

many years a tabetic patient has to live, and just as little should one attempt to make a positive statement as to how long the patient will be able to work. The condition may remain quite enduring for months or even years, and the outlook may appear quite hopeful, particularly in regard to the capacity for work, and yet suddenly a marked change may take place; pronounced ataxia, cerebral symptoms, or the like may manifest themselves, which render the patient incapable of following any occupation. The more cases one sees, the more cautious does one become in giving a prognosis, and the more distrustful of the reports of so-called cures—at least when old cases are concerned.

Diagnosis.—As one can readily see from what has been said, the diagnosis of tabes is sometimes one of the simplest possible tasks for the physician; in other instances it can not be made with certainty for a long time. Thus it may under certain circumstances be very difficult to differentiate between the disease under consideration and complicated cases of syphilis of the brain and spinal cord, diabetes, or hysteria. It seems perfectly possible for one to consider a severe case of neurasthenia for a long time as one of tabes, but the further course and final success of therapeutic measures will demonstrate the error. When in the course of tabes the sensory and bladder disturbances are only slightly marked, there may be question of the existence of a chronic anterior poliomyelitis, but usually the lancinating pains, the paræsthesias, the affection of the eye muscles, and the mere fact that bladder symptoms exist at all, afford sufficient grounds on which to base a diagnosis. In diseases of the vertebral column, in the course of which lancinating pains, "Westphal's sign," and bladder symptoms may be found, an examination will reveal that the vertebral column itself is affected, and the spinous processes are painful on pressure—a condition which is sufficient to settle the diagnosis. The mistake of considering a tabophobe, or a person who imagines he has tabes, as a real tabetic, can only occur when a careful examination is neglected, and the physician is afraid to adopt any energetic, psychological as well as somatic, treatment. As soon as this is instituted the tabetic symptoms will turn out to be mere hypochondriacal notions, and recovery will quickly follow.

It is of practical importance to note that the various symptoms occurring in tabes are also observed in other affections.

In these cases there is much room for errors in diagnosis, the most important of which we wish to bring to the reader's attention.

Paralysis of the eye muscles and pupillary symptoms are, as we have remarked, very common in the course of tabes. Another affection in which they also occur is multiple sclerosis. Here, however, diplopia as well as strabismus are rare, while, on the other hand, nystagmus is very frequent, and the pupillary reaction to light is preserved. Myosis occurs in this affection as well as in tabes, but whereas in the former the pupils contract still more under the influence of light, in tabes they usually remain immobile under the same circumstances.

Symptoms referable to the optic nerve—amblyopia, for instance—are also observed as the effect of different poisons (page 39). In such cases the history will be of great assistance to us in making the diagnosis. Amblyopia developing in the course of multiple sclerosis is not accompanied, as in tabes, by a contraction of the field of vision, nor does it steadily grow worse; but remissions occur, and the improvement may even last for a considerable time. It has already been shown on page 620 that the optic atrophy of multiple sclerosis differs in important points from that occurring in tabes. It should also be remembered that there is an optic atrophy in which the morbid process is confined to the optic nerve, and in which it is impossible to demonstrate any general nervous disease.

The various visceral "crises," in which tabes abounds, can likewise be produced by independent affections of the vagus. Here one must rely upon the more characteristic symptoms of tabes, particularly Westphal's and Romberg's signs. That "gastric crises" alone can not enable one to make the diagnosis is all the more to be insisted upon since Debove has observed them in neurasthenics (*Soc. des hôp., séance 1888, xii, 28*).

