A surgical treatment of locomotor ataxia / by L.N. Denslow.

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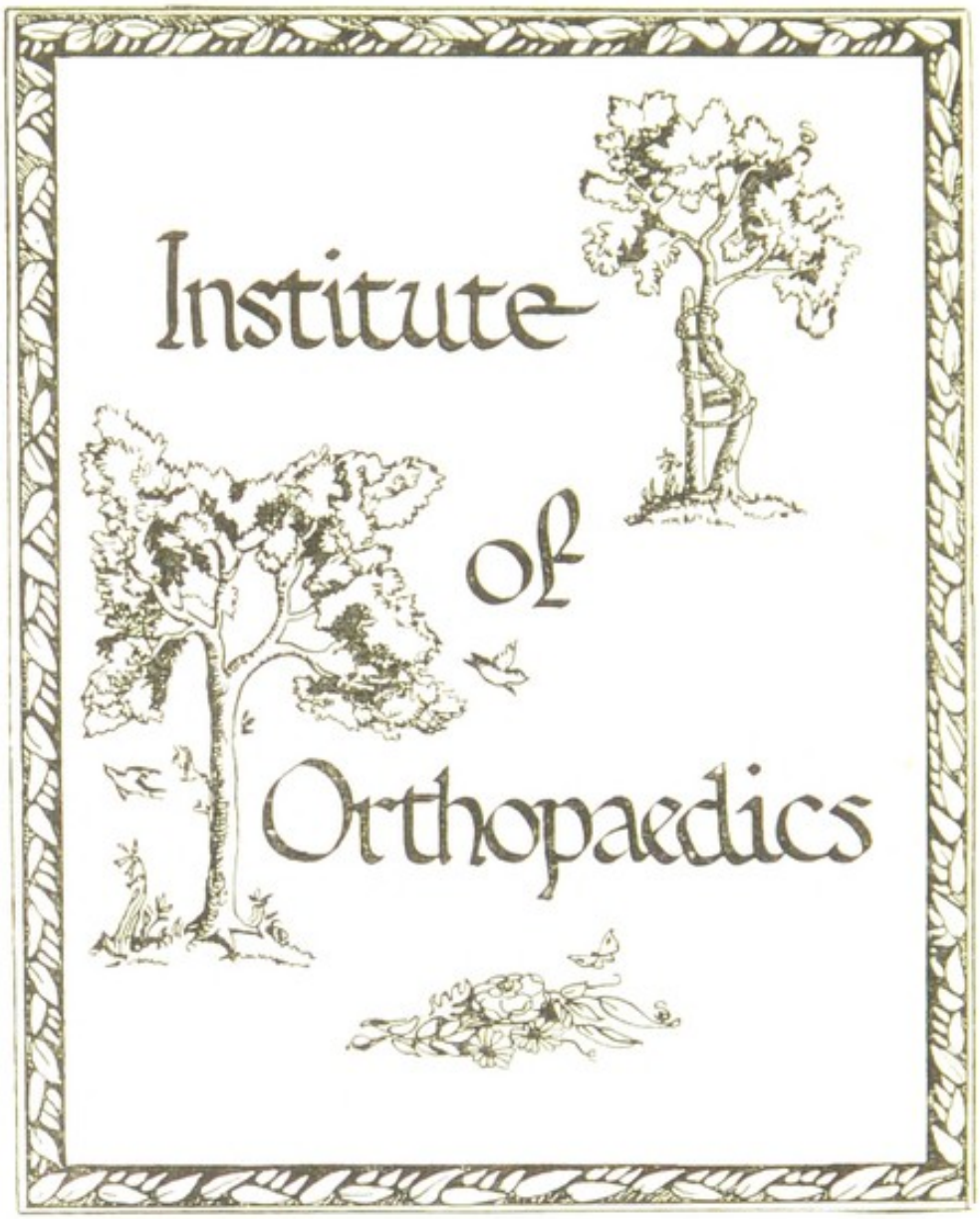

A SURGICAL TREATMENT OF LOCOMOTOR ATAXIA

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BY

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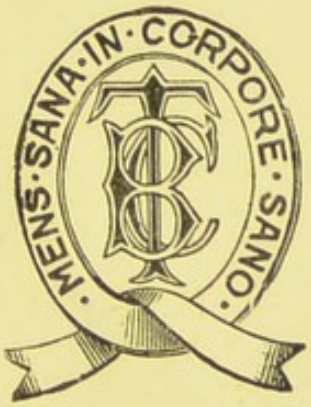

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BAILLIÈRE, TINDALL AND COX
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1912

DEDICATED, WITH GRATITUDE,

TO THE MEMORY OF MY FRIEND AND TEACHER

PROFESSOR OTIS

PREFACE

THE results I have obtained in the treatment of locomotor ataxia by surgical methods have been so encouraging that I have been led to lay them before the profession.

L. N. D.

76, WIMPOLE STREET,
LONDON, W.,
February, 1912.

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CHAPTER I

A SURGICAL TREATMENT OF LOCOMOTOR ATAXIA

I DESIRE to direct the attention of the medical profession to a method of treatment of locomotor ataxia which has met with considerable success in my hands.

I find that in male subjects in every case of this disease without exception an abnormal condition of the urethra exists, and that by treatment directed to this condition many of the symptoms of the disease—*e.g.*, the pains, ataxia, visceral crises, *sensation profonde*, hyperæsthesias, anæsthesias, and incontinence of urine and fæces, may be cured or alleviated, and the disease itself at least held in check.

It need scarcely be said that permanent pathological changes are irreparable, and in that sense a cure is out of the question; but where a train of symptoms is due to some irritation, and this is stopped by removal of the cause, undoubted good may be achieved.

Besides the peripheral irritation in the urethra, irritation may be present in the bladder and rectum of both sexes, and also in the uterus and its appendages. In this connection I may refer to the case of a woman, communicated to me by a Boston surgeon, in whom great improvement in the ataxic gait took place immediately after a rectal operation performed solely for the relief of the rectal disease.

