ON THE ETIOLOGY OF TABES DORSALIS.

BY JAMES PIETERSEN.

Under the title of "Over de Aetiologie der Tabes Dorsalis," Dr. B. H. Stephan contributes to the 'Nederlandsch Tijdschrift voor Geneeskunde' an interesting paper, summing up all we know from Continental writers on the subject, and raising the interesting question whether Locomotory Ataxy cannot be regarded rather as an affection of the whole cerebro-spinal system, due directly to change in the vessels supplying the nervous system, than as has heretofore been done, attributing all the symptoms to one or more definite cord lesions; and among the causes which favour changes in the blood-vessels he gives syphilis the first place, making it thus indirectly the main, though not the exclusive cause of tabes. Regarding sexual excess as a primary cause, he says, "One can well understand that sexual excess, even as a severe attack of typhus, syphilis, alcoholism, rapidly following and more or less continuous lactation, may now and then favour the development of this affection; but having regard to the relative frequency with which sexual excess is met with, and the relative infrequency of occurrence of tabes dorsalis, it seems to me that the assumption of such a primary cause is wholly unwarrantable." Exposure to cold, as well as mental and physical strain, he regards, with hereditary predisposition, as of secondary moment. He then quotes Fournier as the earliest promulgator of the syphilitic origin of tabes, whose disciple Erb went so far as to affirm that no one could evince ataxic symptoms without being able to account for a previous syphilitic affection. "The main arguments brought forward by those who deny the syphilitic origin of locomotor ataxy are to be classed under three heads.

"1. The almost inappreciable success of specific treatment.
"2. That the lesions in tabes, limited as they are to certain anatomical tracts, in no way correspond with other syphilitic affections of the nervous system.
"3. The unreliability of the statistics brought forward."

Putting on one side the first two opposing arguments, which he deals with more fully in the body of his paper, he holds that statistics are of great value in the consideration of this question, and that there are three points for us to consider when we look at it statistically.

"(1.) Are the numerical results in the various tables writers have drawn up to show the connection between syphilis and tabes proportionately alike?
"(2.) Do investigators regard the early manifestation of a chancre of doubtful character, or a soft sore, as sufficient warranty that
when tabes occurs a syphilitic cause should be assigned to the malady? [for the distinction between the hard chancre and soft sore, in that they are each due to a separate and distinct virus, is by no means universal].

"(3.) Is the tabulation of such cases where syphilis preceded tabes satisfactory, when a doubtful chancre or a soft sore was considered sufficient evidence to assume syphilis?"

Notwithstanding these weak points, he holds that a remarkable relation exists between tabes dorsalis and earlier syphilis, "for when Bernhardt computes that of 125 ataxic patients, 46-8 per cent. had some syphilitic antecedents, while of 155 others, not ataxic, only 15-8 per cent. had had syphilis (in both cases soft chancre being regarded as non-syphilitic), then undoubtedly some connection must exist between these two affections." He goes further, quoting Landsberg, who published a case of locomotor ataxy with precursory syphilis, where the nerve affection yielded to a specific treatment, mainly inunction, and where the malady at the time of publication had almost wholly disappeared, the most undoubted ataxy having manifested itself previously: Berger, who relates the history and post-mortem appearances of a case that came under his observation, where syphilis was contracted in the 69th year, followed by slight secondary symptoms. Three years later double interstitial orchitis, with typical tabes, manifested themselves; the diagnosis was verified by the autopsy: Voigt, too, draws attention to the access of tabes in old persons where syphilitic infection had taken place in the later years of life.

He does not, however, agree with Erb in giving syphilis as the exclusive cause of tabes dorsalis, for Eulenburg could only prove precursory syphilis in 36-8 per cent. of his cases, Berger only in 43-8 per cent. "There are therefore," he continues, "in the development of this spinal affection other causes also at work. What these causes can be, and what the nature of the connection is between syphilis and these causes on the one hand, and tabes on the other, we must follow more closely."

He first of all draws attention to the action of poisons on the system, quoting Strümpell, that observation of such action often is of etiological value as regards cord affections. "We know that certain poisons act only on certain portions of the spinal cord, disturbing certain physiological centres without in any way affecting the whole cerebro-spinal system (instance the action of strychnine on the reflex centre: curari on the motor end-plates of peripheral nerves: morphine on the sensory central organs: atropine on the vasomotor and secretory centres). The action of certain poisons, too, is not alone the cause of functional, but also sometimes of anatomical change (e.g. Plumbism causing affection of the motor portion of a certain nerve: Ergotism evincing not only a clinical but also a pathological likeness to tabes)."

3 'Centralblatt für Nervenheilkunde,' 1885, No. 8.
4 Virchow's 'Archiv,' Bd. 99, 1.
“More and more probable does it then appear,” he continues, “that infectious vessel-affection (one species of poison-influence) plays etiologically a more important part in lesions of the spinal cord than up to the present it has been accredited with. Various writers have attributed some forms of spinal-cord sclerosis to primary arterial affection, and others have noted endarteritis as a coincident phenomenon in affections of the cord, without going more deeply into the question of the connection between them.”