The motor disturbances which we find here, and of which the most important is the ataxia of the lower extremities, appear not only in the course of tabes, but also in other diseases in which one is unable sometimes to ascertain their anatomical basis. This is more especially true of the so-called functional ataxias (Gallard, Jaccoud), which develop sometimes with, sometimes without, sensory disturbances, and are associated with no other symptoms. Ataxia has likewise been observed developing slowly or quickly after diphtheria (*Berl. klin.*

Wochenschr., 1887, 49, p. 930), after quickly succeeding pregnancies, and in the course of diabetes; and the question must remain undecided whether it is to be considered as the expression of a severe general affection, of a faulty composition of the blood and an imperfect innervation dependent upon it, or as the result of a peripheral neuritis developing under the influence of an infectious agent. However, it can not be difficult in a given case to determine whether the ataxia is to be regarded as of spinal or tabetic, or as of functional or of infectious origin. In cases of hysteria the differential diagnosis, as has been already pointed out, may present very great difficulties (*Pseudo-tabes hystérique*, *Gaz. méd. de Paris*, Septembre 20, 1890).

The lancinating pains occur also in affections of the vertebral column, e. g., in Pott's disease, when the posterior roots are irritated, but the deformity and the tenderness of the vertebræ upon pressure will make the diagnosis clear.

Other pains, following the course of various larger nerves, which can last for weeks or months without marked exacerbations, and be accompanied by paræsthesias, formication, numbness, etc., are observed not only in tabes, but also in peripheral neuritis, following, for example, the abuse of alcohol. If to these a temporary loss of the patellar reflex be added, we have the picture of what is called pseudo-tabes, and a cautious and often-repeated examination is necessary in order to make the differential diagnosis. The history and the further course of the disease, which in alcoholic neuritis may become favorable after the removal of the cause, should always be taken into consideration (*Higier*, *Deutsche med. Wochenschr.*, 1891, 34; *Fournier*, *Münchener med. Wochenschr.*, 1892, 10).

We have already pointed out on page 650 the circumstances under which Westphal's sign may be present, and we can not insist too strongly that it is an error, or at least a too hasty conclusion, to think only of tabes whenever the patellar reflex is absent. On the other hand, we must not imagine that its presence puts tabes out of the question, for the possibility of the existence of this disease is not at all excluded when the reflex is found to be normal.

Pathological Anatomy.—Considered from the pathological standpoint, tabes represents a degenerative process in which the entire nervous system takes part. The reason that we have been unable to demonstrate in all cases the participation of all

the nerves—that in many cases, for example, the cord seems to be the part most involved while the brain and its nerves appear less affected—lies in the fact that we have been accustomed to examine the cord with the greatest accuracy, while the brain and peripheral nerves were considered only of secondary importance; and, secondly, in the fact that many cases are terminated by intercurrent diseases before the degenerative process has had time to develop in all directions.

This degeneration, which consists principally in the death of the nerve elements and an increase of the supporting tissue (*Leyden*), presupposes a certain change in the nervous system, the nature of which we do not as yet know, and which is peculiar to the individual either as the result of hereditary influences or which has been acquired later through syphilitic infection. The congenital predisposition is not sufficient to produce an outbreak of the disease. For this some one of certain exciting causes, of which we shall speak later, is needed. On the other hand, the changes produced in the nervous system by a syphilitic infection are able of themselves to lead to the production of tabes. As to the manner in which heredity works in the production of these changes, we are not in a position even to hazard a conjecture, nor are we by any means certain of the precise mode of action of syphilis. In this latter case, however, it is, according to our idea, most probable that the changes are a result of a syphilitic affection of the blood-vessels. It is, in our opinion, less likely that a poison ("toxine"), which affects the nervous system, is developed secondarily, in which case tabes would have to be regarded as a post-syphilitic affection, just as paralysis of the soft palate is a post-diphtheritic affection (*Strümpell*); and it would be still harder to imagine that the syphilitic virus becomes localized in the nervous system, and, as such, later produces the disease (*Rumpf*). One could in the last case not help but ask how it is possible for ten, fifteen, or more years to elapse between the syphilitic infection and the appearance of the first tabetic symptoms, a circumstance which, on the other hand, could be easily explained by assuming the existence of anatomical changes which are due to a diminution in the blood supply and require a relatively long time for their development.