I have no doubt, from an extensive experience, that all cases of tabes are ultimately due to syphilis, in whatever manner acquired. But, admitting this as an essential, certain other conditions have to be reckoned with. Thus syphilis alone may not suffice to cause the disease; other factors may be needed to call it forth, and among these urethral irrita-

tion in the male occupies the most prominent place.

Shock, over-exertion, exposure to cold, worry, and devitalizing conditions, precipitate it by lowering the resisting power of the nervous system. Men who were apparently perfectly normal up to the time of such shock or injury have, in several instances in my experience, suddenly developed tabes, and in all these urethral lesions, which had evidently existed for a long period, were found. These lesions being relieved, rapid recovery (in some cases with remarkable rapidity) took place. Sexual excesses, I think, have a direct influence where there is already irritation of the genital tract, by aggravating and perpetuating the sensitive points. It is known that men suffer from tabes in a larger proportion than women. The greater extent of their urethral surface may account for this disproportion.

EXAMINATION AND TREATMENT.—It is, in the first place, of the utmost importance to discover the exact condition of the urethra,

as upon this will depend the treatment to be adopted. A urethroscope or an Otis urethrometer is used for this purpose.

The lesions usually found in the urethra are erosions, granulations, and strictures. Besides these, a highly sensitive condition, either local or general, is often discoverable. It is a remarkable fact that though sensibility of the skin, muscles, joints, and viscera, including both testes, is so apt to be diminished in tabes, the urethra, on the contrary, often displays a high degree of hyperæsthesia; and this has to be reckoned with in applying local treatment. The granulations are found either in the fossa navicularis, immediately behind the strictures, or at the farthest part of the pendulous urethra. In a few cases these granulations bleed at the slightest touch.

When the urethra is sensitive, it may be necessary to use a local anæsthetic before introducing the urethrometer or urethroscope. We must bear in mind the danger of irritating a hypersensitive urethra; unless in such cases it is manipulated with proper caution, not only may lightning pains and crises be

precipitated, but profound shock induced. The line between relieving and aggravating symptoms is a narrow one, and any incautious use of instruments may do more harm than good. Erosions and bleeding granulations are best treated with mild solutions of argol or copper per urethroscope, and by the passing of a sound as far as the limit of the pendulous urethra, but no farther.

As to the strictures, those situated in the anterior part of the urethra near the meatus are best incised and dilated regularly and gradually up to No. 18 (English), or even a higher number, two or three times a week for several weeks. I consider this procedure of the greatest importance in the treatment of tabes. My rule is, that when a sound does not drop into the urethra of its own weight, it should not be passed. Should the stricture be in the lower three-quarters of the pendulous or in the deep urethra, the conservative plan of gradual dilatation gives the best results.

As a rule, the strictures are found in the pendulous portions of the urethra, and the sound is not introduced into the bladder after

the first examination, unless an organic stricture is found there, when it usually readily responds to treatment. In all cases 5 grains of urotropin are given three or four times daily in a tumbler of water.

The importance of paying attention to the digestive tract cannot be overestimated. Apart from the evil influence of gastric trouble, it is found that unless these patients have one or two normal stools daily there is great aggravation of their tabetic symptoms, such as pain and ataxia. Constipation is the rule in tabes ; this is best treated with cascara sagrada, or any of the waters containing sulphate of sodium or magnesium. Besides these measures, a simple tonic is given if required. Under no circumstances should strychnia or any spinal stimulant be administered ; this but adds to the irritation, which it should be our utmost endeavour to remove. As to the exhibition of such drugs as phenacetine, antipyrine, aspirine, or any of the other synthetics, to allay the lightning pains, they are seldom needed after a few days of urethral treatment.

In the foregoing remarks I have outlined a successful method of treating tabes dorsalis. So far, in the remarks made, I feel myself on safe ground. As to the rationale of the treatment, I am not in a position to dogmatize, but the following observations I would put forward tentatively.

PATHOLOGY.—It seems we have but to apply Edinger's hypothesis of "functional exhaustion" to explain the injurious effects of urethral irritation in the tabetic. According to this authority,[1] "the fatigue induced by overwork of a healthy nerve may never be recovered from, but eventuate in permanent atrophy and paralysis." This author[2] argues "that the changes which take place in a normally constituted neuron as the result of its normal functional activity are of the same nature as those which usher in degeneration; and when this functional activity is excessive, actual degeneration may ensue." Thus he has shown that "when a rat is strung up for some time by the tail the continued struggles of the creature cause such exhaustion of certain afferent neurons as to lead to degeneration of

the posterior columns of the cord." This fact, that excessive functional activity may be capable of initiating degeneration even in healthily constituted neurons, prepares us for the conclusion that moderate functional activity may be capable of initiating degeneration in defectively constituted neurons, whether that defect be congenital or acquired.

In tabes we have to do with a neuron defect (involving chiefly the peripheral sensory neurons) acquired through the agency of the syphilitic virus. Now, we may suppose, as a plausible theory, that the continuous peripheral irritation, whether arising in the urethra or other regions of the body, may, by exhausting these sensory neurons, produce in the posterior spinal roots and posterior columns changes similar to those which Edinger has produced in rats. It is significant that the same region of the spinal cord should suffer in each instance.

I would finally insist that in some cases of tabes symptoms occur with a severity out of all proportion to the actual pathological changes found. These symptoms are ap-

parently caused by such changes creating a zone of irritability beyond the initial point.

CASES.—Of the seventeen cases reported to the New York Academy of Medicine, October 1, 1908,[3] seven were seen, six heard from, and four did not report, when I was in New York November, 1911.

Of these, ten were in good condition and able to attend to their business or occupations for many hours daily, and this after being without treatment for from two and a half to three and a half years. One is in good physical condition, but cannot stand, although he can sit at table and eat. This patient was utterly helpless, and had to be fed. Two cases have relapsed.

The next seventeen cases were reported in the *Annals of Surgery*, June, 1909.[4] In November, 1911, four were in good physical condition and well able to attend to their business, which required long hours. Three, when last heard from, when on a visit to New York, September, 1910, were in good condition and able to work daily.

