TWO LECTURES ON SCLEROSIS OF THE SPINAL CORD.

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LECTURE II.—THE CAUSES OF TABES SPINALIS.

THAT certain poisons, when habitually taken into the system, may lead to sclerosis of certain portions of the spinal cord, cannot be disputed. It has long been known that a peculiar form of spinal debility is caused by eating bread mixed in undue proportions with ergot of rye, the permanent mycelium or sclerotium of a fungus of a family of the pyrenomycetes, which grows on the flower and fruit of secale cereale, and which contains, according to the researches of Dragendorff and Podwissotzki, two active principles, viz., sclerotinic acid (about 4.5 per cent.) and a colloid substance termed sclerо-mucine (from 2 to 3 per cent.). The term ergotine, which was first introduced by Wiggers, and afterwards used by Bonjean and Wenzell, had better be avoided, as very different substances are comprehended by it; and it is by no means proved that what is called ergotine really constitutes the active principle of ergot. Even less is known of other alkaloids said to be contained in the mycelium, viz., ergotinine and ecboline. Sclerotinic acid, however, is a definite poison, five grains of which will kill a kitten. The phenomena produced by the administration of this substance are, according to Nikitin, paralysis, lowering of the temperature of the body, and retarded respiration, which latter ceases before the heart's action is arrested. Tuzek has endeavoured to produce locomotor ataxy artificially, by feeding animals with small doses of ergot and of sclerotinic acid. Under the influence of ergot, mice and fowls died rapidly, with symptoms of wasting and fatty degeneration of the principal organs. Rabbits, on the other hand, appear to be insusceptible to the action of that poison, since they remained perfectly well when fed for months with doses varying from half an ounce to an ounce. Cats and dogs, again, wasted away, became unsteady, more especially in the hind legs; but the knee-jerk persisted, and after death no change in the spinal cord was discovered. Sclerotinic acid in small doses produced, according to the same observer, more distinctly the phenomena of locomotor ataxy, first in the hind legs and afterwards in the fore legs; but the knee-jerk could be elicited to the last, and inspection of the cord showed that organ to be unaffected. Experiments made with trimethylamin have likewise given uncertain data.

While, therefore, the results of purely experimental pathology are ambiguous, and so far bear out Vulpian's statement, made some years ago, that it is impossible to produce tabes artificially in animals, it is certain that, when bread contaminated with ergot of rye is habitually taken as food, posterior sclerosis becomes developed. Until lately, the description of the symptoms which occurred in such cases has been somewhat obscure, and the results of inspection not sufficiently clear; but recently Tuzek has given a lucid description of an epidemic of this kind, which occurred in the district of Frankenberg (Hesse) subsequently to the bad harvest of 1879, when as much as ten per cent. of ergot of rye was found to be mixed with the flour of which the bread supplied to the inhabitants was made. The district mentioned contains twelve villages, with a population of 2,500; five hundred of the latter fell ill, many of whom were children. The common people there are miserably poor; the dwellings and the food are generally abominable; and, in addition to this, the people have an extraordinary proneness to dram-drinking, for on the average three quarts of raw potato-spirit are consumed daily by each person, and even children are found addicted to this pernicious habit. The harvest of 1880 contained much less ergot of rye than the one of 1879, and does not appear to have led to any fresh outbreaks of the malady; yet it gave rise to many relapses; and although the harvest of 1881 was good, and the meal pure, cases nevertheless occasionally presented themselves even then for admission into the hospital, owing to relapses.

In a few instances, the action of the poison appeared to be rapid, since severe cerebro-spinal symptoms were observed soon after the ingestion of the poisonous bread. In by far the largest majority of cases, however, the mental affection, as well as the epilepsy and tabes, broke out some months afterwards, and, in some instances, ergotism set in a considerable time after the consumption of the bread had been discontinued.

