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Reprinted from the Boston Medical and Surgical Journal of December 22, 1887.

BOSTON:
S. J. PARKHILL & CO., PRINTERS,
No. 222 FRANKLIN STREET.
1887.

LEAD-POISONING AS A CAUSE OF MUSCULAR INCO-ORDINATION (PSEUDO TABES.)[1]

BY JAMES J. PUTNAM, M.D.

It is well known that a number of cases have been described within the past few years, usually presenting a greater or less number of the symptoms which we are in the habit of referring to multiple peripheral neuritis, such as objective and subjective sensory disorders of a variety of kinds, and muscular wasting, with diminution of electrical irritability, but characterized above all by inco-ordination in the use of the muscles of the extremities.

The analysis of these cases shows that this inco-ordination may occur without the other symptoms of multiple neuritis being prominently present, just as, in other cases of that disease, the cutaneous sensory disorders may predominate, or even occur alone, or as paralysis may come on, and after lasting for a short time, disappear, without leading to muscular atrophy.

To this group of cases the name of pseudo tabes has been given, and although this name is not really a suitable one for many of the examples reported — those, for example, where the knee-jerk is exaggerated instead of being diminished — yet it is of temporary value as indicating the possibility of confounding cases of this kind with true locomotor ataxia, a mistake which has, in fact, no doubt often been committed.

In such cases as those which form the subject of this paper, there is a true impairment on the part of the patient's ability to co-ordinate their movements accurately, probably due to a loss of the impression coming from their muscles; but another class of cases has also been included under this same name of pseudo tabes, where there is no true inco-ordination, but a disorder of movement due to loss of power on the part of certain groups of muscles. In these cases the gait of the affected patient is of a character that has been likened by Professor Charcot to the movement of a high-stepping horse, because, in consequence of the paralysis or weakness of the extensors of the foot, the toe drops when the leg is lifted, and the knee has consequently to be raised unnaturally high

[1] Read before the Boston Society for Medical Improvement, Nov. 30, 1887.

in order to clear the foot from the ground. Furthermore, these patients, on account of their muscular weakness, often walk with an uncertain and somewhat straddling gait.

Of this latter group of cases I do not intend to speak further, although they are doubtless related, pathologically, in many respects, to those where true muscular inco-ordination is present.

All that is absolutely known, so far as I am aware, of the pathology of pseudo tabes of neuritic origin, is furnished by the results of three autopsies, two of them reported by Déjérine,[2] and the third by Dreschfeld.[3] In these three cases the disease was presumably of alcoholic origin. The clinical histories agree in all essential paticulars with the clinical pictures already indicated. The central nervous system was found practically unchanged in all, whereas there were marked changes in the peripheral nerves. The microscopic examinations in the two cases reported by Déjérine were especially careful, and showed a degenerative process, mainly confined to the cutaneous nerves, but probably affecting, also, as he thinks, the nerves of the muscular sense.

Besides these cases, the pathological diagnosis of peripheral neuritis as a possible cause of muscular inco-ordination receives support from the fact that the symptoms usually associated with the inco-ordination are unquestionably due to neuritis ; and also from the teaching of physiology. (See Déjérine l. c.)

The conditions under which pseudo tabes has been mainly observed are, in the first place, chronic alcoholism ; then, in cases of poisoning from arsenic, lead, sulphide and oxide of carbon, diphtheria, and other acute infectious diseases.

These are all recognized causes of neuritis, and the inco-ordination due to them is, doubtless, almost always of neuritic origin. It is, however, to be remembered that we get the symptoms of the so-called pseudo tabes in a more or less characteristic form, where the sensory tracts are diseased in another part of their course, namely, in the posterior columns of the spinal cord. It will be pointed out further on that it is not always easy to say whether we are dealing with a case of inco-ordination from neuritis, which will probably be curable, or with the first stage of certain types of posterior or combined sclerosis of the cord which are likely to prove incurable.