Nine have not been heard from. One has relapsed.

Of these fourteen clinical cures in the two series, two have lost 10 pounds and 1 stone 1 pound each, two have gained 12 pounds and 3 stone 8 pounds each, and ten report that they "are up to their ordinary weight."

It is but fair to say that many who were in an utterly hopeless condition were treated during this time, to whom no encouragement was given, but on account of their pitiable condition could not be refused treatment.

The next series of nineteen cases were kindly referred to me by the late Professor Raymond, of the Charcot Clinic at the Salpêtrière Hospital, Paris. I attended them from early in August until November, 1909. These patients were taken just as they appeared at the clinic, good and bad alike, no one being refused treatment. My assistant at the Salpêtrière during that period, Dr. Jaworski, reports in his book[5] the following results:

"Nineteen were treated. Of these, 7 were

immensely improved, 10 were ameliorated, and 2 received no benefit; 16 were chronic cases who had been long in attendance at the hospital. Ataxia was present in 17 patients: in 6 it disappeared; in 5 it was ameliorated. Lightning pains were cured in 5 out of 16 cases, lessened in 9. Urinary troubles were cured in 5 out of 19 patients, ameliorated in 9."

January, 1912: The seven cases treated at the Charcot Clinic in 1909 have maintained the improvement.

The next seven cases, of from one to ten years' standing, were referred to Dr. Jensen and myself from the West End Hospital, London, by Dr. Harry Campbell during 1910. Dr. Jensen[6] reports: "One, after showing decided improvement in tabetic symptoms during February and March, developed acute phthisis in July, and died in September. The six others have all improved, they say, more than under any other treatment. Three may, at present, be considered as clinical cures."

A case I have recently treated, with a

history of almost daily severe lightning pains of twenty-five years' duration, was relieved within a month ; the gait and balance were also re-established.

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CHAPTER II

A NEW THEORY AS TO ITS CAUSE

THERE has, as yet, been no explanation as to the exciting cause of the changes that take place in the nervous system in this disease. It is in the hope of throwing some light on the subject that the present theory is submitted.

In the light of my clinical experience, I am of the opinion that the changes that occur in this disease are due primarily to irritation of peripheral nerves producing reflex disturbances in the spinal cord and brain, and that such irritation kept up continuously for a sufficient length of time can and does produce pathological changes in the cord, although such irritation it has been supposed could only bring about functional disorders.

It would seem that the nerve tissues are

subject to degeneration from peripheral irritation only under certain conditions, and exempt from it in others. From the fact that all authorities agree that there is a primary or inherited syphilitic history in all cases of tabes, that disease is responsible for the tissue condition necessary for its development.

The highly neurotic temperament would seem also at times to furnish a fertile soil, it having been met with in my experience in such cases a number of times.

Exposure to cold, over-exertion, sexual excesses, and alcoholism, all have been given as contributory causes; but when one takes into consideration the thousands who suffer from all these occurrences and the comparative rarity of the disease, it would seem that there must be some other necessary factor.

In all my cases some source of peripheral irritation was found, and wherever corrected marked relief ensued. This would lead one to infer that without the addition of the peripheral irritation, and that long continued, the tabes was not set up.

Trauma has been found in several instances to have been followed by tabes, with more or less serious symptoms supervening very early in the disease. It has been thought that in such cases the shock of the injury only precipitated the disease, as irritation was always found in the urethra in the male, and the symptoms yielded quickly upon relieving such irritation.

It was not the writer's experience to get a known syphilitic history in every case, but in all, without exception, some source of peripheral irritation was found, and when amenable to treatment more or less relief was experienced.

According to Tuczek, chronic ergotin-poisoning induces a degeneration of the posterior columns of the cord in all points analogous to that which constitutes the anatomical lesions in tabes. This would appear to have a special bearing on the theory in hand, from the well-known action of ergot on the unstriped muscular fibres; these, from their general distribution over the body in the skin, could be so acted upon by the drug

as to set up a general peripheral disturbance by their alternate contraction and relaxation acting upon the nerves and capillary vessels. The writer's article, "The Etiology and Treatment of Acne," *New York Medical Journal*, February, 1881, bears directly on this subject. The observations of Dejerine have shown that a neuritis of the peripheral nerves may produce a symptom-complex very similar to that of tabes dorsalis (peripheral neurotabes).

Thus we have two exciting causes of tabes: (1) Long-continued peripheral irritation, causing it with a prior syphilitic infection; and (2) chronic ergotin-poisoning. There is a third cause, peripheral neuritis, producing a symptom-complex very similar to that of tabes dorsalis.

If we allow that peripheral irritation is the cause of the changes in tabes, I would submit a possible explanation of the mode whereby these changes may be accomplished. It is known that the conducting nerve substance is a very simple tissue, almost protoplasmic, being little more than highly

phosphorized fats in a weak saline solution; in other words, this portion of the nerves consists of colloid particles in suspension. Now, if we apply Professor Mathews's theory that when a nerve is stimulated electrically the colloid particles of these fats are precipitated, and that coagulation to a certain extent takes place, we have a working hypothesis.

The peripheral irritation referred to is that which is and has been constant for a period of time, longer or shorter as the case may be, but, above all, persistent, and producing continuous nervous stimulation. This irritation may exist for years without being known to the patient and without ever producing any local symptom. Such nervous action would keep up a condition of chronic coagulation, which in time would become permanent. This condition accords well with the actual first change found. Given this change, the subsequent alterations of nerve tissue are but natural sequelæ; for with the increased sensory irritability consequent upon such coagulation, and the disturbance of the orderly action and balance of both the sensory nerves

and their ganglionic cells with their trophic connections, and given the continued persistence of the initial peripheral irritation, it would seem that there was sufficient to account for the perpetuation and progress of all the pathological changes that take place in the disease.

