that the conclusions upon which it is based are false, illogical, and unworthy of the present advanced stage of scientific medical research.

The disease which we know by the name of locomotor ataxia, and which we shall again refer to, is not of rapid progress until it arrives at a more advanced stage, and many cases of inveterate and incurable ataxy have come under my observation during the past three years which have existed in the pre-ataxic or curable stage for ten, fifteen, and even more than twenty years. Every case of locomotor ataxy (with very few exceptions) can be traced to a syphilitic origin, if due care be taken to inquire fully into the patient's history.

It is surprising to note for how long a time some men will suffer from attacks of unsteadiness of gait, inco-ordination of movement, abnormal sensations, and acute flying pains, before they think in any way seriously of the grave nature of the disease with which they are afflicted; and then, alas, when too late for any remedies to be of absolute avail, they seek advice on all sides in the most impatient and irresolute manner, deploring the helplessness of doctors to do them any good. This is unquestionably a most distressing state of things for the patient, who looks to the physician as one skilled in the art of healing, and in whose powers of discrimination and judgment in scientific detail, he not only hopes, but expects to find some remedy for his afflictions. It is a blot upon our skill in diagnosis, no less than upon our skill in reratment, that so many cases of nervous disease are permitted to tun an unchecked course, and are not unfrequently relegated to diseases caused by mere derangement of function on the part of the liver or on the part of the digestive apparatus. It is true that physicians, either from want of skill or from a too superficial examination of the patient, do frequently permit an incipient locomotor ataxy to pass from a curable to an incurable stage before taking active measures to prevent such a condition ensuing. I have had many patients to consult me for flying (so-called rheumatic) pains about the body, associated with want of sleep, and stomach and liver derangements, who were quite

ignorant that they were suffering from locomotor ataxy, and the fact that they were walking with their legs wide apart, and wearing down the heels of their boots in a manner which they had not done before, and with their eyes watching the movements of their feet, was, in their opinion, more a habit than a sign of commencing and serious mischief of the spinal cord.

In all diseases of the nervous system it is especially necessary that a careful and early diagnosis should be made, and if this were done we should see far less of the many incurable cases which are constantly presenting themselves to our notice. In this article I shall confine my remarks more particularly to ataxy of the lower limbs, and give my experience in reference to its curative treatment and its differential diagnosis in reference to some other diseases of the brain and nervous system. A physician accustomed to the treatment of the varying forms of nervous disease has generally, comparatively speaking, very little difficulty in arriving at a correct and approximate estimate of the seriousness or otherwise of the symptoms and signs which are presented by his patient, although it may be a matter of grave doubt in some cases as to the extent, nature, and position of the lesion in the brain and spinal cord, which may be the cause of those signs and symptoms. It is far too common a practice, even amongst professional men, to treat with indifference many of the incipient signs of the most serious and grave degenerations of the brain and spinal cord, and to transfer such cases to the class of 'nervousness,' 'mimicry,' and 'hysteria.' The man of experience is invariably more careful in making a diagnosis and in giving a prognosis concerning any lesion of the nervous system than is the man whose knowledge of such cases is less profound and of a more superficial nature. I am compelled to admit that I have in several important instances seen cases of unquestionable organic disease of the brain, which were merely looked upon as due to exhaustion or functional derangement, and which required, so it was thought, only time and change of air to effect their cure. Now this, in my opinion, and even in my practice, has demonstrated to me the existence of errors of judgment in diagnosis which most

certainly ought not to have had the shadow of an existence, and much less the reality of one. To believe that a patient is feigning disease because the medical man fails at once to recognise its true nature, and is unable to trace it to its origin, shows an ignorance and even culpability which is deserving of the most severe censure and reprobation. Yet so little do we know even now of the nervous system, and the marvellous power which it possesses in controlling our every thought, word, and deed, that we ought to be the more careful—and, in fact, we cannot be too careful—in bringing together and training our ideas to unravel the as yet inexplicable network of fallacies which at present entangle this field for laborious study. I am quite willing to admit, however, that the diagnosis of a tumour of the brain or a tumour of the spinal cord, let it be syphilitic or otherwise, is in its early stage not unfrequently a question of great difficulty, and so also is the diagnosis of many of those slight and chronic inflammatory changes which give rise to what we now term a sclerosis, and which lead to many protracted and incurable forms of paralysis. In making the diagnosis of a progressive locomotor ataxia in that stage when our remedies shall be found of avail to bring about a cure, we have certain points presented to us for our consideration which serve as landmarks to guide us to a satisfactory issue, but these vary so greatly that it is almost an impossibility to lay down any hard and fast laws for our guidance with that degree of certainty which is at all times so desirable for teaching purposes.

Dr. Seguin, of New York, has given to the profession a clinical lecture on locomotor ataxy, which, in my opinion, is a very valuable contribution to the literature of this subject,* and I shall take the liberty of copying his classification, because in almost every particular I can quite endorse the soundness of his doctrine and the truth of his assertions.