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This seems to show that there is, apart from the primary affection, a kind of secondary or late intoxication—resembling somewhat the progress of syphilis—and leading eventually to severe disease of the centres of the nervous system. Seventeen patients suffering from ergotinic tabes were received into the University Hospital of Marburg, eleven being males and six females, including six children under fifteen years of age. There were other cases in which attacks of mania, with epileptiform seizures, formed the principal symptoms; yet in all cases, without exception, the knee-jerk was absent, and eventually returned only in a single instance, although a good many cases recovered. Even in children, in whom, as a general rule, the patellar reflex is well marked, it could not be elicited after they had shown symptoms of ergotism.

In the cases of tabes, numbness, pins and needles, lightning-pains, a feeling of constriction round the waist, analgesia, staggering on closing the eyes, and ataxy of gait were present. The faradic sensibility was much diminished; and the faradic wire-brush applied with a powerful current caused hardly any reddening of the skin. The pupils were large, as is often seen in the commencement of tabes. In four fatal cases, Burdach's columns were found sclerosed, while Goll's columns appeared to be either normal or only slightly affected. The antero-lateral columns and the grey matter were healthy. In Burdach's columns, the degeneration could be traced throughout the entire extent of these tracts, from the lumbar portion up to the medulla oblongata. The pia spinalis was found to be healthy. The changes in the cord consisted essentially of overgrowth of the neuroglia and atrophy of nerve-fibres. There were no traces of acute myelitis anywhere. Corpora amylacea were present.

The absence of the knee-jerk was of the greatest diagnostic value in all these cases. In some, where at first only epileptic seizures or mental symptoms were present, this symptom justified the conclusion that there was even then a definite anatomical alteration in the posterior columns of the cord. In one of these patients, absence of the knee-jerk was the only sign of tabes, and yet the inspection showed that even at such an early stage there was decided evidence of degenerative atrophy in the cord. The blood-vessels and the pia mater were healthy, and so were the posterior roots and spinal ganglia; but, in the lumbar and lower dorsal cord, the whole transverse section of Burdach's columns was found to be diseased; further upwards, only the middle portion of this system appeared to have suffered, while in the cervical cord only a small tract contiguous to Goll's columns was found in a state of sclerosis.

A counterpart to ergotism is seen in the causation of spastic spinal paralysis, with, presumably, sclerosis of the pyramidal strands of the cord, by eating bread mixed with the meal of the grain of *Lathyrus Cicera*. This bread is consumed by the poorest classes in Upper and Central India, especially near Allahabad and in Upper Sindh, in Algeria, in some parts of France, and in the south of Italy, where the people call it "mochi." Hippocrates and Galen speak of "crurum impotentia" in those who feed on crum, which is analogous to *Lathyrus*. Since then, much has been written on this complaint; but it was Brunelli of Rome who recognised that the peculiar affection caused by eating *Lathyrus* shows the symptoms of spastic spinal paralysis. He happened to see, in October 1880, five cases of this kind, and found that all the patients had come from the commune of Alatri, near Rome; they were small farmers, three of whom belonged to the same family, and they had for several months been obliged to subsist on bread consisting of equal parts of rye and *Lathyrus*. Proceeding to Alatri, Brunelli found six more persons similarly afflicted. Most of them were young men under thirty-five years of age. The aged and the children who partook of the same bread did not appear to suffer.

The first symptom of illness consisted of debility and tremor in the legs; the patients had the appearance of being drunk, more especially after meals when the *Lathyrus* bread had been the only food taken. If the use of the bread were then discontinued, the people got quite well again; but in those whom poverty obliged to go on with it for a length of time the disease made rapid progress, and, after two or three months, presented the characteristic aspect of spastic paralysis. There were great stiffness in the legs, and impaired power of walking; the steps were short, and the feet dragged on the ground; the legs were approached to one another by rigidity of the adductors of the thighs; the toes were contracted in flexion, and the heels lifted from above the ground by contraction of the gastrocnemii. Muscular nutrition was not impaired; there was no affection of sensibility, or of the special senses, the sphincters, or the brain. The tendon-reflexes were exaggerated, more particularly as regards the rapidity with which the leg was jerked forward on percussing the patellar tendon, and less so with regard to the extent of the movement produced.