In connection with the foregoing theory, it is interesting to note that it does not conflict with Marie's view, modified by Oppenheim,* that "the exciting cause of tabes acts upon the spinal ganglia and their homologues, and injures them without at first altering them structurally," and that "this is sufficient to cause atrophy of the sensory fibres of the spinal cord, of the medulla, and of the periphery, which come from the ganglia. This atrophy gradually ascends—*i.e.*, towards the ganglion cells—until their fibres are also involved." Also of special significance is the fact that Wollenberg and Stroebe discovered degeneration changes in the nerve cells even in incipient cases of tabes.

This theory of the etiology of tabes is

* Oppenheim's "Diseases of the Nervous System," 1904.

based upon a considerable clinical experience. I am further of the opinion that if this is found to be the case it must create a basis for a new etiology in tabes, and possibly for other nervous diseases of unknown origin.

This would lead us to infer that symptoms occur in many cases of this disease with a severity out of all proportion to the actual change in the cord, and consequently that there must be a wide sphere of functional disorder in these cases beyond such change.

It would be of interest to know whether eye-strain was a contributing cause, in those cases of the disease in which atrophy of the optic nerve takes place.

CHAPTER III

FURTHER CONSIDERATIONS AND TREATMENT, WITH CASES

As long ago as the time of Hippocrates writers described a condition associated with spermatorrhœa and sexual excess, which they attributed to wasting of the spinal cord. It is possible that this was the tabes of the present time, if we accept the general opinion of to-day regarding its purely specific origin.

Medicine and surgery during the whole of the Middle Ages was in such a chaotic state that it is not possible to form any opinion as to whether or not tabes occurred before the appearance of syphilis in the fifteenth century. Numerous writers, commencing with Olivier in 1824, described what was undoubtedly tabes; but Todd (1847) was the first to differentiate paralysis and inco-ordination, and to

attribute the latter to disease of the posterior columns of the spinal cord. Romberg (1840 to 1857), in his "Lehrbuch der Nerven-Krankheiten," was the first to give an extended account of tabes. He described the characteristic gait and the exaggeration of the ataxia upon closing the eyes, the lightning pains, the anæsthesia and paræsthesia, the urinary troubles and the ocular disturbances, and for the prognosis said: "To none affected by this malady is there any hope of recovery" —"Über alle ist der Stab gebrochen." He gives as the post-mortem appearances atrophy of the posterior roots of the spinal nerves—the anterior remaining normal—with destruction of the lower lumbar cord and the nerve substance in the cauda equina, at times leaving only neurilemma sheaths. The roots of the higher nerves are also frequently affected. The next most notable addition to the knowledge of tabes was the publication by Duchenne in 1858 of his researches, under the title "Ataxie Locomotor Progressive." He differentiated it from muscular paresis, gave an exhaustive description of its symp-

toms, and was under the impression that he had discovered a new disease. He considered it due to disease of the cerebellum. It was that masterly clinician, Trousseau, who first considered the changes in the cord as secondary; in his words they were probably only the secondary results of the functional disturbances created by "some obscure general condition." Isnard, a pupil of Trousseau, regarded it as a neurosis of the muscular sense. Before this, however, many observers in France and England were satisfied that the symptoms of tabes and degeneration of the posterior columns were coincident. The first microscopical investigations were made by Virchow (1855), and Rokitansky (1857), and it is of interest to note that these fathers of pathology recognized its true character as a non-inflammatory destruction of the nerve elements proper. Bourdon and Luys (1861) described the change as chronic inflammatory; Charcot, Vulpian, Gull, and many others, agreed with them. V. Leyden (1863) took the original views of Rokitansky, that it was a simple atrophy of the sensory tracts of the

cord, generally progressing from below upward, and further that such inflammation as showed in the membranes and bloodvessels was secondary. Although he recognized the character of the change, he did not, however, causally connect the degeneration of the posterior columns with the process in the sensory roots; as to the degeneration being caused by extension of inflammation from the pia mater, he says: "But the view that the atrophy of the posterior roots caused by inflammation of the pia mater leads to a similar degeneration of the posterior columns is very unlikely. Moreover, the disease of the posterior columns progresses more from the posterior or periphery and middle line, rather than follows the distribution of the roots." Pierret, eight years later (1871), localized the degeneration process "in two symmetrical islets of small extent, situated in a special region of the posterior columns," and not invading the columns as a whole. Thus tabes was looked upon as a systemic disease. Without going into the details of all his speculations and arguments, which the scope

of this paper would not permit, we may state that Vulpian, in 1879, proposed the formula "sclerosis of the posterior roots," instead of "sclerosis of the posterior columns," thus being the first to inaugurate the root theory, which is held by most neuropathologists to-day.

Many theories have been advanced as to the cause of the progressive dystrophy of the posterior roots and their intermedullary terminations—among them the alteration of the cells of the spinal ganglion, the trophic centres of the fibres in question. The strongest argument against this is that the peripheral process as it emerges from the distal pole of the ganglion practically shows no abnormality, while the central process, the posterior root, may be degenerated into the ganglion itself. V. Leyden and Goldschneider look upon the peripheral nerve endings, which often show dystrophic changes, as more probably the starting-point of the process. Against this, however, is the fact that degeneration of the peripheral nerves does not always precede the changes in the

cord, neither is it always associated with tabes. At present it is not considered a satisfactory answer to the question. Nageotte, Redlich, and Obersteiner, are of the opinion that the origin of the tabetic process is an inflammatory condition of the meninges affecting the posterior roots. As against this is the fact that meningitis is not constantly present—in fact, is more often absent—and when it is present is more often of the character of a secondary thickening than an inflammatory process.

Again, in the early stages of tabes it is found that the intramedullary degeneration is often well marked when the posterior roots exhibit no appreciable change and no indication of a local neuritis. Another fatal objection is that the neuritis Nageotte finds in the anterior radicle is evanescent, while that of the posterior is so profoundly destructive. Redlich and Obersteiner hold that where the posterior roots penetrate into the pia mater there is a constriction, and that during meningeal inflammation they become strangled. The weak point in this theory is that menin-

gitis is not always present, and when it is, rarely causes degeneration of the posterior roots.