For the sake of clearness and definition we divide the course of locomotor ataxy into three stages, and, as Dr. Seguin points out, 'The first stage of the disease may well be designated the stage of

* A series of American clinical lectures edited by E. C. Seguin, M.D., 'The Diagnosis of Progressive Locomotor Ataxia,' 1878.

fulgurating pains, and in association with these pains we find the following signs and symptoms :

Localised hyperæsthesia.
Diplopia from strabismus.
Ptosis from palsy of third nerve.
Small pupils.
Unequal pupils.
Numbness and slight anæsthesia of feet.
Sexual excitement.
Seminal emission.
Paresis of the bladder.
Diminished tendon reflex.
Impaired sight from atrophy of optic nerves.
Slight joint affections.
Localised anæsthesia.
Absence of paralysis or ataxia in the limbs.
General health excellent.

'The beginning of the second stage is characterised by the ataxic movements, and may be called the ataxic stage. The chief symptoms are in order of importance :

Ataxic movements.
Fulgurating pains.
Localised hyperæsthesia.
Ocular paralysis.
Numbness and other dysæsthesia.
Anæsthesia.
Staggering with closed eyes.
Failure of sexual power.
Absence of tendon reflex.
Rectal and vesical pareses.
Gastric crises.
Laryngeal crises.
Vesical crises.
Severe arthropathies.
Amaurosis.
Complicating common transverse myelitis.

Spinal congestion.
Paralytic dementia.
Vesical catarrh.
Preservation of mere muscular force.

'The third stage may be said to begin when the anæsthesia and ataxia are so great as to render the patient perfectly unable to stand or to use his legs. This might aptly be called the pseudo-paralytic stage. In this terminal period we may have any of the following symptoms in various groupings or even all of them :

Fulgurating pains.
Ataxic movements.
Absolute anæsthesia.
Loss of sexual power.
Rectal and vesical pareses.
Paralysis of ocular muscles.
Amaurosis.
Deafness.
Various crises.
Severe arthropathies.
Disorganisation of large joints without pain.
Seeming paralysis of the extremities from anæsthesia (and loss of muscular sense).
Dementia.'

I think this classification of so much usefulness that I have not hesitated to adopt it here, because I feel sure that it is as perfect as such a differential classification can be, and it would be impossible to classify the signs and symptoms of this disease from a limited number of cases with anything approaching accuracy of detail ; also I have no doubt there are many observers who would disagree with the main order of frequency and relationship of many of the symptoms and signs which are here laid down. Of course, in going over these lists one would have really little or no difficulty in bringing forward individual cases which would upset these methodised results of Dr. Seguin's careful and observant industry, but this would by no means invalidate his general conclusions.

Now, in progressive locomotor ataxia, or tabes dorsalis, we have a sclerosed condition of the posterior root zones of the spinal cord, and I quite agree with Dr. Hammond* that the terms just mentioned to designate this disease are inappropriate, quite as much so, in fact, as calling a disease after the name of the man who first chronicled it. The term ataxy (from α priv., and τακτὸς, ordered) means a want of order, disturbance, irregularity; but irregularity in locomotion is due to disease of the brain or cerebellum, as well as to disease of the spinal cord, so that we have to consider the especial kind of muscular inco-ordination which is peculiarly pathognomic of the disease which we are considering. It will be found that the legs in walking are invariably kept extended, the forepart of the foot is thrown well forward into the air, and the heel is brought down to the ground with a thud, so that the foot comes into contact with the ground by two distinct movements, and the more the patient tries to co-ordinate his movements the less co-ordinate they become. A patient that I now have under my care, who suffers from the first stage of syphilitic ataxy, can walk with comparative comfort upon a thick Turkey carpet, but when he tries to walk upon a tiled floor his movements are so inco-ordinate that he runs the risk of turning over, and he has to balance himself with his arms to keep himself from falling, and when the eyes are closed, or when he attempts to walk in the dark, he fails utterly to do so in the most signal manner; again, when a patient with syphilitic ataxy is in the recumbent posture, with the eyes closed, he is still unable to co-ordinate the movements of the legs, just in the same way as he is when trying to walk: if, for instance, he is told to place one leg over the other, the leg is usually raised high in the air with an oscillating action, and falls with considerable force and without due co-ordinating power. It is by this means that we can readily distinguish an ataxy of this kind from an ataxy due to disease of the cerebellum, where the movements of the lower limbs are quite co-ordinate when the patient is lying down.†

* 'Diseases of the Nervous System,' New York, 1876.

† Ataxy of locomotion is made manifest by a feeling of weakness whilst standing upright and in walking, which is associated at the same time with the