It has been noticed in Italy that pigs, after feeding on the fresh,

plant of *Lathyrus Cicera*, begin presently to drag their hind legs. The dried grain of the same plant, when taken by pigs, dogs, and rabbits, causes similar effects. Rabbits seem to die soon after they have fed on it, while hogs resist the action of the poison much longer. Lathyrism is by some authors believed to be identical with beri-beri; but recent researches seem to make it probable that the paraplegia of beri-beri is not owing to spinal disease, but to acute multiple neuritis.

I now proceed to consider the influence of another poison, which is far more subtle in its nature, more widely diffused over the earth, and more destructive of human life and happiness in its effects than any other, viz., the poison of syphilis. Syphilis, which begins as a blood-disease, and, if unchecked in its course, ends as a flesh-and-blood disease, has long been known to play an important part in the production of certain diseases of the brain, such as tumour, arterial thrombosis, and meningo-encephalitis. It is, however, only quite recently that evidence has been brought forward from different quarters showing that it lies at the root of most cases of locomotor ataxy which come under our observation in practice; and I have no doubt that it will presently be found to have likewise a direct or indirect influence in the causation of other forms of primary sclerosis of the spinal cord. For practical medicine, this is one of the most important facts which have been elicited by recent researches, as it seems to open up to us a new prospect of our being able, by energetic and long continued treatment of the venereal distemper, to prevent the outbreak of tabes in many instances, and to cure it, if the patient come under care in the initial stage of the malady.

When it once becomes known throughout the profession that insufficient treatment of the earliest symptoms of venereal disease opens the door to the invasion of such an awful disease as tabes, which causes the most severe sufferings that men are called upon to endure, and which, when fully established, baffles all our therapeutical resources, it may surely be hoped that the treatment of primary syphilis, and of the earlier stages of secondary syphilis, will be carried out in a more systematic manner than is now frequently the case, and that every trouble will be taken to destroy that baneful and insidious poison before it has taken a thorough hold of the system. Instead of telling the patient, as is now often done, that his primary affection is "nothing," and "will soon be well," his attention should be drawn to the necessity of a long and persevering treatment, if he value his health and happiness; and he should be plainly advised that it is very often in cases which have a mild beginning that, years afterwards, the most terrible consequences are apt to supervene. We fortunately possess specific antidotes to the syphilitic poison in mercury and iodide of potassium; but these can only exert their full effects if perseveringly used for many months from the very beginning of the malady. Thus only can we eventually succeed in preventing the evolution of some of the direst diseases to which the human species is liable.

The earlier observers of tabes did not recognise the connection between that malady and the venereal poison. Thus we find that Romberg, that sagacious physician, to whose clinical acumen we owe the first and truly masterly description of the symptoms of the disease, when discussing the causes of it, does not say a single word about syphilis. Duchenne, many years afterwards, noticed that several of his patients had had syphilis, and that this appeared to be the only rational or obvious cause of the ataxy; but he added that such a conclusion was hazardous, inasmuch as there was no novel or special symptom in those cases, apart from certain well-known signs of the venereal distemper. It is true that the pain complained of appeared occasionally to be more severe or was only felt at night, but this also happened when there was no syphilis; while with regard to treatment, anti-syphilitic remedies had no beneficial influence on the disease. Fournier was the first who, in 1876, expressed himself decidedly for the syphilitic origin of tabes, and has more recently developed his ideas fully in a work which, although written in the spirit of a special pleader, contains, nevertheless, a large amount of irrefutable evidence establishing his thesis. He was followed in France by Vulpian, who placed syphilis in the first rank of those influences which determine the outbreak of the malady, and asserted that there are few patients suffering from tabes who have not, a few years before the appearance of the first symptoms, had an infecting sore and secondary syphilitic manifestations; that a few of these have been properly treated, but most of them very insufficiently so; and that amongst twenty patients suffering from tabes, there were at least fifteen who had previously been syphilitic. Caizergues, who has reported a hundred cases of syphilitic affections of the spinal cord observed by various authors and himself, has, from his own experience, recorded three cases of undoubted syphilitic tabes. Grasset has recently made the inspection of one of these latter cases, and found in the brain diffuse lesions of meningo-encephalitis, and in the cord systematic sclerosis, which, below the

cervical enlargement, affected the whole of the posterior columns, and above that point, only Goll's columns. In that case the ataxy had been confined to the lower extremities, but the patient had also suffered from general paralysis (megalomania). According to him, the circumstance that syphilis habitually produces diffuse lesions in the brain does by no means show that it could not produce systematic lesions in the spinal cord; and he is of opinion that clinical evidence should, as far as this point is concerned, be held of greater weight than pathological anatomy.