The degenerations of tabes occurring as they do in widely separated situations throughout the cranium and sympathetic system as well would seem to be sufficient argument against these theories. That there is a point where the posterior root fibres are specially prone to degeneration, at what is known as "Obersteiner's ring," due to the loss of their neurilemma sheath and the thinning of the myelin sheath, is well known, and that the absence of the neurilemma cells is the cause of the greater proclivity to degeneration of the intermedullary terminals than of the other branches of the sensory protoneurons in the tabetic dystrophy. Ferrier says: "Some conditions probably exist favouring the incidence of noxious influences in this portion of the protoneuron." Marie and Guillain attribute the tabetic degeneration to a syphilitic affection of the posterior lymphatics, and derive the lymphocytosis of cerebro-spinal fluid from the elements of this system. Antisyphilitic

treatment has not given results in support of these views. There is in tabes a marked lymphocytosis, but it is also present in a number of other conditions. Ferrier says: "I am inclined to adopt the hypothesis of Thomas and Hauser that the essential lesion of tabes is a dystrophy similar to that induced by certain toxic agents, affecting the proto-neuron as a whole, and manifesting itself in degeneration of the peripheral and central terminations, of which the intermedullary are the more vulnerable, and are usually the earliest to exhibit anatomical changes. The process, however, is not confined to the spinal protoneuron, but may affect, among others, the optic, the sympathetic, and certain other motor neurons." Ford Robertson has found in living tabetics a bacillus which he has named "paralyticans," but he has not as yet produced sufficient evidence to prove that its toxins are an etiological factor in the production of the disease. The prevailing tendency at present is to search after a toxin that will account for all the various degenerations in tabes, and it is acknowledged that no remedy,

chemical or physical, has as yet been discovered which materially influences the morbid process.

In the light of clinical experience during the past eight years, I am of the opinion that the dystrophic changes that occur in the neurons of the posterior roots and their connections in tabes are the result of continuous sensory impulses conveyed from some peripheral point to the sensory roots in the cord; that such continuous impulses, kept up, perhaps, for years, exhaust the central nerve substance, which, having no rest or intermission from such impulses, and having no opportunity for recuperation, finally succumbs. In other words, not a toxin, specific poison, strangulation, or bacillus, but a purely physical cause. The best of batteries by constant use without replenishing becomes useless; then why not that most wonderful battery in existence, the cerebro-spinal system?

The changes found in situations other than the cerebro-spinal, such as the sympathetic and peripheral nerves, are probably due to the force of the sensory impulse passing on

through their spinal connections, and expending their force at the points of least resistance —as, for example, their terminations in the skin and muscles, and in the ganglia of the sympathetic.

I think this theory of damage done at the most vulnerable point well illustrated while the impulse is still in the direct line, in first destroying the neuron where it has lost its neuroglia in the posterior roots—at the "ring of Obersteiner."

This would account for the "tabetic degeneration being selective in character, unlike the Wallerian, which affects all tissues indiscriminately, attacking in succession fibres and tracts of perhaps different function significance."

Since formulating this theory eight years ago, I have learned that Professor Mathews, formerly of the University of Chicago, at present of the Leland-Stanford, has made observations that may explain the manner in which the dystrophy takes place, and it certainly accords with the present theory. It is known that the conducting

nerve substance, or neuron, is a very simple tissue, almost protoplasmic, being little more than highly phosphorized fats in a weak saline solution; in other words, this portion of the nerves consists of colloid particles in suspension. Professor Mathews found that when a nerve is stimulated electrically the colloid particles of these fats are precipitated, and that coagulation, to a certain extent, takes place.

It has also been proved (Howell's "Physiology") that the effect of fatigue (either natural or artificial through electrical stimulation) is shown by histological changes, characterized by shrinkage of the nerve cell. In the resting condition these cells are turgid, with large round nuclei, whereas fatigued cells are vacuolated and shrunken, with corresponding changes in the nuclei. It has been found that the amount of shrinkage increases in geometrical ratio to the length of time during which the stimulus has been allowed to act. This would seem additional evidence that nerve impulses can, as the result of incessant irritation, produce the change I claim takes place.

A new point of view for the origin of nervous diseases was brought out by Cornelius (*Aerztliche Sachverständigenzeitung*, No. 20, 1906), who assumes the existence of an independent circulation in the nervous system analogous to the circulation of the blood. The causes of nervous disease are referred to—(1) the pathological irritability of the nervous system, due either to heredity or to increased stimuli affecting the body (over-exertion, exposure, disease); (2) some obstruction of the free nerve current, all stimuli which affect the body being received and transmitted in such a way that there is no rest for the centre.

According to the views advanced by Edinger (*Med. Klinik*, No. 28, 1909), the fatigue or exhaustion induced by overwork of a healthy nerve, or simple use of a poisoned or degenerating nerve, may never be recovered from, so that the outcome is paralysis and atrophy.

Syphilis is no doubt the principal factor in tabes, and renders such tissue more susceptible to the continuous sensory impulses. It is certain that other causes that have been

supposed to have been direct factors in the etiology of tabes, such as exposure to cold, over-exertion, alcoholism, are only so in that they lower the resisting power of the system and nerve centres. Sexual excesses, I think, have a direct bearing where the irritation is in the genital tract, by aggravating and perpetuating the points of irritation.

Since announcing my theory I have reason to expect that it may explain the etiology of other nervous diseases of unknown origin, and possibly of general paralysis and tabo-paralysis, which Fournier, Mott, and many other neuropathologists of the present day, believe have an essential pathological identity with tabes. In Ferrier's opinion "these are merely different aspects of the same polymorphic disease, and the morbid process underlying both is identical."