It is an interesting question to consider what relationship exists between the electric-like pains and the ataxic gait in reference to precedence of origin (but this part of the question we shall enter into more fully when considering the signs and symptoms of the pre-ataxic stage of locomotor ataxy), and also whether these subjective and objective signs can in any way, according to their relationship, lead us to the conclusion that the disease is of a syphilitic nature. I am greatly inclined to believe that if we follow up our researches in this direction we shall arrive at a satisfactory result, and although I feel sure that nearly every case of locomotor ataxy is due to syphilis, either hereditary or acquired, so much so, in fact, that it may well be called syphilitic ataxy, still I can scarcely see that we are justified in maintaining that a locomotor ataxy is syphilitic because there is some indistinct history of the existence of a sore of many years before the ataxy made its appearance. If my own experience serves me, I should say that a prolonged first stage in locomotor ataxy is rather against, than in favour of, its being of syphilitic origin, and I base my statement upon comparative, rather than upon direct, evidence; and for this reason, that out of twenty-three cases of this disease which I have recorded, seven have existed almost stationary in the first stage with ataxy for a series of years varying from eight to fourteen, whereas in the remaining sixteen cases, where there has been a clear history of syphilis, the troubles of the second stage, and even of the third stage, with ocular paralysis and vesical and gastric crises, have come on in from two to five years. I am not, as a rule, at all ready to admit that because a disease yields to anti-syphilitic remedies it should on this account be considered absolute that such disease was of a syphilitic character; but in reference to disease of the posterior columns of the cord, I am bound to make the statement that whenever this condition does yield to mercury or to iodide of potassium, it is as sure a test as we

troubles of motor co-ordination and equilibration, and which contrasts with the integrity of healthy individual movements; by loss of sensibility, varying in different degrees, of the skin and parts beneath it—that is to say, of the muscles, nerves, osseous and articular surfaces; by functional troubles of the genital organs (impotence or satyriasis); and difficult micturition or defecation.

can possibly have that it must have been of a syphilitic nature. With regard to the pains of locomotor ataxia, they are, I venture to think, of so peculiar and special a kind, that it would be impossible for them to be confounded with the pains of rheumatism, or with the pains of neuralgia. They certainly simulate a tri-facial neuralgia with regard to their intensity, but they very rarely, if ever, take the course of a nerve, so that it would be impossible to map them out in the same manner that one frequently does a neuralgia, which invariably follows the course and distribution of the nerve affected. These pains are extremely sudden in developing themselves; for instance, a patient of mine will complain sometimes of a peculiar feeling at the back of the thigh, which will continue perhaps for an hour or more, when he cries out, 'Here it comes,' and in a second, like a lightning-shock, he is convulsed in agony. Sometimes these pains are stabbing, cutting, and tearing, whilst at other times they are burning and gnawing in their character; and what I think makes them still more peculiar, is the way in which they sometimes yield to the most simple remedies, whilst they resist anything like heroic treatment.

A gentleman who consulted me not long ago, told me that at times the pains disappeared upon the application of aromatic spirit of ammonia to the part; but in very severe attacks, neither morphia injections nor the internal administration of chloral helped to mitigate the pain. I am quite convinced that chloral is of little use in relieving the severe pains of locomotor ataxia, and unfortunately it seems to lose its power under these conditions to induce sleep even in large doses. One of my patients suffering from locomotor ataxia, who had never previously taken chloral, thought that during one of his attacks of pain he would give it a trial, and in the course of four hours he took upwards of two drachms of this drug without any relief from the pain, and without even a tendency to sleep having been induced.

The use of morphia, on the other hand, has certainly many advantages, and if its internal use is not promptly followed by relief, I blister the skin rapidly with a strong ammoniated solution of cantharides, and apply to the blistered surface two grains of

morphia rubbed up with vaseline. These pains are so vagrant, and present such an infinite variety of symptoms, that it would be impossible almost to describe them accurately. A gentleman who was a patient of mine, and of the highest intelligence, said that he utterly failed when he tried to give a succinct account of the horrible pains from which he suffered.

In the case of another gentleman, who consulted me some few months ago, I found a specific for the relief of his pains in the injection of half a grain of morphia sent well down to the sciatic nerve at the hip, and following this, I thoroughly anæsthetised him by causing him to inhale the bichloride of methylene. He usually slept after this for two hours, and he then awoke quite free from pain.

I have never seen severe measures of much use in the relief of these pains. I shall not readily forget the condition of the limb of a patient whom I was called hurriedly to see; he had rubbed the leg so vigorously with a strong hair-brush, that it was literally raw, without any good effect having been produced. The application of extreme heat and extreme cold has in some of my cases produced a relief from the pain when other remedies have failed. Within the past six months the following plan has been adopted, both upon the continent and likewise in this country, but with very partial success, for the removal of these distressing pains. The plan has been to make a free incision right down upon the sciatic nerve, and to raise the nerve from its bearings with the surrounding parts so as to stretch it to the extent of some inches. I cannot recommend this mode of procedure, for in those cases where I have known this operation to have been performed very little if any permanent good has been the result.

We sometimes find that when the first stage of an ataxy is prolonged the pains will leave the patient for years, and then return again in the most unaccountable manner; and again, I have found that in some old-standing cases of ataxy the patients never suffer from pain otherwise than during an electrical state of the atmosphere. It is an important fact, and one which ought not to be forgotten, that in nearly every case of locomotor ataxia the ataxic

gait is preceded by these fulgurant pains; and I would here draw a marked distinction between those severe pains of a deep-seated character which are associated with the ataxic gait, and those slighter pains which are so evanescent and resemble a sharp needle or lancet thrust into the skin, and which do not infrequently resemble a neuralgia in their nature, and which may exist for years before any ataxy may become evident by objective signs; and so far as I have seen from the writings and experience of others concerning this disease, this symptom has not been sufficiently thought of, and I would maintain, in contradiction to many observers, and Dr. Seguin amongst the number, that the pre-ataxic stage of a true locomotor ataxia can be diagnosed, and if diagnosed, the advance of a 'fasciculated sclerosis' of the posterior nerve roots can be stopped and an incurable locomotor ataxia prevented. I am as sure of this as I am of anything in medicine, and the following signs and symptoms are in my practice and experience diagnostic of what I now call the pre-ataxic stage of a locomotor ataxia:

Pre-ataxic Signs of Locomotor Ataxy.