In this country, Moore, Dreschfeld, Drysdale, Gowers, Hutchinson, and others have expressed themselves in favour of the syphilitic origin of the disease in the majority of cases.

A few years ago, it occurred to me that it would be worth while to ascertain the influence of syphilis in the production of other diseases of the nervous system, and to compare the numbers thus obtained with those which had already been recorded for tabes. In this way a kind of cross-experiment would be made, whereby I thought that a good deal of light might be thrown upon this question. I therefore analysed a thousand consecutive cases of nervous affections recorded in my case-books with regard to this point, without making the least attempt at selection.

These cases were chiefly of epilepsy, hemiplegia from cerebral hæmorrhage or softening, hysteria, neurasthenia, tabes, chorea, and allied affections; and I found that, while the percentage of syphilis in tabes was above ninety per cent., it was only eleven in neurasthenia, six in hemiplegia, and four in epilepsy. Since taking these percentages, I have analysed another set of cases which have been more recently under my care, and found a percentage of above eighty-two in which locomotor ataxy had been preceded by syphilis.

In Germany, it was chiefly Erb who made himself the champion of the syphilitic theory of tabes, and found a percentage of ninety. He was therefore led to the conclusion that few people who have not had syphilis are likely to get tabes. Leyden, on the contrary, states, in a somewhat peremptory manner, that the theory is wrong, because it is based on statistics only, and that statistics may prove anything. He considers that the anatomical changes found in tabes have not the slightest resemblance to other notorious lesions of syphilis, and that specific treatment does no good in tabes. For these reasons, he rejects the specific theory of the disease; yet, in the same paper, he states that iodide of potassium must, after all, be looked upon as the most useful remedy for it! Westphal, whose opinion is entitled to the highest respect, has likewise been, from the beginning, a consistent opponent of this theory. He has no faith in statistics, as he finds it impossible to rely on the statements of patients. Some of these latter consider any sore on the sexual organs to be venereal, and even surgeons are in the habit of treating any abrasion on those parts as syphilitic, in order to be on the safe side.

Where opinions amongst those best qualified to judge differ so widely, a full discussion of all the different points in dispute appears to me the only way to arrive at the facts of the matter.

1. With regard to statistics, it seems hardly fair to exclude them altogether, as they are constantly utilised for determining various points in the pathology of other diseases, such as fevers, consumption, epilepsy, etc. To my mind, the adversaries of the syphilitic theory of tabes would combat this view more effectually if they would furnish us with statistical data from their own practice, showing that syphilis has been absent in a large proportion of cases. All the percentages which have been published are in favour of syphilis being of great influence in leading to the appearance of the disease.

This surely cannot be a simple coincidence; moreover, if all the facts were known, it seems probable that these percentages would appear even higher than they actually are. It is well known that syphilis is often overlooked by careless persons, where its manifestations, whether primary or secondary, are mild. A small primary sore, which heals readily in a short time, may be followed by a few spots of roseola and a slight soreness in the throat and tongue. This disappears with or without any treatment, and the patient thinks that he never had syphilis; yet four, five, or ten years afterwards, double vision and a severe attack of lightning-pains may herald the invasion of tabes, which is as plainly owing to the venereal disease as gummata or sarcocele.