The degeneration begins probably always in the peripheral nerves. The terminations of the cutaneous sensory nerves may be the first to become affected. The admirable researches of

Dejerine, Oppenheim, Siemerling, and others, have clearly demonstrated the participation of the peripheral nerves in the tabetic process, and there is no doubt but that they appear just as much degenerated as the posterior roots, in which the atrophy was shown to be most marked between the spinal ganglia and the cord, while the peripheral portion was often relatively quite free (Dejerine, *Compt. rend. de la Soc. de biol.*, 1882, p. 215). The degree to which the several cutaneous nerves are attacked varies. Those of the legs are usually more affected than those of the upper extremities. No definite rule can be said to exist. Sometimes, and this often happens, the peripheral ends of certain of the cranial nerves are the first to become diseased—e. g., those of the optic, the oculo-motor, and the abducens—and then the symptoms described above appear in the initial stage. At any rate, the first symptoms develop in consequence of lesions of peripheral end organs.

The degenerative process in the cord, which occurs later, is the most prominent pathological feature at the autopsy, and formerly was considered the only, or at least the only characteristic, lesion. This explains why tabes was and is still considered, by the majority of authors, as a disease of the spinal cord. According to our idea this is not true. It is rather an affection of the entire nervous system, in which the cord is not even the first part to become affected, but later is altered in such a characteristic and striking manner that we can not be surprised if the other, less marked, conditions were overlooked. Though the changes in the cord have long been recognized, the views as to their origin are still conflicting and the most varied interpretations have been put forward. We do not care to enter into an account of the controversies, but will only bring before our readers succinctly the conclusions arrived at as to the nature of the affection. It consists probably of a primary degenerative atrophy of the nerve fibres, which is followed by a secondary increase of the supporting tissue. As the degeneration takes place slowly, few compound granular corpuscles are found, and only in older cases can corpora amylacea be demonstrated. The grayish discoloration of the posterior columns depends upon the destruction of the medullary sheaths. A marked degree of atrophy is to be noticed in the posterior columns, and in advanced cases the entire cord appears narrower and thinner than is normal. On cross-section it is readily demonstrable that besides the

posterior columns the posterior gray horns and the posterior roots also become atrophied. The condition of the posterior roots has been carefully studied by Leyden, who noted the frequent atrophy in them; according to his conception, the changes in the posterior columns are a result of the changes in the posterior roots, so that we have "a progressing affection of the sensory portions of the spinal cord." This view is still upheld by Leyden, in spite of various objections which have been raised against it (Redlich, Marie, and others; see the latest article of Leyden in the *Zeitschr. f. klin. Med.*, 1894, xxv, 1, 2). Moreover, it is of interest to note that certain portions of the cord seem, as a rule, to be spared, while others are almost always involved in the degeneration which affects both sides of the cord symmetrically. The lesion is of the character which we have learned to recognize in the so-called "combined system diseases"—that is, certain systems of fibres which have certain anatomical and physiological relations to one another become diseased, while others are unaffected. It is also seen that not all portions of the posterior columns are implicated equally (Strümpell), but that the extent of the lesion differs according to its situation. For example, it is most severe in the lumbar region, in which only the anterior part is left intact, the middle and posterior portions being de-

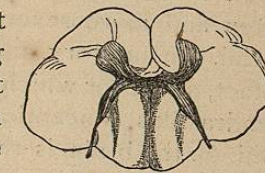


Fig. 178.

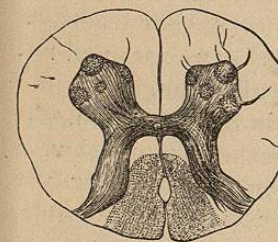


Fig. 179.

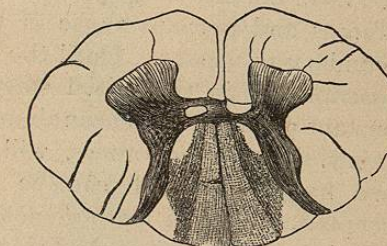


Fig. 180.