Inequality of pupils.
Small pupils.
Paresis of left third nerve.
Cutaneous fulgurating pains.
Sexual excitement.
Transitory inco-ordination of lower limbs.
Variable patellar tendon reflex, rarely absent.
Spinal irritability.
Dysæsthesia. } Very transitory.
Anæsthesia. } Very transitory.
Hyperæsthesia. } Very transitory.
Visual colour changes.
Gastric and intestinal crises.
Temperament variable.
Retinal changes.
Mental depression.
Insomnia.

I believe that I am quite right in making the statement that within the past few years our ideas concerning the signs and symptoms of a locomotor ataxy have undergone a very material change. It is not so long ago that physicians were disinclined to recognise any form of disease as locomotor ataxy provided there were no ataxic movements; but now a sclerosal atrophy of the optic disc, if associated with lightning pains and an absence of knee reflex, would be quite sufficient to lead most men to the conclusion that a sclerosal change was going on in the sensory side of the nervous system, and that inco-ordination of movement would invariably follow. I am now going to describe, *seriatim* and very briefly, the symptoms and signs of what I venture to think I am the first to note as the pre-ataxic symptoms proper of locomotor ataxy; and when I say that I am firmly persuaded that if these signs and symptoms be fairly diagnosed and properly treated, an incurable disease can be prevented, then I repeat that I think our knowledge will prove a great boon to many unfortunate sufferers. I am not at all clear in my own mind—and the conclusions arrived at by the investigations of numerous Continental and home authorities appear to be not more explicit than myself—upon one point, which is this, namely: Of all the pre-ataxic signs of locomotor ataxy, can we place most reliance upon those which affect the eye, or upon those which affect the skin? I have seen many cases during the past few years where the eyes have been affected, and there have been as well the lightning-like pains of the skin and muscles for over twenty years before there were any of the objective difficulties associated with inco-ordinate movements either of the speech or the upper or the lower limbs; and speaking more particularly from my own experience, which has been considerable, I must say that, of the two most important signs of locomotor ataxy—namely, what we call the eye symptoms and the electric-like pains—I am fully inclined to believe that no case of locomotor ataxy ever existed which was not preceded by these pains, and, moreover, that these pains were the first subjective phenomena which bore upon them the initial stamp of what would inevitably follow in months, or perhaps years, and many years, to come.

Character of Pains.—Now, these pre-ataxic pains differ very greatly from the particular and special pains of a confirmed locomotor ataxy, which are commonly spoken of as fulgurant or electric-like pains. In the first place, although they come on suddenly and disappear suddenly, they are much less intense and of much shorter duration, and they vary greatly in character and intensity. This variability in character and intensity would confound one very much concerning their real nature were it not for the fact that they vary in that periodicity which is so common a condition in neuralgia and migraine. Yet, although it is not a difficult matter to diagnose a purely neuralgic pain, even when associated with locomotor ataxy, from those pains which may be considered as intimately bound up with the symptoms of locomotor ataxy, still it is much more difficult—and in our present state of knowledge I have no hesitation in saying that it is almost impossible—to diagnose pre-ataxic pains from other pains which are essentially neuralgic, unless we exercise great care and judgment, and endeavour, if possible, to find out some other initiatory and associated sign; and this is the more difficult for the reason that the pre-ataxic stage of locomotor ataxy is invariably associated with spinal irritability, and well-marked tender spinal spots can be readily elicited, which appear to be more or less connected with the pains by nervous contiguity and influence. These pains, however, have this special peculiarity, and in this respect they certainly resemble their congeners in well-marked locomotor ataxy, and that is (a point, by the way, which I have previously referred to), that they are electric-like in their arrival and their departure, and almost of momentary duration. They may affect, like neuralgia and migraine, the head, eyes, face, ears, jaws, and neck; and this is due, as Mons. Pierret* has pointed out, to the sensory divisions of the roots of the fifth and occipital nerves becoming implicated by a commencing degenerative change in the medulla oblongata and upper cervical post root zone. And they may also affect the chest, the abdomen, the genital organs, the rectum, the anus, and

* 'Essai sur les Symptomes Céphaliques du Tabes Dorsalis,' par le Dr. A. Pierret, 1876.

the lower limbs, and the inner side of the calf, the inner and back of the thigh, and outer side of the foot.

A man twenty-three years of age consulted me at the North London Hospital for consumption, for a hard, dry cough; but what he mostly complained of, and what seemed to give him very serious anxiety, was the pains of the most violent and sudden character which invaded principally his chest, but sometimes they would attack the heart, the head, and even the lower limbs. I treated them in the first instance as neuralgic, but upon his second visit I found that there was an imperfect knee reflex and fairly well marked pupillary symptoms, and, in fact, other signs indicative of a commencing ataxy. I discontinued treating him for his chest, and blistered his spine freely, and gave him large doses of bromide of potassium and ergot, and he rapidly improved.