2. It is frequently noticed in practice that patients deny having ever exposed themselves to infection, at a time when they show the most evident signs of it. More especially in hospital, we often see patients who are covered all over with a syphilitic rash, and have ulceration in the throat and palate, and yet state plainly that they never had any "venereal." Even private patients, who ought to know better, occasionally suppress the information which is so important for us, from a sense of false shame. Some, no doubt, forget it in the course of time;

others overlook it; and, where there has been an urethral chancre or inherited syphilis, patients may be well excused for not knowing that they ever had such a complaint.

In August 1879, Dr. Wright of Derby asked me to see a commercial traveller, aged 53, who had been twice married, and acknowledged having exceeded a good deal in his sexual relations. His habits had been irregular. Three years ago, his present illness commenced with a feeling of numbness in both hands. When he put his hands into his pockets to feel for anything, he had not the least notion of what was there. I made him close his eyes, and put coins and other familiar objects into his hands, but found him totally unable to determine their nature. He could, however, still feel sharp pricking and pinching. He had optic atrophy in both eyes, to such an extent as to be unable to read No. 19 of Jäger's test-types. The hearing in the left ear was defective. He complained of pain in his legs, which was sometimes acute and darting, at other times dull, and was frequently confined to a small area in the leg, not larger than a crown-piece. The patellar reflex was absent in both sides. He was very unsteady on his legs; he could not stand on one without being supported and with his eyes open; nor could he balance himself on both legs with his eyes closed. The gait was ataxic in the highest degree; he had the greatest difficulty in going down stairs, and in the dark he could not walk at all. The spine appeared to be tender on pressure. The bladder was sluggish; the sexual power and desire very much diminished; on attempting copulation, erection was imperfect, and ejaculation premature. He had lately been often subject to small abscesses on the second finger of the left hand, which made the whole arm so tender that he was unable to use it. On being asked whether he had had syphilis at one time or another, he answered, "that he thought he had had something, but did not remember what it was; yet he believed that a doctor had burned him."

In the following case, antecedent syphilis was at first denied, and subsequently acknowledged.

In October 1879, Mr. Bader asked me to see a merchant, aged 44, who had for three years past suffered from paralysis of the left rectus externus muscle, and gradually advancing atrophy of both optic nerves. He could only just read No. 6 Jäger, and had achromatopsia and bilateral myosis. He denied having ever had any syphilis, and attributed his illness to excessively hard work and annoyance in business. He also suffered from chorea, which had commenced during childhood and never left him; and he had been impotent for five years. The patellar reflex was absent, and there was some ataxy in standing, but not in walking. After the patient had been under my care for some time, he one day told me that he had really had syphilis about ten years ago, and suffered for twelve months from various manifestations of the distemper, chiefly in the mouth and throat. He gave as his reason for denying this, in the first instance, that "the very thought of his foolish behaviour at that time annoyed him so much, that he preferred not to talk about it."

In April 1879, I was consulted by a merchant, aged 35, married, and father of four children, who attributed the symptoms of tabes from which he was then suffering to an accident which he had had in a tramcar. Ten months ago, he noticed that he suddenly saw everything double; and the right eye was turned outwards, so that he evidently had had paralysis of the right rectus internus. He recovered from this in about three months. When I first saw him, there was a degree of ptosis in the right eyelid, making the right eye look considerably smaller than the left.

The knee-jerk was absent in both sides. Walking was troublesome, the right leg being worse than the left. He could stand pretty well on the left leg, but could not balance himself when standing on the right. There was a tight feeling across the chest and throat, and great numbness from the waist downwards. I asked him whether he had had syphilis, and he denied it indignantly. On examining the penis, however, I discovered an enormous scar on the gland. To my question as to the origin of this scar, the patient replied that it was owing to the resistance he had experienced on consummating marriage! It had, however, all the appearance of a syphilitic cicatrix; and the patient eventually recovered completely under specific treatment.

In some cases, the initial symptoms of syphilis are so very slight, that a lay patient might have some difficulty in believing that so little could have led to so much; while the medical intellect is better able to grasp the full bearings of this influence.