[2] Arch. de Phys., 1884, Nervo Tabes Périphérique.
[3] Brain, 1885, Vol. VIII, p. 433.

As compared with the other symptoms of multiple neuritis from these different causes, the cases of incoordination are rare. Even in chronic alcoholic poisoning, where they are the most common, the whole number reported in literature is very limited.

Of the cases due to arsenic, of which a complete and excellent summary is given by Dr. C. L. Dana in *Brain* of January, 1887, the whole number reported amounts to seven. Two of these cases are described for the first time by Dr. Dana himself, and are of special interest, apart from the clinical picture which they present, from the fact that in one of them the arsenical poisoning was acute, and due to a single dose; while in the other it seemed to be traceable to the continued ingestion of small quantities, taken for medicinal purposes.

The reported cases which we have reason to believe may be of *plumbic origin*, consist only in two, so far as I know, of which I shall take the liberty of giving a brief account.

The first case was reported by Teissier, in the *Gaz. Med. de Lyon*, 1861–1862, and is cited at length in the thesis upon pseudo tabes by Leval-Picquechef, published in 1885. The patient was a young man of twenty-four years, who had worked as a plumber for two years previous to his illness, for which no other cause than lead-poisoning could be assigned. His symptoms, at the time of his first examination, consisted in increasing difficulty in the use of his arms and legs; in progressive impairment of vision and of memory; emaciation, headache and vertigo. He suffered also from sensations of prickling and numbness in his extremities; the sense of touch was found to be diminished in patches, and his speech was somewhat indistinct. On careful examination it was found that the difficulty in the use of his limbs was due, not so much to the loss of muscular strength as to the impairment of his co-ordinating power, and this was so great that he could scarcely stand, or hold a pen. As is usual in cases of this kind, it was extremely difficult for him to keep his limbs in a fixed position. There was a marked lead-line on the gums. After treatment for three months in the hospital, the patient was discharged, much relieved, in all respects, but not entirely well.

The second case is reported by Raymond, and was first published in the important monograph upon chronic lead-poisoning by Renaut (L'Intoxication Saturnine). It is of unusual interest on account of the short time during which the patient was exposed

to the poisonous action of lead, and for other reasons. The patient was a man of forty-two years, and began to work in a lead manufactory of Clichy towards the end of January, 1874. He gave up work on the 25th of March, that is after about two months. He had never worked in lead before, and showed no symptoms of lead-poisoning, or other important impairment of health. On the 20th of March, that is five days before he left work, he had an attack of colic, which lasted for nearly two weeks. On the 25th of March he had a convulsion of two hours' duration, and, four or five days later, another convulsion of similar kind. On the 2d of April he became quite suddenly very ataxic, so that he could not carry a cup to his mouth without spilling the greater part of its contents. This ataxia was preceded by a moderate degree of muscular weakness. The next day he had marked formication in his lower extremities, and a few days later could only walk with great difficulty. He had also pains in the head and impairment of sight and of hearing. The inco-ordination of the arms improved as that of the legs came on. There was considerable loss of strength in the arms, but no marked atrophy; and the strength of the two arms was equal, while the inco-ordination was greater on the left side. The loss of hearing was also greater on the left side. Anæsthesia of all kinds was present. In spite of their severity the ataxia symptoms were nearly well after four months of treatment. There was a lead-line on the gums.

To sum up the history of these interesting cases, we have two patients, both exposed to the causes of lead-poisoning, and both showing a lead-line on the gums, and one of them, in addition, characteristic colic and confirmatory cerebral attacks, and both exhibiting a series of symptoms, severe and yet curable, similar to those which we have learned to diagnosticate as pseudo tabes.

I desire to call especial attention to the fact that tenderness of the muscles on pressure is not mentioned as present in either of these cases, and that, for the second, the severest case, at least, it may be certainly assumed to have been absent, because the report says, in speaking of the sensibility, "there are two painful areas in the left leg, in the neighborhood of the articulations of the ankle and the knee; except from these both legs are anæsthetic," etc.