Fig. 178.—SECTION THROUGH THE CERVICAL CORD IN A CASE OF COMMENCING TABES. Fig. 179.—SECTION THROUGH THE LUMBAR CORD IN TABES. Fig. 180.—SECTION THROUGH THE CERVICAL CORD IN A CASE OF ADVANCED TABES. (After STRÜMPPELL.)

generated. In the cervical region there are to be distinguished four fields on either side, of which, two, Goll's columns and a part of Burdach's columns, the so-called lateral root fields (into which direct fibres enter from the posterior nerve roots), appear

degenerated, while two others, one anterior and lateral, the other posterior and external (the posterior outer fields of Strümpell), appear normal (Figs. 178, 179, and 180). Such a distribution of the lesion is frequently observed, but naturally not found in all cases. We have already mentioned that the posterior gray matter is involved in the process. Lissauer deserves credit for having demonstrated (Arch. f. Psych. und Nervenkrankheiten, 1886, xvii, p. 376) that here the affection of the fibres in Clarke's columns should be distinguished from that of the fine and large root fibres in the posterior horns. Physiologically this discovery can not as yet be utilized.

Of the lesions in the medulla oblongata and the brain, produced by tabes, the former affect the cranial nerves at their nuclei or in their peripheral course. Of the manifold symptoms produced thereby we have spoken before. On the other hand, we may have lesions of the cortex, an implication of which in many cases can not be called into question. We also said that some of the nuclei, particularly those of the eye muscles, of the vagus, and of the hypoglossus, are affected more often and more severely than others, while, for instance, the facial, the auditory, and the glosso-pharyngeal remain as a rule intact, a fact for which we have no explanation. According to Jendrassik's conception (Deutsches Arch. f. klin. Med., 1888, xliii, 6), the brain is the primary seat of the tabetic process, so that the sensory disturbances and the ataxia are to be considered as of cortical origin, and the degeneration in the posterior columns, and perhaps those of the direct cerebellar tracts, as secondary processes. Until the cortex has been examined microscopically in the initial stages of the affection, and some constant changes have been demonstrated in it after death, this theory, like all the others, will remain nothing more than a bare hypothesis, and can be neither contradicted nor yet accepted. Such a pathogenesis, however, is not impossible, though it is not difficult to bring forward objections to it.

Lastly, it should be mentioned that Basso (Ann. univers. di med. et chir., June, 1886) considers tabes to be an affection of the sympathetic system, under the influence of which the cerebro-spinal lesions develop. He thinks that the anatomical changes in the nervous system are at first caused by functional, and later by organic disease of the blood vessels, and holds that when taken in time tabes is curable.

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Ætiology.—In speaking of the ætiology of tabes, one must constantly distinguish, as is evident from the views expressed above, between the non-syphilitic and the syphilitic affection. In the first case one should above all take into consideration the hereditary conditions in order to comprehend the congenital predisposition which is necessary for the production of the disease. By this we do not mean to class tabes among the hereditary diseases in the ordinary sense of the word, for it certainly can not come in this category; on the contrary, we are justified in assuming that direct inheritance of it is quite rare. By heredity in this connection we mean a general neuropathic inherited tendency, or, in other words, that in the family of the patient all kinds of neuroses, not excluding psychoses, have occurred repeatedly. Not only the parents, but also more distant relatives, e. g., aunts, uncles, or grandparents, may have suffered with general paralysis, epilepsy, melancholia, hysteria, migraine, etc., and it is just this heredity which in the presence of exciting causes is sufficient to open the

door to the tabetic process. The labors of Charcot (Arch. génér. de méd., Sept., 1883) and the comprehensive statistics of Ballet and Landouzy (Arch. de neurol., 1886, vii, 20) have thrown an interesting light upon this subject, and have brilliantly substantiated the view which Trousseau expressed at an earlier period, that tabes was (in the sense of the word as expressed above) hereditary. Among the German authors Möbius has occupied himself particularly with this subject (Allg. Zeitschr. f. Psych., 1883, xl, 1, 2).