In September 1882, I was consulted by an Irish practitioner, aged 40, single, who told me at the beginning of the interview that twenty years ago he had had a very mild form of syphilis—namely, a small chancre, which healed rapidly; and, six weeks afterwards, a slight ulceration in the tongue. He had never had any rash on the skin, or ulceration in the throat, or any further manifestation of the specific

diathesis; and he had remained apparently in very good health for fifteen years. Five years ago, however, the first symptoms of his present illness appeared, and affected more particularly the right side of the body. Dimness in the vision of the right eye came first, and optic atrophy is now well established. Lightning-pains in the right knee then supervened, and are at present apt to come on in almost any part of the body. They last a few hours, and then vanish, generally under the influence of chloral. Eight or ten days afterwards, there is another bout of pain. There is a slight degree of ptosis of the right eyelid, but no palsy in the muscles which move the eye itself. Great numbness is felt in the sphere of the right ulnar nerve. The sexual power and desire are gone. Twelve months ago, he had the last imperfect connection; but he still has occasionally seminal emissions during sleep. The bladder is sluggish; incontinence is not unfrequent; the bowels are constipated. The knee-jerk is absent in both sides, and the muscles of the lower extremities are much wasted. The patient staggers when standing with his eyes closed and in the dark, and the gait shows well marked ataxy. He had never been able to take iodide of potassium, and had just returned from Aix la Chapelle, where he had had forty mercurial inunctions without the least result.

It may be safely assumed that, if this patient had not been a medical man, he might have forgotten all about the very slight specific affection which had preceded the outbreak of tabes by fifteen years. As it was, however, he was quite convinced of the syphilitic nature of his affection, as he could not think of any other cause which might have led to his present illness.

In August 1881, Dr. Meurer of Wiesbaden sent a gentleman to me who was forty-two years old, married, and a great sportsman. Some years ago, he noticed that he saw everything double, and had, therefore, great difficulty in shooting. This arose apparently from paresis of the right rectus internus. When I saw him, that muscle was quite paralysed, and there were also ptosis and paralysis of the rectus superior of the right eye. The tendon-reflexes in the knee were absent, and the patient experienced the characteristic difficulties in walking and standing. On my asking him whether he had had syphilis, he said that twenty-five years ago he had had a "soft sore, which lasted only two days;" that he had swallowed large doses of iodide of potassium, and had undergone a long treatment at Aix-la-Chapelle without the slightest benefit; and that he did not consider that he really ever had had syphilis.

Fournier's experience with regard to this particular is, that tabes generally becomes developed where the early symptoms of syphilis have been unusually mild. Amongst eighty-four cases in which this point was particularly inquired into, there was not one of severe syphilis; ten were of medium intensity, twenty-one mild, forty very mild; in ten there had been a chancre without subsequent secondary symptoms; and in three the patients were unaware that they had had syphilis. He says that most of his tabid patients have only had a slight rash on the skin, insignificant erosions of mucous membranes, alopecia, and swollen lymphatic glands; and that all these symptoms disappeared rapidly with or without treatment. A natural consequence of this is, that such cases are insufficiently treated. Of seventy-nine such patients, two had undergone no treatment at all, forty-six had had treatment extending from a fortnight to four months, while thirty-one had had a longer treatment. It is, however, well known that syphilis cannot be cured by a short treatment, which latter does little but suppress its manifestations for the time being.

In other cases, again, the syphilitic symptoms are prolonged and severe, and become so intertwined with those of tabes, that no one would be able by any amount of sophistry to explain away the connection between the two diseases.

In January, 1883, I saw a patient in consultation with Dr. Mullar of Kilburn, who was aged 31, a baker by trade, married and childless, and who had had a hard chancre and a bubo, quickly followed by secondaries, six years ago. Ever since that time, he had suffered from some constitutional manifestations of the syphilitic dyscrasia, being never thoroughly well. Six months ago, sarcocele became developed in the left testicle. Ten days ago, he had a severe epileptic fit, which lasted five minutes; and the day before I saw him he had had another, in which he passed the excretions under him. His memory had of late become much impaired; he was unable to attend to his business, in consequence of feeling always muddled and confused. The knee-jerk was absent on both sides, and the patient staggered when standing with his eyes closed. I saw him again in the following October, when some additional symptoms of tabes, viz., paralysis of the left rectus externus and lightning-pains, had made their appearance. The mental hebetude was more marked, and alternated with violent outbreaks of temper. On one occasion he made an indecent proposal to his nurse, in the presence of several other people; then threw himself

On the floor, where he rolled about on all fours, and swore in such a frightful way as to terrify all those present. The symptoms of tabes were in this case evidently being developed, together with those of general paralysis of the insane; and meningo-encephalitis, combined with sclerosis of the posterior columns, would most probably be found, were it to come to an inspection.