To these two cases I believe that I am able to add three more of my own observation.

The *first case* is that of a young lady twenty-seven

years of age, in good circumstances, and of good previous health. She first consulted me on January 22, 1886, for serious inco-ordination and impairment of muscular strength, affecting, at that time mainly the hands and arms, and impairment of vision, especially of the left eye. She gave the following interesting history:

The sickness had begun towards the end of the previous August (1885), with aching pains in the elbow of the left arm, and numbness and prickling, with loss of sensibility, along the back of the left forearm and hand. It is especially noteworthy as indicating a peripheral localization of the disease that, at that time, the forefinger and thumb were affected alone, that is, without the other fingers. The same aching pains then attacked the right hip, and similar, but severer, numbness affected the whole of the right leg on the under side, as far as the foot, and including the latter. The affected limbs, at the same time, became more or less weak, but it is interesting to note that, subsequently, this weakness improved rather rapidly. The right hand and the left leg were attacked in the same manner in the following November, that is, three months later. Since then, while the the right hand has been growing worse, the legs have been improving, so that she now feels no numbness there, and can walk with ease.[4]

In the same month (November), she first noticed a sensation as of a broad band drawn tightly around the body below the breasts. This symptom lasted for some weeks, and then passed gradually away, though she is still conscious of it from time to time. Lest it should be thought that the presence of this girdle sensation stamps the case as certainly one of myelitis, I will here remark that it is occasionally present in cases otherwise characteristic of multiple neuritis, and so diagnosticated by good observers, as, for example, in Obs. III. in the thesis on pseudo tabes, of Leval-Picquechef.[5] The irritation which causes it may occur anywhere, and must occur somewhere, in the course of the sensitive nerves or nerve-roots of the two sides.

At about this same period (Nov., 1885), the vision became blurred, especially, or as she thinks, exclusively, that of the left eye. This blurring came on, she says, quite suddenly, but has steadily increased, so that she has given up trying to read. At first it seemed to her as if there were something in front of

[4] A similar rapid alternation of symptoms between the arms and legs is reported in Raymond's case.

[5] Loc. cit.

the eye which she tried in vain to brush away. There was no double vision. Her feet and hands felt very cold, so that even in August weather she was obliged to use hot-water bottles. There was no fever at any time, and she had had no pain except that described as occurring at the onset of the sickness. No cause could be assigned for the illness, except as hereafter to be stated. Her sister said, as regarded the time of appearance of the first symptoms, that she remembered the patient speaking of weakness of the legs some months before the final outbreak.

My notes of the physical examination are as follows:

The patient's appearance suggests a naturally healthy person. The pupils are unusually large in moderate light, but are equal and respond well to light; very slightly, however, with efforts of accommodation. The hands, in consequence of slight atrophy of their intrinsic muscles, show the "bird-claw" deformity in some degree, with an approach to the simian position of the thumb. The position of the right thumb can be voluntarily corrected somewhat, so that the thumb and little finger can be touched together. The left hand is worse than the right, and the interosseous muscles on the ulnar side of both hands are more affected than the others, so that the two smaller fingers remain crooked even when a strong effort is made to straighten them. The thenar eminence is also slightly wasted, but, on the whole, the appearance of atrophy is not marked. There is no marked change in the muscles of the right forearm, but the left forearm is cooler than the right, and measures one c.m. less, (right, 22.5; left, 21.5;) and the long flexor muscles on the ulnar side are somewhat wasted. The grasp with the left hand is weaker than that with the right, though both are weak.