The physiological pathology of tabes, whereby we would attempt to refer each symptom of the disease to its organic base, is so vast a subject that only a word is possible at this time, in so far as it attacks the cord. Ferrier says that :

"From these posterior roots are given off the variously named tracts that constitute one continuous system of descending commissural fibres receiving and giving off fibres at different levels of the grey matter, and connecting together the various segments, as well as the upper and lower spinal centres with each other. The change that takes place in the roots, according to most recent research, is a progressive dystrophy or demyelization and ultimate destruction of the nerve fibres. The myelin sheath breaks up, becomes granular, and finally disappears ; a proliferation of the neuroglia network occurs only in proportion to the atrophy of the nerve tissue proper. These changes are, as a rule, most pronounced in the lumbar and lower dorsal regions, which contain the long fibres from the lumbo-sacral regions in their course up to the nuclei gracilis of the medulla oblongata."

CHAPTER IV

URETHRAL IRRITATION IN THE MALE AS A SOURCE OF DISEASE

NEARLY sixty years ago Dr. Marshall Hall claimed that irritation of peripheral nerves would produce, through centric disturbance in the spinal cord, many disorders of the economy of apparently distant origin. Since that time his claim has been sustained by thousands of cases, observed and reported, bearing upon almost every organ of the body, so that to-day it is no longer a theory, but an accepted fact, based upon an overwhelming amount of clinical proof.

We know that the gynæcologists, oculists, aurists, neurologists, and, last, but not least, the rectal surgeons, have not been behind-hand in their appreciation of this, thereby ridding humanity of an almost incalculable amount of pain and suffering.

On the other hand, the general practitioner, together with the general and the genito-urinary surgeon, has, with a few rare exceptions, not given this matter of reflex irritation sufficient attention; nor, do I think, have they appreciated the extent of the untrodden ground yet to be explored by the study of this subject as an etiological factor in both functional and organic diseases that come under their observation.

This being the state of affairs, the opinion of a few of our most eminent physicians may not be amiss at this point.

The late Sir Henry Thompson said: "I have given complete relief to distressing symptoms of very long continuance, the cause of which was not suspected, by dividing an internal meatus. I have met," he further stated, "with three marked examples of a similar kind, in which the very simple operation necessary was followed by complete disappearance of urinary difficulties, which had been long regarded as of an extremely obscure character."

M. Civiale writes: "Independent of its

local sensitiveness, the urethra possesses another kind, which may be termed sympathetic; also, when this sensitiveness is aggravated, it may awaken sympathetic responses in every organ and function of the body." In many cases sympathetic phenomena were manifest in the lower extremities, particularly in the soles of the feet. Again: "It is not rare to observe that slight encroachments upon the urethral calibre induced marked difficulty in micturition, those at the meatus having this effect not less than those located farther in." Again: "Strictures seldom exist for a long time without exciting a series of disorders of the genito-urinary functions, and consecutively in remote parts of the body—among them gleet, retention of urine, and difficult micturition. That which has struck me forcibly in dividing a meatus only slightly contracted is the sudden and complete change effected in the general condition of the patient. The constriction, which seemed barely to impede the flow of urine, is no sooner divided than all morbid symptoms vanish. The urethral walls, which were rigid, hard,

and unelastic, immediately recover their normal condition. An effect so prompt, through means of which the significance is plain, shows that the slightest obstruction in the urethra is able to produce the gravest symptoms, local and general." Civiale also states that obstructions in the urethra will set up reflex irritation sufficient to produce paresis.

The late Dr. Otis's opinion is so well known that it is hardly necessary to mention it; but to him is due the honour of having been the greatest investigator and enthusiast in this field.

Beard says, in his book on sexual neurasthenia: "What lacerations of the cervix and perineum, irritations, congestions, and displacement of the uterus and ovaries, are to many female nervous symptoms, such are phimosis, redundant prepuce, varicocele, irritable testes, urethral contractions, and, above all and pre-eminently, irritation and congestions of the prostate and prostatic urethra, to many male nervous symptoms."

Hammond, in his book on impotence in the male, cites a large number of cases where

grave nervous disturbances—such as loss of memory, melancholia, and general neurasthenia—were directly due to irritations in the urethra, and were generally relieved by appropriate treatment.

Beard records some forty-three cases illustrating so-called neurasthenia, in almost all of which excessive venereal indulgence is set down as the cause. These cases cover a wide range, and are illustrations of almost every class of disease set down in the following table. He believed that spinal and cerebral exhaustion was the source of most of these troubles, whereas, undoubtedly, the urethral irritation was the true seat of the disease, as many of them were promptly relieved by attention to this particular locality.

Gross cites several interesting cases of mental depression that were relieved by attention to contractions in the urethra.

Brown-Séquard, in 1874, related a very interesting case that presented all the rational signs of advanced cerebral disease—one he considered quite hopeless—that was relieved by an operation for phimosis and the treat-

ment of an inflammatory condition of the glans penis. To quote his own words, he said: "So rapid was the recovery that within six weeks from the date of the operation he presented himself at my office perfectly well in every respect."

Dr. Sayre, in 1870, before the American Medical Association, reported several cases of partial paralysis of the lower extremities, due to the same cause. He says of one case, "From the very date of operation the child began to improve, and without other treatment made rapid and complete recovery." In another of his cases of paralysis of the lower extremities associated with urethral irritation, causing dysuria and painful erections, appropriate surgical treatment resulted in a complete recovery in six weeks.

So far as I know, there has not as yet been any definite classification of disorders due to this cause. I would therefore submit to you a crude one, with a few illustrative cases. I am well aware that it is very defective, and that in many instances a case could, with equal propriety, have been placed

in any one of several or in more than one class; the attempt has merely been to place them where they might be considered from the standpoint of the most prominent symptom as a matter of convenience and aid to their study.

CLASSIFICATION.