All writers on locomotor ataxy appear to be agreed that it is ofttimes a very difficult matter to obtain a true statement from patients concerning the pains which we are now considering, and which, in fact, play so important a part in that phase of the disease which we have under our immediate observation. It is a most common thing to hear patients speak of these pains as 'rheumatic' or 'gouty.' They say that they are very sharp while they last, but are soon over. Whenever a patient thus speaks of recurrent pains precisely similar in their action, do not let them pass without considering their exact nature with the most painful care and discrimination, and examine every spinal process with exactitude and precision. These abnormalities of sensation which we have hitherto been designating pain must now be considered rather in the light of a perversion of normal sensibility. For instance, we will first take the sensations of heat and cold. C. complains of feeling as though a hot iron were being applied to the left side over the 8th, 9th, and 10th ribs. S. will complain of a feeling at the back of the left thigh as though a star had fallen upon it and radiated its heat to surrounding parts. D. complains of a feeling as though innumerable very fine needles were being driven into the skin of the calf of the leg, extending over a surface about the size of a crown piece. E. will complain of a general shooting pain passing through the temples, as though a knife had been driven

through. F. will complain of a creeping sensation over the left nostril, as though a number of ants were crawling over the skin. G. complains of a sense of coldness over the left shoulder, as though a lump of ice had been placed upon it. I. complains of the *left* foot becoming cold and numb, whilst the right foot is burning. B. complains of a feeling as though a rod of cold iron were being placed upon the inner part of the thigh; which, however, alternates in feeling, being sometimes cold and sometimes hot. E. will say that her back feels as though it were being scalded by boiling water; whilst R. will say that the back feels as though cold water were being poured down it. I. will complain (and this is not uncommon) that the teeth feel spongy, and as though they were made of indiarubber. P. complains of a feeling as though a tight band of variable roughness was being tied around the head. W. as though a sharp, fine knife were being driven into the perineum, or it may be into the rectum.

In this stage of the disease which we are now considering there is unquestionably an exaltation of sensation and sensibility. This, however, is not only extremely variable, but it may be of very short duration.

In reference to undue subjective sensibility on the physical side of the nervous system, it is demonstrated in many ways; as, for instance, a man in the pre-ataxic stage will not be able at times to sit cross-legged for more than a few minutes without experiencing a feeling of numbness (and pins and needles) and, it may be, a shooting pain running up the sciatic nerve at the back of the thigh; or if he catches his foot in walking, it jars upon the nerves going up the leg in a manner which is quite unknown in the healthy state. Now the same condition is referable to the upper limbs. A patient of mine who suffers from initial ataxy is constantly experiencing these jarrings upon his nerves, and, although he is not an anatomist, he can map out the course of the larger nerves with the greatest accuracy, simply from the fact that he *feels his nerves*, as he very graphically expresses it.

In reference to undue sensibility on the psychical side of the nervous system in the pre-ataxic stage of locomotor ataxy, I think

there can be no question of doubt but it is often a very difficult matter to elicit this point. Men do not like to admit that they are fearful, impressionable, irascible, excitable, emotional, and so on; but the practised eye can readily detect an inward trepidation and instability, which the patient endeavours to mask by an assumed air of cool nonchalance, which is in truth nothing more nor less than pure assumption.

I had a patient under my care a few months since who spoke of these pains as resembling the sting of a horse-fly. I have seen a patient in the greatest distress and discomfort from these pains, and they succeed each other with the greatest rapidity; they occur for the most part singly, and the patient has scarcely time to rub one part of the body before his attention is called to another part. Now these pains may be preceded and succeeded by intense itching over a limited and circumscribed area, and this state of itching will be as rapidly migratory as were the pains just described. If we test the sensibility of the skin of the feet and lower limbs we shall find patches which are decidedly anæsthetic; but this is more particularly marked over the plantar and dorsal surfaces of the feet and inner part of the legs. A patient of mine who is now the subject of a confirmed ataxy, told me that the first symptom which in any way alarmed him was that upon one occasion when mounting his horse he could not recognise that he had his foot in the stirrup.

There can be no question that the resistance of the cord to the reception of impressions is greatly increased in this stage, probably not enough, however, for the patient to recognise it until his attention is drawn to it; and I maintain that this increased power of resistance on the part of the cord is due in most cases to an actual congestion of its vascular supply; in fact, a vaso-motor paralysis which leads on to defective nutrition and ultimately to degenerative change.

Thus the two symptoms which I have just described, namely, fulgurating cutaneous pains, and plantar and dorsal limited anæsthesia, are infallible signs of the pre-ataxic stage of a locomotor ataxia. If any of the other signs exist the diagnosis is made more

confirmatory; but when investigating the history of these cases (I mean of disease of the posterior columns of the cord), one frequently finds that patients will date the commencement of their illness from the time when they first became ataxic, and when they are asked concerning other subjective symptoms, such as pain, perversion of sensibility, attacks of indigestion, rapidly appearing and as suddenly disappearing sexual excitement, seminal emissions, and so on, they seem somewhat astonished that such apparent trifles and ordinary derangements of health should have ever been the important and diagnostic precursors of such a serious nervous infirmity as that from which they are suffering.