The most striking symptom relating to the hands is, however, a high degree of inco-ordination of movement, associated with almost complete loss of the sense of position and impairment of the tactile sensibility, the latter, however, almost confined to the hands — and most marked at the ends of the fingers. The deep prick of a pin is distinctly recognized, but the point and head are distinguished with difficulty on light contact. Slight differences in temperature are distinctly recognized, even with the finger-tips. The inco-ordination is increased by closure of the eyes, but present even when the eyes are open. The loss of muscular sense is so great that the presence of a weight of fifty grammes held in the hand, with the

arm bent at a right angle, is but just recognized with the left hand, and a weight of one hundred and fifty grammes is not felt with the right hand, although, in other respects, the right hand is in much the best condition. There is absolutely no sense of position of the hands, and, when the patient is not looking on, the fingers wander off in constant movement. The thumb and forefinger are less clumsy than the other fingers. The gait is now practically normal, though the legs are said to tire more easily than formerly. The muscles of the calves are rather flabby and small, but the patient can raise herself on the ball of either foot alone. She can also balance herself fairly well on either foot, and the difficulty in doing this is not much increased by closure of the eyes. The cutaneous sensibility of the legs (left alone tested), is slightly, but very little diminished. A light touch often passes unnoticed, but the prick of a pin is distinctly recognized, and the æsthesiometer points are distinguished at a distance of one and a half to two inches. The knee-jerk is markedly exaggerated on both sides, and the "front-tap" contraction is well marked. No distinct ankle-clonus is brought out by the usual methods of testing, but "trotting" of the leg is easily excited, and has been noticed by the patient herself. There is also some exaggeration of the myotatic irritability of the forearm muscles.

I will here remark that whether this increase in the myotatic irritability indicates an involvement of the spinal cord or not, it has several times been observed in cases diagnosticated as multiple neuritis (Möbius, Strümpell, Brissaud, and others), and I have myself seen it repeatedly in undoubted cases of lead-poisoning.[6]

The electrical examination shows the reaction of the ulnar nerves to be equal on the two sides, and nearly or quite normal to both currents. The interosseous muscles and the opponens pollicis of the left hand react rather more readily than those of the right, in spite of being more atrophied. There is no degenerative reaction. Both disks look rather pale, but not beyond physiological limits. At a second examination I concluded that the right disk was normal. The left disk is more opaque than the right, though not absolutely beyond the limits of possible health. The vessels of the left disk show whitish lines along their borders, and there is, altogether, more connective tissue on the left than on the right disk. With

[6] Lead in the urine, etc. J. J. Putnam, Boston Med. and Sur. Jr., 1887, July 28th and August 4th.

the inverted image method, however, no difference in color is seen. The rest of the fundus is normal, and the media are clear. Fine oscillatory movements of the right eye are noticed during the examination.

This patient has been in the habit of drinking for a part of each year, and that during the winter season, water from a very old well which was sunk under the floor of the house, its exact position not being known. The water was pumped through a lead pipe, and was reported by Dr. A. M. Comey [7] as "bad-smelling and filthy," and containing "an enormous amount of lead, considering that it is used for drinking."

The urine contained no albumen, but a large amount of lead.

In spite of the fact that up to the time of my examination the patient had been steadily losing ground in the use of the arms (although, to be sure, the legs had improved spontaneously), she improved decidedly under treatment, so that, nine months later, her sister writes that she "can use her hands almost as well as ever, although there still remains some of the numbness, and she has not fully recovered her sight." According to later reports her condition has varied from time to time, and though much better, she is not entirely well.

The *second case* is that of a young lady of fifteen, in good circumstances, not of neurotic temperament or antecedents.[8] She was first seen by me in consultation with Dr. Wadsworth, of Malden, in April, 1887, for slight inco-ordination of the muscles of all four extremities, and difficulty in the use of the eyes. She gave the following history:

Her health had been good up to last fall, except for occasional headaches. Last fall and winter she had an increased number of headaches, each attack sometimes lasting several days, and the pain being referred to the forehead and vertex. On the day following one of these attacks she was very dizzy, but there was no nausea or vomiting. In the latter part of the autumn she had partial loss of control of the bladder, lasting several months, but ceasing when she stopped going to school, and going out into the cold. She left school in March, 1887, mainly because the teacher noticed that her eyes had a peculiar expression, and, perhaps, because there was some difficulty in reading, although the patient now thinks that she did not herself notice much trouble in reading at that time. For a few weeks previous to my examination, however,

[7] Vide Lead in the urine, etc. Loc. cit.