1. Cerebral	Headache.	Anthrophobia.
	Mental Depression.	Epileptiform convulsions.
	Defective memory.	
	Melancholia.	
	Excessive irritability.	
	Brain exhaustion.	
2. Spinal	Partial paralysis	
	Formication.	
	Pain: Back.	
	Pain: Testicles.	
	Pain: Urethra.	
	Pain: Legs.	
3. Cerebro-spinal	Cardiac irritability.	
	Dyspnœa.	
	Sweating of the hands and feet.	
	Syncope.	General alopecia.
4. Sympathetic	Acne.	
	Congested conjunctiva.	Functional eye troubles.
5 Digestion	Dyspepsia.	
	Anæmia.	Impaired nutrition.
6. Genito urinary	Gleet.	Spasmodic stricture.
	Urethritis.	Impotence.
	Irritable prostate.	Cystitis.
	Prostatorrhœa.	Organic disease of the kidney.
	Spasm of the ureters.	Uræmia.

Heading the list, in the first class, we have headache, well illustrated in the case of a

young man who came under my observation suffering from a slight gleety discharge, which had existed for several months. He had had no venereal trouble. Upon examination, I found a highly sensitive condition of the urethra for the first inch, associated with a contracted meatus. This was incised to the normal size, with the result of curing the gleet before leaving for home, which he did in a few days. He remarked to me that for months he had been annoyed with very severe headaches, occurring almost daily, and which frequently incapacitated him for business; but that since the operation they had ceased. At my request he has written me at intervals during several months, each time stating that he has not had any recurrence of his headache.

Mental depression associated with anthrophobia and sensitive urethra is quite common.

W., age 29. Prominent member of the Bar and hard student. Has been morbid more or less as long as he can remember. Within two or three years has become abnormally sensitive, and finds that his mental

processes are becoming obscured ; has great difficulty in fixing his attention, and it is only with effort that he can grasp the subject of his reading. Upon examination find that he has been circumcised ; the meatus 24 (normal 30), and lips protruding ; the entire urethra exquisitely sensitive. The meatus was incised, and a full-sized sound passed regularly. The urethra is no longer sensitive, and the patient declares that mentally he is a different man, that he is no longer despondent, and that within a week he has passed through a trial that prior to the operation would have "about killed him." I notice a great change in his nervous condition. This patient applied to me for an aggravated case of acne, situated over the entire back from shoulders to buttocks, of fourteen years' duration, which has entirely disappeared without other treatment.

A case of well-pronounced melancholia I have never treated in this manner, but Hammond and Otis have both recorded them.

I have met a very pronounced case of brain exhaustion in a merchant, a very hard worker,

who applied to me for relief, complaining of a loss of seminal fluid during defæcation, accompanied by a constant "tired feeling," as he expressed it, and inability, without effort, to conduct to his satisfaction, as formerly, a large business requiring considerable mental activity. Although there was no loss of memory, his head, as he said, "felt tired." I found a small meatus, together with several deeper contractions, and an exquisitely sensitive condition of the entire urethra. The meatus was divided, together with the other strictures, with great relief, but the symptoms did not entirely disappear until a second operation, as a slight contraction took place after the first.

In this connection I would say that I would not despair of giving relief from any symptom that appeared to have its source in the urethra, until the canal is perfectly free from obstructions and has regained its normal sensibility.

Otis reported the cure of a patient suffering from epileptiform convulsions by the simple passing of sounds.

The following case, occurring in my practice, will speak for itself: G., printer, had gonorrhœa seven years ago, lasted a month before he was entirely well; had connection with dissolute women several times every night for two weeks. About this time he fell in a fit, biting his tongue, etc. These attacks have occurred almost daily, and sometimes every day, until the present time. He has frequently fallen from his stool while at work. His last attack occurred suddenly. The stream of urine very small. Upon examination, normal urethra should be 34 millimetres, meatus only 29 millimetres, strictures at 2, 3, $4\frac{1}{2}$, and $5\frac{1}{2}$ inches; the latter only admitting a No. 7 Fr. Following the examination, he had a severe attack just after leaving my rooms. The next day I divided the meatus and introduced French bougies for the next week, for the relief of the lower stricture. His general condition was so bad that I refused to perform urethrotomy at that time. Within a few days a No. 22 could be easily introduced into the bladder, and although I treated him for a number of

weeks, he did not during that time have another epileptiform attack. Finding that he was relieved, he dropped out of notice, as he refused operation, which I considered necessary for a radical cure.

In the second class, commencing with partial paralysis of the lower extremities, I reported a case in the *Medical Record* occurring in my practice in an apparently very strong man. There were several strictures in the pendulous portion of the urethra, together with contracted meatus. He was entirely relieved after the first operation.

I have already spoken of very pronounced cases reported by Sayre and Otis.

Pain is a very common symptom, and as to situation, I think it occurs in the legs most frequently. It is generally referred to the inner aspect of the thighs, occasionally reaching as far as the knees, and not infrequently the feet. The next situation is the back, generally in the lumbar region, radiating over the buttocks and along the sides. The third and most frequent is in the testicles; and the last, and consequently the one the

cause of which is most likely to be overlooked, is the urethra itself. When occurring here, it is not generally such as would be produced by an active inflammatory condition, but rather neuralgic in character. I have classed with the latter the pain, or rather the pressure and weight, frequently complained of in the perineum.

Formication is generally referred to the scrotum or inner aspect of the thighs.

Otis, Beard, and Hammond report cases of cardiac irritability and dyspnœa.

In the next class, that I have called sympathetic, we have sweating of the hands and feet as the symptom complained of. This very frequently amounts to such an inconvenience as to need attention. I have recently met with a case of sweating of the hands that was greatly relieved by division of the meatus, but as there has been some contraction following the operations the cure may be expected when this difficulty is overcome, as it probably will be after another operation. In this connection it is worth mentioning that occasionally there is a case

where contraction is prone to occur to such an extent as to require several operations; these, fortunately, are rare, one operation generally sufficing. I do not attempt to explain this complication, as all cases receive the same after-treatment.

Otis reports a case of complete unconsciousness following the passage of a sound. I have frequently noted great pallor and prostration under similar circumstances.

Acne is undoubtedly, in many instances, caused and kept up by an abnormal condition of the urethra. Sherwell of Brooklyn was the first to call attention to this, in a paper read before the American Dermatological Society some years ago, when he reported two severe cases cured by the mere passage of the sound, in which no venereal disease had occurred, and where only a sensitive condition of the deep urethra existed. Since that time I have seen many cases where relief was afforded by attention to the urethra.