Eye Symptoms.—It is indeed highly probable, but the statement requires time and further observation for its complete verification, that special eye symptoms may exist in the initial stage of locomotor ataxy for twenty or twenty-five years. For the moment I pass over what may be actual changes in the retina, and consider those more delicate reflex processes which we find to exist in connection with the pupil of the eye, and which have been referred to for some years by Echverria, Voisin, Clymer, Argyll, Robertson, Grainger Stewart, and others. Of all recent writers upon this subject, Professor Erb has, I think, treated this question in the most philosophic and scientific manner, although very much remains to be done in this interesting field of observation. In the pre-ataxic stage of locomotor ataxy we often find extreme contraction of the pupil (spinal myosis), with inexcitability to light, and with preserved accommodative movements, which we also so frequently see in well-marked locomotor ataxy, general paralysis of the insane, lead-poisoning, and in other diseases of the nervous system due to syphilis. Yet, on the other hand, it may be set down as a well-ascertained fact that, although the pupil may not, and frequently is not, contracted (for, on the contrary, it may be even abnormally dilated), it will also be found that there is an absence of reflex pupillary mobility to light; whilst, under accommodative impulses and convergence of the visual axes, they react with perfectly normal promptness. Erb ('American Archives of Medicine,' 1880) says that in 84 recent cases of tabe he found

absolute reflex pupillary immobility to occur 59 times; very weak, slow, and inexpansive action to light, 12 times: hence a total of 71 cases with diminished reaction, against 13 with normal reaction. *Out of the 71 cases, 43 belonged to the initial stage—that is, they exhibited no signs of ataxia, or only the slightest trace of it.* It is obvious then, according to this most distinguished neurologist, that we have in this pupillary non-excitability a sign in reference to the pre-ataxic stage of locomotor ataxy which is not only remarkable, but of the utmost diagnostic importance. The absolute value of this sign may, if necessary, be further confirmed by the fact that this diminished pupillary reaction rarely if ever exists in healthy individuals, but, as we have before stated, it does exist in persons suffering from various forms of nervous disease. Erb, in the article before alluded to, says that it does sometimes exist in persons not affected with tabes; but that these patients will not develop tabes sooner or later, who will dare say? In my own practice during many years I have given considerable attention to the so-called eye symptoms in the pre-ataxic stage of locomotor ataxy, and I am perfectly convinced of their diagnostic value.

There is another point of importance for consideration, and it is this: 'In confirmed tabes we find almost invariably absence of reflex pupillary contraction, and not unfrequently an absence of reflex dilatation; and there is this marked difference to be noted between the excitability of the pupil in the stage of pre-ataxy and in the stage of confirmed ataxy, namely, that in the pre-ataxic stage an ordinarily unexcitable pupil can readily be excited by sympathetic or reflex irritation, both with and without the aid of electricity. For instance, if a patient in the pre-ataxic stage of locomotor ataxy (where the pupils do not contract to light in the ordinary way) is made to shut one eye, and if the lid of the closed eye be lubricated with the tip of the forefinger, exercising at the same time some amount of pressure, the pupil of the opposite eye will dilate to a degree which is really remarkable; and the same effect can be produced, but not in so marked a degree, when the faradaic brush is applied to the skin of the temples, or the mastoid process of the temporal bone, or the cervical plexuses

of the sympathetic in the neck. Now, such an excitability of the pupil does not follow, under similar conditions, in a well-pronounced case of locomotor ataxy. I do not mean to say that such excitability of the pupil cannot be produced in myosis associated with lead-poisoning and general paralysis, because I have long been acquainted with the fact that it can be, and I have frequently used this means to aid me in making a differential diagnosis. Nevertheless, in this sign, when considered with other signs, we have a most important aid in diagnosis which ought not to be forgotten; neither must we fail to remember the great help which the ophthalmoscope affords us; but I am inclined to think (whether rightly or wrongly I am not prepared to say) that in the pre-ataxic stage of locomotor ataxy the non-excitability of the pupil to light (by this I mean the sluggish pupil) is of far more value than the intraocular changes which may be met with by ophthalmoscopical examination. By way of example, I will refer to three cases of confirmed locomotor ataxy which are under my care at the present time, and two of these cases were sent to me by an oculist, to whom they applied for defective vision, and in whose eyes he found a rapidly advancing grey sclerosis and atrophy; but, upon going into the history of these men, I found that they had been suffering from the initial signs of locomotor ataxy for years before their vision became affected (this does not, I am well aware, negative the fact that a neuritis may exist, and yet vision of a kind remain unimpaired)—so long, in fact, that I feel sure that the other signs did exist prior to the changes in the optic disc. A patient consulted me who had been under the care of one of our most eminent oculists, who said that he either was ataxic or would become so. There was complete sclerosal atrophy of one eye, with loss of vision; but, as far as I can remember, there were no other signs of ataxy, and the man's condition was stationary; so that I am inclined to hold to the opinion just expressed, that we must look to the pupil of the eye rather than to the changes in the optic disc for a definite pre-ataxic sign; still, neither must be neglected. If we look at the physiological side of this question, I think we shall be more than ever convinced

that this opinion has some foundation in fact, even although Stilling of Strasburg has very recently endeavoured to prove that the optic nerve has a spinal or medullary root.* It is now generally admitted by ophthalmic physiologists that certain nuclei exist in the floor of the aqueduct of Sylvius, which govern the muscles of the eyeball, the action of the pupil, and the accommodation of the eye; hence we find those objective signs through the medium of the pupil, which predicate with an almost unerring accuracy changes in the sensory tracts of the brain and spinal cord.