The exciting causes which relatively frequently lead to the development of tabes (in those with hereditary tendencies) consist (*a*) in exposure to cold and wet, to sudden changes of temperature, and to prolonged living in damp lodgings; (*b*) in traumatic influences; (*c*) in certain factors due to the daily occupation, the most important of which is overexertion. The opinion that sexual excesses may lead to tabes, which has been expressed by various authors, must be given up as without proof.

I have never questioned but that exposure to cold, sudden changes of temperature, and, particularly, severe wettings, may play an important part in the ætiology of the affection; still, to me the following case was particularly convincing: The patient, a general agent for several hail-insurance companies, fifty-eight years old, had had syphilis thirty-nine years before, since which time he had been perfectly well. In August, 1885, while estimating the damage caused by a hailstorm, he was drenched to the skin, and was obliged to spend several hours in his wet boots. Three months later the first tabetic symptoms made their appearance—paræsthesia and anæsthesia of the legs, loss of the patellar reflexes, etc.; by Christmas, 1885, he was markedly ataxic, and in the spring of 1886 he was unable to pursue his calling. In the summer of 1886 he suffered with intestinal crises and intense lancinating pains, and eighteen months from the beginning of the affection he had paraplegia of both legs. In the early part of 1887 he died from an intercurrent attack of pneumonia. When tabes develops in one well on in the fifties, there must be some particular cause for it, and in this case it was, without doubt, the wetting. Similar cases can easily be found if the history be carefully taken.

The rôle which traumatic influences play in the production of the affection is just as certain. In one of my cases, a government official of high position, who had been affected with

syphilis twenty-nine years before, met with an accident on a glacier in the summer of 1884. He fell and slid some distance on a snow field with great rapidity, but no bones were broken and no dislocation occurred. A few months later the first tabetic symptoms made their appearance, and now the disease is well developed. Again, a fall from a height may be the cause (Oppenheim); Strauss reports numerous traumatic cases (Faits pour servir à l'étude des rapports de traumatisme avec le tabes. Arch. de phys., Novembre, 1886). From his communication it is apparent (1) that years may elapse after the accident before the disease makes its appearance, and (2) that the traumatism may have an influence in determining the seat of the early symptoms, particularly of the lancinating pains, so that, for example, after a fracture of the lower part of the left leg the pains will first make their appearance at that point, and so forth. In an article by Spillman and Parisot (Traumatisme périphérique et tabes, Revue de méd., 1888, 3) there is a table which gives the different forms of injury which have been followed by tabes. Of great interest also is a case reported by Blocq and Onanoff (Arch. de méd. exp. et d'Anat. pathol., p. 387, 1892) in which there was a combination of tabes and traumatic neurosis.

I have already pointed out, in my book on diseases of the laboring classes, that the occupation is not without importance, and more especially overexertion—for instance, at the sewing machine—or hard bodily labor in general may be the cause of the outbreak of the disease in those who are predisposed to it. However, the percentage of such cases is not large. Hofmann gives an instance which may be classed partly with those cases in which the occupation, partly with those in which traumatism, is the exciting cause. The patient was a laborer engaged in cutting tin plates, and in the course of his work his body was shaken from six to ten thousand times daily; under the influence of these shocks the disease developed (Arch. f. Psych. und Nervenkrankheiten, 1888, xviii, 2, 439).

Concerning the syphilitic tabes, which has been studied with the greatest care by Fournier and Erb, it is an undoubted fact that syphilis by itself is usually a sufficient cause for the disease, and that no other exciting factor is needed for its development.

We do not know what percentage of persons who have had syphilis become tabetic, but we do know for certain that the