About the same time I saw, in consultation with Dr. Grasemann, a patient who was an auctioneer, aged 44, married, but childless, and who had had a somewhat severe form of syphilis ten years ago. There had been an indurated chancre and a bubo, followed by bad and prolonged secondary symptoms. He had altogether lived a wild life, masturbated as a boy, committed venereal excesses later on, and had drunk and smoked heavily. He had suffered from diplopia some time ago, and five years ago had an attack of aphasia and right hemiplegia, from which he recovered in a few days. Several such attacks had taken place since then at intervals, leaving no traces after a short time. The last hemiplegic attack occurred only five days ago, and then affected the left side of the body. The memory was much impaired, and the patient felt occasionally so confused that he was unable to attend to his business. When I saw him, the hemiplegia of the left side had already disappeared. There was, however, total loss of knee-jerk, Romberg's symptom, constipation of the bowels, sexual excitement and debility, and occasional attacks of spasmodic incontinence of urine, thus rendering the diagnosis of tabes certain.

Occasionally, tabes results from direct inoculation of the syphilitic virus.

A well known and able surgeon consulted me in May 1871, and informed me that, while examining a woman in a workhouse-infirmary in 1866, he had inoculated the index-finger of his right hand with syphilis. For two years afterwards, he was, to use his own words, never-free from that wretched disease in one form or another. He then became apparently quite well, and continued so until Christmas 1870, when he was rather suddenly seized with tingling in the legs and numbness in the left arm and side of the body; a day or two afterwards, double vision supervened, and there was a feeling of constriction round the waist and inability to walk. Some of the medical friends whom he consulted thought the symptoms owing to the extreme cold which prevailed at that time, while others believed them due to syphilis; and there was, therefore, some hesitation how to treat it. However, he slowly but steadily improved, and was able, during the last six months, to resume his practice. He now complained chiefly of more or less constriction round the waist, which was at times almost unbearable. His left arm and both legs were numb and stiff. He could not balance himself with his eyes shut, but would fall backwards unless supported. He also had sudden shocks of stabbing pain in the lower extremities, and, on awaking in the morning, felt a curious wave of sensation flowing down the left arm and up the leg towards the perineum.

3. Several observers have expressed the opinion that the morbid anatomy of tabes speaks against the syphilitic origin of the disease. Thus Chauvet says "that syphilis can never cause a primary sclerosis of the posterior root-zones." Lancereaux considers that the lesions of tertiary syphilis never invade an organ through its whole extent; they are, according to him, circumscribed, forming single or multiple nodes grouped in one or several spots, which undergo a granular, fatty, or hyaline degeneration, and terminate in loss of substance or a cicatrix. The lesions of tabes, on the other hand, are diffuse, extended, systematic, and although slowly developed, like those of syphilis, do not produce loss of substance, nor do they leave a scar. Westphal expresses a similar opinion; yet I do not hesitate to say that no one, however experienced, is able by inspection alone, even if aided by the microscope, finally to decide what is syphilitic or not. Moreover, we are familiar with diffuse changes occurring not only in the blood-vessels, but also in the liver, kidneys, and other organs, and which are generally acknowledged to be owing to syphilis. Diffuse acute hepatitis and acute glossitis may be of a specific nature, and affect the whole, or almost the whole, of the liver or tongue. Lancereaux's statement, that tabes does not produce any loss of substance, seems to be somewhat of a solecism, for what is wasting but loss of substance?