Lastly, before leaving the eye symptoms, I would draw attention to the fact that inequality of the pupils is not unfrequently an initial sign of locomotor ataxy. One pupil, for instance, will be widely dilated whilst the other is contracted, and neither pupil will react to light, but the contracted pupil will act under accommodation more readily than the pupil which is abnormally dilated.†

From examinations of the retinæ, made by myself and others, there has invariably been found a more or less degenerative change going on in the vessels and in the disc; the former are more or less tortuous and blurred on the outline, and the latter have a dull greyish appearance, but in many cases no changes in the disc are seen. Colour-blindness is a not uncommon accompaniment of ocular defects in the pre-ataxic stage. For instance, red and green are frequently said to be dirty yellow and brown, but blue and yellow are invariably perceived correctly. Other ocular troubles and palsy of ocular muscles are not uncommon in the pre-ataxic stage.

Patellar Tendon Reflex, '*Knee Reflex*,' '*Westphal's Symptom*.'—

* *Lancet*, November 27, 1880.

† These eye phenomena have, according to Erb, the following physiological significance. He says: 'Between the retina and sphincter pupillæ innervated by the oculo-motorius, exists a reflex tract which goes through the optic nerve to the brain within the brain to the oculo-motorius, and in this centrifugally to the iris; and in explanation of the reflex *immobility* we can only maintain that that portion of the reflex tract is affected which lies between the optic and oculo-motor centres. For the myosis we must refer to changes in the dilatator pupillæ, whose centre is said to be in the medulla oblongata, and sends the principal part of its mass into the cervical cord, down to the cilio-spinal centre.'

We now come to the consideration of a very valuable sign which is usually supposed to be diagnostic of organic disease of the spinal cord, and, until I questioned the fact, it seems that no other observer took exception to what has generally been received by the profession as a rule to which no exception could be taken—I refer to the 'knee reflex,' or what is more commonly called the 'patellar tendon reflex.' There is no one who knows the practical value of this sign more than myself, and it was a lucky hit of Westphal when he first found the absence of a knee reflex in disease of the spinal cord, and set to work to draw the valuable deductions with which we are now familiar. I admit that I am sceptical concerning too great value and importance being attached to this condition, and not only so, but also to the condition itself, and I have very good reasons in support of my statement.

In the summer of this year a gentleman from Australia was brought to consult me, with many symptoms and signs of a locomotor ataxia in the pre-ataxic stage. After eliciting from him all the information I could, I tried the knee reflex in every way without any response attending my various tappings, and it certainly looked as though I had an incurable case to deal with; however, with my previous experience to guide me, I then passed the continuous current freely through the spinal cord, and the knee reflex, which before was entirely absent, now became evident in the most unmistakable and satisfactory manner. I have records of other cases, and shall refer to them again when speaking of treatment.

The question naturally arises as to what was the difference in the cord before the galvanism and after the galvanism, for it was perfectly clear to my mind that this gentleman was suffering from the pre-ataxic stage of locomotor ataxia, and that the posterior root zones, and column of the cord were in a state of inhibition or congestion, or at all events, to put it in less theoretical and less figurative language, there was some molecular condition of the cord which increased its power of resistance beyond the normal, and which was removed by the influence and stimulus of the galvanic current.

Erb has arrived at the conclusion that absence of knee reflex exists in about ninety-five per cent. of cases of locomotor ataxia, and I am thoroughly convinced that Erb is quite right; yet I feel sure that functional absence of knee reflex will be found to exist in the pre-ataxic stage. But it must be remembered that it is by no means uncommon to find all the reflexes exaggerated in the pre-ataxic stage of locomotor ataxy as well as in the initiatory stages of the general paralysis of the insane, and I think that this may be accounted for by the possible probability that the changes in the posterior root zones are extremely peripheral, and invade more or less the adjacent matter of the lateral columns, and so give rise to motor sensorial disturbances and to an exaggeration of automatic and other reflexes; and if future experience should prove the truth of my assertion, I think that there are few practitioners of medicine who will deny that such a condition, if it be found correct, must be an invaluable guide to a definite and curable course of treatment of a disease which is thought at the present time to be incurable. I have upon more than one occasion astonished my patient who sought my advice on account of what he considered to be nervous dyspepsia, by tapping his knees and then proposing to him that he should have his spine dry cupped and the actual cautery applied; and in cases of so-called nervous dyspepsia and biliousness with inco-ordinate movements, I must say that it is the special duty of the doctor to make sure whether the knee reflex is absent or not, and should it be absent, then to make sure whether it is due to a functional or organic arrest of the normal reflex tonus of the spinal cord, and under any circumstances, if the knee reflex is absent, to treat the assumed dyspeptic symptoms in a manner very different to what they would be treated provided the knee reflex was quite normal. I am very well aware that in ninety-nine cases out of one hundred of dyspepsia no approach even to a locomotor ataxia does exist, yet it does exist, nevertheless, in many cases where it is not even suspected; and every experienced observer must be aware that locomotor ataxy is frequently marked by functional troubles, with which, however, it may nevertheless be associated;