[8] This case has been already reported (loc. cit.), but I give it again at somewhat greater length for the sake of completeness.

the patient had found it impossible to read, unless, perhaps, a line or two at a time, the words blurring and running together. She can recognize her friends, but has, as she says, "the greater part of the time," distinct diplopia. Since the middle of March she has noticed an unsteadiness of gait, and while walking feels dizzy, probably on account of the diplopia. With this there has been impairment of strength, noticed, for example, in sitting down or rising from a chair, and a sense of fatigue in the legs. About Christmas time the ends of the fingers of the right hand felt numb and prickly for a week or so, but there was no difficulty in using them. The left hand began to be numb about the middle of March, at the same time with the onset of the symptoms above described, the numbness affecting mainly the fingers, but also the whole hand from the wrist downward. This numbness was persistent, not accompanied by pain, and disappeared about ten days before my examination, passing away quite suddenly.

The notes of my physical examination are as follows:

April 8, 1887. Slight but well-marked ataxia in both the upper and lower extremities. Grasp of both hands weak; left much weaker than right; left leg also weaker than right. Patient can stand on either leg and balance herself fairly well, even with her eyes shut. A staring expression of the eyes is very noticeable and there is well-marked diplopia. On examination it is found that the right eye cannot be moved inward much beyond the median line, and only very imperfectly upward and downward; the motion outward is perfect, or nearly so. All the motions are accompanied with more or less jerking of the eye-ball. The left eye is in a similar condition, but all its movements are better preserved. The pupils react well to light. Vision of the right eye is much impaired, so that print which can be seen at about eight feet with the left, is seen only at about two feet with the right. The field of vision but little, if at all, impaired. The knee-jerk is exaggerated on both sides, and imperfect ankle clonus is present. Attention is called to the fact that the right eye and the left limbs are the worst. The patient is said to be more dull and apathetic than before her sickness began, though not so much so now as at an earlier time.

An opthalmoscopic examination was made, and seemed to show an abnormal paleness of the disks. At a subsequent examination, however, made a month later under more favorable conditions, the disks appeared

normal, and as, by that time, the eyesight had become almost completely restored, it seems highly probable that the original difficulty of vision was one of accommodation only. At the first examination some of the muscles of the left arm seemed to be somewhat wasted, as compared with those of the right, but the difference may perhaps have been no more than natural.

On May 26th, seven weeks later, the report of her condition was as follows: "Better in every respect. Thinks the hands are as well as ever. No staggering. In fact, the only difficulty that seems to remain is a slight trouble in reading. On examination it is ascertained that there is double vision only when the eyes are carried far to the left, and under those circumstances the right eye is noticed to twitch slightly.

"On electrical examination the reaction of the muscles is found apparently normal, that is, there is no essential difference in reaction between the flexors and extensors of either arm. None of them, seem to react quite as rapidly as those of health but this is uncertain. The flexor muscles of the left arm are not quite so large as those of the right, but the grasp is nearly, if not quite, as good."

On examination of the urine of this patient, lead was found to be present. The only source from which lead could have come is indicated in the inclosed letter from Dr. Wadsworth.

"Mr. G. told me after you had gone, that, last summer, during July and August, the family spent a couple of months at ————, where he built a house and drove a pipe some seventy feet for water. The sections of pipe were screwed together, and the joints covered with white lead, so that a good deal of lead would be left on the inside of the pipe, and this supplied the house with water."

Still later the patient reported herself at my office perfectly well in every respect.