He then quotes Letulle and Martin, who have published cases where tabes was accompanied by general atheroma, and who mooted the question whether any connection can exist between the vessel-affection and the cord lesion: Ballet and Minor, who published a case in 1884 of diffuse sclerosis of the lateral and posterior columns, where in the sclerosed portions endo-periarteritis plainly existed; the patient had previously been syphilitic. After that Ordonez had claimed to find in arterial change the primary commencement of nerve degeneration in tabes, Adamkiewicz has more recently reasserted his view, the degenerated tracts in the posterior columns in tabes corresponding to the vessels affected. According to his ideas, the vessel affection in these cases would not act in a direct manner (and in this particular he differs from Ordonez), but indirectly through the medium of the interstitial connective tissue binding these vessels together, serving thus to bring about sclerosis and atrophy of the nerve-tissue. Rumpf also, taking note of the thickening of the media and adventitia, considers arterial change in certain cases the primary cause of tabes. Krauss investigated in 13 cases of tabes the condition of the vessels in the posterior columns; in most cases thickening of the vessel-walls existed. No distinction could be drawn between such condition of vessels in tabes of syphilitic and of non-syphilitic origin.

“Affections of the heart, and notably of the aorta and aortic valves are not uncommon in tabes. Berger and Rosenwajch have published the first seven cases of locomotor ataxia with aortic incompetency. Letulle and Grasset have also collected some cases exhibiting the same association. Tessier thinks that in many cases the aortic lesion is not diagnosed during life, and that, post-mortem, small perforations of the valves are to be found; more recently he has published a case where a patient with initial ataxic symptoms developed, after a long tramp one cold night, an aortic incompetency. Déjérint described a case in 1884 which had been taken for one of amyotrophic lateral sclerosis, wherein, post-mortem, multiple patches of sclerosis were found, and in which also periarteritis existed. Demange also published a case

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1 'Archives de Neurologie,' 1884, No. 7.
2 ‘Die Rückenmarksschwindsucht,’ 1885.
3 'Archiv für Psychiatrie,' Bd. 15, No. 2.
4 'Neurologische Centralblatt,' 1885.
5 'Gazette hebdomadoire,' 1884, No. 40.
6 'Revue de Médecine,' 1884.
7 'Ibid.'
in that year which was considered one of amyotrophic lateral sclerosis, and in which a disseminated myelitis of vascular origin was found; endo-periarteritis of the vessels of the medulla, with general arterial atheroma, was likewise discovered. This year two cases appeared under his observation, in which there was found, post-mortem, a general atheromatous endo-periarteritis of the cord, and in which, during life, the symptoms of lateral sclerosis had existed. Marie also has recently drawn attention to cases cited by Westphal of ataxy following acute infectious disorders, and has tabulated cases of multiple sclerosis following typhus, small-pox, erysipelas, pneumonia, measles, scarlatina, whooping-cough, intermittent fever, dysentery, diphtheria, cholera, and puerperal fever. He further speaks of arteritis and periarteritis (probably resulting from bacteria emboli) in their connection with the multiple patches in the brain and spinal cord, to define in conclusion such cases as cerebro-spinal localisations of an infectious vessel-lesion. "Acute poliomyelitis, acute encephalitis, and multiple neuritis, by their peculiar symptoms and course, cause us to suspect the influence of infection, wherein the infecting virus is localised in the cerebro-spinal system, just as the virus of cholera is localised in the intestinal tract;" and he quotes cases contributed by Mulder, which go far to prove that such a surmise is a correct one.

"While observers then at the present day regard vascular change as the primary anatomical cause of various cord affections, there is but little unanimity when such a cause is assigned to tabes dorsalis. Others, opposing the idea that the initial changes arise from the vessels, consider a primary degeneration of nerve tissue as the anatomical starting-point—the doctrine, however, of vessel change as the primary anatomical cause of tabes is steadily gaining ground. Such being the case, and innumerable instances warrant the adoption of such an opinion, there can be no improbability in the assumption that affections which bring about endo- or periarteritis can cause by a spinal or cerebral localisation an acute or chronic change in the cerebro-spinal system. Among the influences which can occasion such a condition, syphilis stands prominently and undoubtedly at the head; but we also know, and Duplay has lately again drawn attention thereto, that rheumatism, gout, chronic alcoholism, malaria and lead-poisoning, can bring about like changes; and it is also manifest that sometimes, after an acute infectious malady, endo-periarteritis of spinal vessels may ensue. It is possible that particular infectious vessel-affections such as these may bring about particular spinal cord lesions, as, for instance, that syphilis mainly induces changes resulting in tabes, and that causes other than syphilitic may bring about other spinal affections.