and I repeat, with emphasis, that it is only in the initial stage of a chronic inflammatory change in the spinal cord, whether it be of the posterior root zones and posterior columns, or whether it be of the anterior horns and anterior columns, that our treatment can be of any avail in the cure of this class of nervous disease; and after all is said and done it avails our patient but little if we devote too much attention to the possible cause of certain phenomena, while we fail to recognise the exact moment when it is in the power of the physician to retard the onward progress of a disease which otherwise can have but a fatal termination. Above all things the physician has to be extremely careful that he does not relegate an initial locomotor ataxy to the class of nervous functional diseases which are known by the name of neurasthenia, 'nervous debility,' 'nervous exhaustion,' hypochondriasis, and so on. Several such unfortunate cases have come under my notice during the past three months, and they have been in the hands of men who would never have failed in making the correct diagnosis if they had noted with care the pupillary phenomena which have been described.

In the month of last June I was consulted by a gentleman, about thirty-four years of age, for what he considered to be nervous depression, associated with acute dyspepsia, and for this latter complaint he had sought the advice of many leading physicians, both at home and at the leading European spas, whose remedies, however, did him no good; his intellect became confused, and his legs and arms felt strange, and their movements were inco-ordinate; he suffered from seminal emissions and sexual excitement. The bowels acted very irregularly; sometimes he would suffer from attacks of diarrhœa, and at other times the bowels would be obstinately confined; but after an evacuation, the feeling of exhaustion was so extreme that for an hour or so after he felt good for nothing, and at times he suffered great distress from the fulgurating cutaneous pains which were darting about his body; but what I want to demonstrate in this case is that the knee reflex was absolutely lost, but the continuous current applied to the spine and to the feet completely restored the reflex power of the cord, and he got quite

well under the influence of bromide of potassium, solution of ergot, and bichloride of mercury. The spine was dry cupped every third day for a month, and as no marked improvement became apparent, I applied the actual cautery to the extent of three inches every other day, first rendering the skin insensible by means of æther spray. Now, it is an interesting and important fact that after the second application of the cautery, reflex patellar tendon was permanently regained.

In the latter part of July, S., a South American, consulted me concerning some obscure nervous symptoms from which he suffered, and which one physician attributed to nervous exhaustion, and another to anæmia of the spinal cord; normal patellar tendon reflex was greatly subdued, but rapidly renovated after the continuous current was applied to the spine. From the other symptoms I came to the conclusion that the posterior columns of the cord were congested, and that he was in the pre-ataxic stage of locomotor ataxy. I at first gave him strychnine with bichloride of mercury, but he suffered so much from sexual excitement and insomnia that the strychnine had to be discontinued. I then gave him bromide of potassium and solution of ergot, and his servant used to dry-cup the spine every day. He improved greatly under this treatment, but I lost sight of him, as he had to return home.

A gentleman, who was in the Indian Civil Service, consulted me in the fall of the year, for what he considered to be neurasthenia. He was a man of excellent physique, fair and robust looking, and of about thirty-three years of age. He contracted syphilis at the age of twenty-five. When he sat down in the chair he quietly remarked that he was all to pieces, but he certainly looked just the reverse of this, and after he had given me a somewhat extensive history of the errors of his youth, the first thing that I asked him was to cross his legs, and I must say that I was rather astonished to find a complete absence of tendon reflex. I then found out that he had suffered from neuralgias and from rheumatic pains (fulgurating pains). The pupils did not contract to light, but contracted fairly well during accommodation. There was a marked absence of the ataxic gait, but he reeled when standing erect with

the eyes closed. I considered this to be a case of locomotor ataxy in the pre-ataxic stage, but no galvanic stimulation of the spine gave me any knee reflex. I told him what was my opinion of his case, and the remedies which I wished to be employed. He rather hesitated, and then remarked that as everything had hitherto failed to do him any good, he placed himself entirely in my hands. I produced slight ptyalism by mercurial inunction of the oleate of mercury, and applied the actual cautery to the spine (previously anæsthetised) every other day, and I was no less surprised than delighted to find in about ten days a most marked improvement. The reflex at the knees was returning, and the fulgurating pains had disappeared. The treatment, however, was persisted in for a month, and when discontinued ten grains of the iodide of potassium was taken three times a day. He recovered most completely. I could give an infinite number of cases in support of my views, but the main object of my paper will be achieved if I can direct professional attention more immediately to this important subject.

I need scarcely say that I have had many persons suffering from advanced forms of locomotor ataxia when all my remedies have been of no avail whatever, but I will never concede to the opinion expressed by many, and taught by most, that a locomotor ataxia is an incurable disease, for there is a stage of this disease, which I now call the pre-ataxia stage of a locomotor ataxia, when by prompt and energetic treatment, we may safely hope for good and successful results.

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