On looking through pathological literature, we find all and every kind of lesion in the spinal cord described by reliable observers as arising from syphilis. Cases are on record of acute myelitis, either diffuse or limited to certain portions of the cord, such as the lumbar enlargement, the lumbodorsal, the dorsal, or the cervical portion; this, again, may be transverse, superficial, or central. Then we find cases of acute ascending spinal paralysis without any appreciable anatomical lesion, and all the different forms of chronic myelitis; while the different systems of the cord, including the anterior horns, have been

seen to be separately or collectively affected. If this be true—and anyone may convince himself that it is by searching the vast store-houses of the records of morbid anatomy—then we can certainly not accept the statement *ex cathedra*, that syphilis cannot produce sclerosis of the posterior columns. The principal lesions of tertiary syphilis are gummata and sclerosis. The hard chancre, to begin with, is a form of sclerosis; and the "cirrhosis" which is found in the tertiary period in the rectum, the liver, lungs, and kidneys, is nothing but sclerosis.

The objection that syphilis never produces any system-disease elsewhere is surely untenable. We know the distemper often attacks exclusively such systems as the skin and hair, the lymphatic glands, and the periosteum. As the syphilitic virus is one of a highly specialised character, it seems only rational to expect that it should affect certain systems in preference to others. Nobody doubts that the influence of cold may produce tabes; but it is certainly more difficult to understand how a general cause, like cold, should set up morbid changes in special systems than that a special poison like syphilis should do so.

Quite apart from this, however, we know that tabes is not absolutely a system-disease confined to the posterior columns of the cord, but that almost invariably, besides sclerosis of those parts, posterior spinal meningitis, wasting of the posterior roots and the posterior cornua of the grey matter, and of Clarke's vesicular columns, is found, while the ganglionic cells of the anterior grey matter are not unfrequently seen to be wasted, and the cranial nerves sclerosed. We are therefore justified in stating that tabes is a much more general disease than is expressed by the terms of sclerosis of the posterior columns.

The idea that something absolutely special ought to be discovered, showing a definite syphilitic origin, appears unreasonable, more especially if we consider that what is called the "classical type" of tabes is probably only rarely idiopathic, and much more frequently specific.

Finally, it will surely be acknowledged that, where morbid anatomy and clinical medicine appear to clash concerning the nature of a disease, the latter science should carry the day. I may here fittingly refer to an interesting discussion which took place at a recent meeting of the Clinical Society of London (October 26th, 1883), when I brought forward a case of apparently syphilitic tumours of the cerebral membranes, in a patient in whom there had been no history of congenital or acquired syphilis during life. The anatomical appearances in that case were as characteristic as possible for syphilis; yet there was an almost unanimous expression of opinion on that occasion that anatomical structure without life-history is, in a general way, insufficient for a diagnosis, and that the tumours which were described might have been owing to the tubercular or some other dyscrasia.

[To be continued.]

ABSTRACT OF LECTURES ON THE STRUCTURE AND FUNCTIONS OF THE BRAIN IN RELATION TO DISEASE.

Delivered before the Faculty of Physicians and Surgeons, of Glasgow.

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LECTURE I.

[As an introduction to the more special subject-matter of the lectures, a short sketch was given of the evolution of the nervous system, founded upon the phylogenetic and autogenetic records. Commencing with the coelenterata, brief allusion was made to Kleinenberg's observations on the neuro-muscular cells of hydra. It was shown that, in all probability, these form the first step in the differentiation of a special apparatus for receiving and transmitting external impressions. The sensitive cells of actinia were next considered, and the nervous system of medusa, as investigated by the Hertings and others, was also described. The gradual steps by which certain epidermic cells become endowed with specific perceptive properties, sink into the deeper tissues, and become converted into bodies resembling ganglion-cells, if not identical with them, were illustrated by examples taken from the nemertines, echinodermata, etc. The remarkable transformations which the nervous system of the ascidian undergoes from its embryonic to its adult condition, were also noticed; and, finally, the progressive stages in the development of the vertebrate myelencephalon were briefly referred to.]

[The identity in the mode of development of the nervous system in