The third case was seen by me in consultation with Dr. Francis, of Brookline, on January 13, 1887. The patient was a lady in good circumstances, forty-five years of age. She was passing through the menopause at the time her sickness began. Up to October, 1886, her health was pretty good. At that time she began to show signs of a peculiar form of indigestion, and very shortly afterwards had uncontrollable vomiting, which lasted about six weeks, and was so severe as to make it necessary to feed her by rectal injections. This condition at last passed quickly away, and she became able to take every kind of food

as well as before. Then occurred what seemed to be a sort of hysterical mania, in which she was seen by Dr. F. Minot, in consultation, and although the worst phase of this soon passed off, she had never since been in her normal state of mind, behaving rather childishly, and taking her illness more lightly than might have been expected. During the height of the attack, and even after that, she had some incontinence of urine at times. A few weeks before my examination the present condition developed itself.

My report of the physical examination is as follows:

The patient sits in a chair with an indifferent expression and no appearance of suffering. The legs are bent at the knee, and the left cannot be fully extended. There is marked ataxia of the hands, increased by closure of the eyes. All movements are possible of all four extremities, but feeble. There is some tenderness on deep pressure in the calves, especially the left, but not of the nerves in the popliteal space. The knee-jerk is absent (except that it was obtained once to a slight degree on the right side). The temperature of the skin of the legs seems normal. There is great muscular relaxation everywhere, and great general emaciation, but no atrophy. The tongue protruded straight and without tremor. There is no lead-line. The heart is normal, but weak. The patient is unable to stand alone, but this probably proceeds more from deficient innervation than from weakness. Sensibility to touch or pricking normal on the hands. No ocular symptoms.

The patient was advised to enter the Adams Nervine Asylum, where, in the course of some months' treatment, she gradually improved, although even now, at the expiration of fourteen months, she walks only with crutches, and then with some difficulty, and has still some inco-ordination in the use of her hands.

Dr. S. G. Webber, under whose care she passed, has been kind enough to send me the following notes. I should say that I did not make the diagnosis of neuritis, because I thought that the local symptoms were insufficient, but concluded, erroneously, as I now believe, that the symptoms were of functional nervous origin. Dr. Webber after careful examination, concluded that neuritis accounted for many of the symptoms at least. He did not, however, exclude the possibility of central disease as well, especially of the brain.

"When she came to the asylum Mrs. L's condition was as follows: Pupils, eyes, facial muscles and

tongue moved naturally. There was slight incoordination of the hands, but no tremor when extended. Sensation was only slightly impaired at that time, but later seemed to become more so. There was impairment in the sense of localization in the feet. No patellar reflex. No ankle clonus. Left leg was contracted, slightly flexed at the knee, and its strength was less than that of the right leg. The peronei muscles reacted but very slightly to the faradic current, the vasti interni scarcely at all, the interossei and the long flexors of both hands very much less than normal; the rest of the muscles reacted better. The mental condition was peculiar. There was an unusual degree of childishness. The memory was weak. It was not possible for her to read any long paragraph or article. During her stay she improved mentally, but the memory for recent events remained impaired throughout. At one time, while taking iodide of potassium, she had much tingling in the fingers, and even pain, so that I diminished the dose. At first there was hyperæsthesia of the muscles on pressure. She gained very slowly in all respects, but before she left us the electric reaction had improved, except those of the vasti interni.

The treatment consisted in iodide of potassium, five grains, three times daily; later, two and a half grains; massage, electricity, and symptomatic treatments of various kinds.

Lead was found in Mrs. L.'s urine, once, in such large quantity that I thought there must be an error, especially as there had originally been tin foil over the cork of the bottle. I then took extra precaution to exclude accidental sources of contamination, but lead was again found in large amount."

The symptoms to which I would especially call attention in these cases are the following:

First. The rapid spontaneous improvement of the legs in the first case at the time when the arms were still growing worse; and, in the second case an eventual improvement so rapid that it might suggest that we had to deal with functional and not organic disease. It is, however, well known that an equally rapid improvement has previously been reported in cases of this kind. As an instance of this sort I will call attention to the case cited above from Raymond, as well as to another very interesting case reported by Lilienfeld in the *Berliner Kl. W. schr.*, 1885, page 726.

Second. The exaggeration of the knee-jerk, to which I have already referred, and the bearings of which I have discussed elsewhere.[9]

[9] Loc. cit.