"But it must be remarked, in the first place, that undoubted cases of tabes can be cited without any precursory syphilitic affection, and that syphilitic and non-syphilitic tabes are indistinguishable, either pathologically or clinically, so that there can be no doubt

1 'Progrès médical,' 1884.
2 Archives générales de Médecine, 1885.
that vessel-affections of non-syphilitic origin must also rank as responsible agents in bringing about locomotor ataxy; and also is it well worth considering more closely in how far from the pathological investigations, or from the symptoms of the disorder which we call tabes dorsalis, the localisation in a well-characterised anatomical or physiological manner of a certain poison can be determined." Reviewing then the rise and progress of our knowledge of spinal affections, through the combined aid of pathological research and clinical observation, he more particularly deals with the lesions found in tabes dorsalis. "But," says he, "it is not only to the degeneration of one definite column in the spinal cord that we can assign the lesion of tabes. The almost constant affections of the cerebro-spinal system in cases of tabes are:

1. Changes in the meninges (so decided sometimes that some writers, Arndt, Waldman, and others, have endeavoured to show that tabes is preceded by a primary leptomeningitis).
2. Lesions of the posterior columns.
3. Lesions of the posterior roots.
4. Lesions of the grey matter of the cord.
5. Lesions of the cerebral nerves.

"Less constant, though still frequently observed, are:

1. Changes in the cortex cerebri.
2. Changes in the sympathetic system.
3. Changes in the spinal peripheral nerves."

In tabes, then, there can occur certain definite affections of the brain, spinal cord, and peripheral nerves; in other words, changes in the whole cerebro-spinal system. Various combined lesions also sometimes appear, sometimes of posterior and lateral columns, sometimes of posterior columns and anterior cornua. He further maintains that tabes dorsalis can exist while "the classical 'symptômes tabétiques' of Charcot," with which the lesion of one definite portion of the posterior columns has been associated, are in abeyance. "Sclerosis of the posterior columns is indeed one of the evidences of this affection, but the diversity of the anatomical changes debars us from looking on this one condition as the pathological substratum of this nervous disorder." Clinical evidence is equally indefinite, the symptoms being neither regular nor constant. "Fournier" evidences psychical disturbances (loss of memory, change of character and disposition, and intellectual disturbances), especially in syphilitic tabes, as the forerunner of locomotor ataxy; with others, retinal atrophy of many years' standing is instanced as a precursor; some cases show disturbances of vesical functions; others gastric and other crises; others, again, epileptiform attacks as the antecedent symptoms. The absence of knee-jerk, a phenomenon first studied by Erb and Westphal, associated with degeneration of the posterior column, was regarded

1 Raymond and Artaud.
2 Kahler, Prévost, Raymond, &c.
3 Charcot, Leyden, &c.
4 'L'Encéphale,' 1884.
almost as a pathognomonic sign of the presence of tabes. The value of this as such has of late necessarily declined, now that the investigations of Bernhard have taught us that after diphtheria this absence of knee-jerk is commonly observed; while later still, we find the same phenomenon noted in sufferers from chronic alcoholism, and in those in weak and debilitated conditions of the system; and still more recently the publications of Bouchar, Bosenstein, and Maschka have proved that in diabetes the same absence of knee-jerk is observable."

"In conclusion," he remarks, "what likeness can we draw between the pathological lesion and the clinical signs, when we find cases recorded where pains in the legs, anaesthesia, analgesia, Romberg and Westphal's symptom, ataxy, &c., were observed, while on post-mortem an intact spinal cord, with however a widely disseminated degeneration of peripheral nerves, was found (cases of multiple neuritis or neurotabes peripherica—Déjérine, Hirt, Hun, &c.), and where cases of diabetes are cited, which by their multiple nervous disturbances and evident absence of knee-jerk are to be regarded rather as cases of tabes (the urine not having been examined) than as diabetic, especially when we consider that cases do occur in which tabes dorsalis is accompanied by glycosuria (Althaus)? Regarding then the manifold changes met with post-mortem in tabes, the variety of the symptoms, their irregular grouping and inconstant exhibition, I believe it to be more consistent to designate those symptoms which we call tabes dorsalis, and which we have heretofore attributed to a lesion of one definite anatomical tract in the spinal cord as a universal affection of the cerebro-spinal system, and that in no instance can either pathological investigation or clinical evidence justify us in definitely attributing to syphilitic influence alone the lesion we find in the posterior columns of the cord." In conclusion, he formulates the opinions he has advanced above under four heads.

"1. Cerebro-spinal localisation of infectious vessel-lesions plays an important part in the etiology of affections of the brain and spinal cord (with which, too, particularly tabes).

"2. Syphilis undoubtedly leads most frequently to affections of the vessels; and, as tabes is the most frequent of spinal-cord maladies, it is only natural that syphilis should be a frequent precursor of tabes.

"3. That syphilis should be considered as the exclusive precursor of tabes, and no other chronic spinal affection is as unlikely as that excluding the syphilitic cause, no other malady causing vascular affection can pose as the cause of tabes.

"4. The direct reason why infectious vessel-lesions should at one time induce diffuse changes, at other times more or less plainly characterised systematic affections, is at present beyond our comprehension."

1 Virchow's 'Archiv,' Bd. 99.
3 'Wiener Medicinsche Presse,' 1885, No. 3.