Third. The serious character and protracted course and possibly central origin of some of the symptoms in cases I and III.

The class of cases to which special reference has been made in this paper are mostly curable, or at least susceptible of great improvement, though sometimes their symptoms are of long duration, and some of them may persist indefinitely. Partly on account of this curability, it has been assumed that the peripheral nerves are the chief seat of the disease, so far as the motor and sensory symptoms are concerned and that the spinal cord is nearly, or quite, unaffected. How far this conclusion is justified, we have not as yet sufficient material to decide. The myelitic changes, if they exist, are certainly not of a progressive type. The differential diagnosis, however, between these cases and the early stages of certain others of really spinal origin, and of progressive and fatal course, is by no means always easy.

A typical case of true locomotor ataxia, by the time it has reached the ataxic stage, usually presents enough distinctive features to make this error impossible, but sometimes the posterior columns of the cord, either alone or in combination with other tracts, become diseased in such a way that inco-ordination comes on quite rapidly, attended by alterations of the sensibility, beginning in the hands and feet, and sometimes by amyotrophic or paralytic symptoms, not altogether unlike those which are due to multiple neuritis.

A case where this doubt as to the diagnosis might be entertained, especially in view of the recovery of the patient, is quoted by Leval-Picquechef, from a communication by Raymond, who had made the diagnosis of *diffuse subacute myelitis, involving principally the posterior columns.* The patient was a man, forty-two years of age. Two weeks before the examination he felt, on arising in the morning, sensations of prickling and numbness in the arms; in the afternoon his legs became weak, but not so as to prevent walking; next day he was unable to stand, and lay in bed suffering from formication in the extremities, worse at night; pains in the legs and muscular twitching, and headache. On examination, he was found to have slight paresis of the left side of the face, and slight difficulty in speech, and in deglutition; the muscles of the legs were tender on pressure; the tactile sensibility was slightly diminished, and there was a certain degree of delay in the sensitive conduction from the inner side of the foot. There was also marked inco-ordination in the lower extremities on attempting

to walk; and the knee-jerk was wanting. This patient remained under observation for a little more than three months, at the end of which time he had almost entirely recovered.

Another case which is suggestive from this point of view is one which I have lately had occasion to observe myself, through the kindness of Dr. M. A. Morris, of Charlestown. The patient was a woman of seventy-three years, who had been excessively anæmic, and for two years before my examination had felt sensations of numbness and prickling in some of the fingers of both hands, gradually increasing in severity. A few weeks before I was asked by Dr. Morris to examine her, she had been attacked rather suddenly with inco-ordination of movement which at first affected mainly the lower extremities, but, later, the upper equally. This increased rapidly, so that she soon became confined to bed. Besides the inco-ordination, there was great impairment of sensibility in all its modes. The lower extremities soon became entirely paralyzed, but this was due, mainly, to the development of acute myelitis in the dorsal region, which may be regarded, for the purposes of the present argument, as an accidental complication, although it was eventually the cause of the patient's death, which occurred several months later.

The examination of the spinal cord showed a destructive degeneration of both the posterior and lateral columns throughout their whole extent, both above and below the seat of the acute myelitis. In this case the knee-jerk was greatly exaggerated, but, as we have seen, it is not safe, for this reason, to exclude the possibility that peripheral neuritis may be the prominent pathological condition and the prognosis favorable.

It is doubtless true that in most cases a careful study of the symptoms, etiology, and history will enable us to reach a satisfactory diagnosis in these doubtful cases, but it is also true that, considering the great differences in the clinical pictures presented by different cases of peripheral neuritis, and the long duration of some of the symptoms, it might easily be possible to mistake a pseudo-tabes of this origin for the early stage of incurable myelitis, and vice-versâ.

Finally, it must be admitted that when we say that we believe the symptoms in a given case to be due to arsenic, lead, etc., we must as yet, considering the small number of cases that have been reported, tacitly make the reservation that the disease and the exposure may perhaps have been coincident only.