Congestion of the conjunctiva, and functional disorders of the eye, are known to be produced by venereal excess, probably from

the fact that this would cause a congested and abnormally irritable condition of the prostatic urethra.

A very interesting case of general alopecia which came under my observation is worthy of special mention. S., aged 30, single, no venereal disease. During the past year the hair, which is of a very extensive growth over the entire body, has been falling rapidly ; upon removing his underclothes they are found to be lined with fallen hairs. The skin over the entire body is, to all appearances, in a perfectly healthy condition. Thinking the trouble must be reflex, and in lieu of any other definite knowledge of its causation, I examined the urethra and found it normal, with the exception of excessive sensitiveness in the prostatic portion. From this time the sound was passed every other day. Two weeks after treatment commenced, a very perceptible diminution in the number of hairs falling was noted. One month after commencing sounds, but few hairs could be found on the clothing. After six weeks' treatment, the hairs of the entire body were

firmly fixed, and none could be found on the clothing. Five months after seeing the patient, he reports that he has had no return of his trouble. This is the first case ever reported where general alopecia was treated through the urethra. The result followed the treatment so rapidly, and proved so effective, as to leave no doubt of the cause of the trouble in this case.

The next class I have placed under digestion, and is as yet, I think, a *terra incognita*. It comprises a group of so-called dyspepsia, anæmia, and impaired nutrition. Several of the writers mentioned, more especially Beard, allude to dyspepsia as the result of urethral trouble.

The last class is genito-urinary. Where these organs are directly involved, the true cause has been recognized. However, where the conditions are rare, but few, and in some instances individual cases only, are upon record. The relation of gleet and stricture is well known. But where a slight contraction of non-venereal origin is associated with gleet, it is not so frequently recognized. I

have met with numerous cases where a catarrhal condition of the mucous membrane of the urethra existed sufficient to produce a very perceptible discharge, which was undoubtedly kept up from this cause alone. Irritable prostate and prostatorrhœa are very frequently associated with irritability due to contractions in the anterior portion of the urethra. Otis particularly refers to this.

Spasmodic stricture is a frequent accompaniment of the condition just mentioned, and I believe that many deep urethrotomies have been performed where division of the meatus or other contractions would have sufficed. It is unnecessary here for me to more than refer to the celebrated discussion on this subject that occurred a few years ago between Dr. Sands and Dr. Otis. In fact, the knowledge of this within the last few years has reversed the statistics as to the seat of the relative frequency of organic stricture. Formerly the greater number were thought to occur in the deep urethra, and to decrease in number towards the meatus, until Otis demonstrated that exactly the opposite existed.

Of impotence I have had numerous instances where the division of the meatus was followed by prompt recovery. I will cite but one case, where the history will show that all other causes can be eliminated : O., aged 42, married, good habits, uses neither liquor nor tobacco, in perfect health ; complains that he has been impotent for eight years, and that the condition came on gradually. (I mean by impotence entire absence of erections and total inability to introduce the organ within the vagina.) Upon examination the meatus, which normally should have measured 34 millimetres, was only 16 ; otherwise the urethra was normal, and not in the least sensitive. The meatus was incised to 35. That same evening an erection occurred, and the patient within ten days was pronounced cured. This occurred five years ago. I have recently heard from this patient, and he assures me that at present there is very little indication that further treatment will be necessary.

Under cystitis I will refer to the histories of two cases : one occurred in the practice of Sir Henry Thompson, the other with

Dr. Otis. As to the former case: "J., age 34, suffering from painful, prolonged, and frequent micturition for five years, compelled to pass water from three to five times every night, and every two hours during the day. Has severe pains in the back and loins and general ill-health; urine purulent and alkaline; habitual retention and partial engorgement of the bladder. Upon examination the meatus, the seat of a cicatrix, due to a former chancre, admitted only a small probe; the opening was enlarged by incision and 12 ounces of urine drawn off, although he had just passed water. The relief was almost instantaneous; in a week it was complete. He has had perfect immunity from his urinary complaints ever since."

The report of Dr. Otis's case is as follows: "Age 64; general good health; has been obliged to urinate almost hourly for the past ten years; stream small. Within three weeks began to suffer pain from the straining in passing water. Urine bloody and loaded with pus and mucus; was unable to attend to business. Prostate normal; meatus 24;

this was incised to 31, and no further obstruction of the bladder found at this time. Further examination for calculus was made by Drs. Otis and Marion Sims. The day following the operation he could hold his water for two hours, and all the pain had ceased. Twelve days after the operation the pus had entirely disappeared from the urine; he could ride and walk without discomfort; had resumed his business, and was not obliged to void urine oftener than every three hours."

These cases are sufficient to demonstrate the grave conditions that may be set up in the bladder from an apparently slight cause. Knowing, as we do, the short step from an aggravated cystitis of this character to organic disease of the kidney, it seems hardly necessary to demonstrate further possibilities in this direction; however, I cite one case that Dr. D. C. Black has noted: "Spasm of the bladder occurring from sympathetic irritation from the urethra, that resulted in complete closure of the orifice of the ureters, producing retention of urine in the ureters

and pelves of the kidneys." Dr. Otis also speaks of such a case, where he believes that death resulted from uræmia, due to the rude introduction of the catheter through a narrow stricture in the anterior portion of the urethra; forcible and painful contraction of the bladder followed immediately, with complete suppression of urine, and the patient died uræmic. Twenty-four hours after, on post-mortem, the bladder was found empty, with the exception of a few drops of blood and mucus. It was closely contracted and free from disease; the ureters were normal; the kidneys were engorged with blood, but gave no evidence of disease.

Of late years much has been written about urethral irritation and its relation to nervous disturbances. I am inclined to think that its importance is far from being appreciated. Dr. Otis read a very interesting paper on contractions of the meatus urinarius as a source of reflex irritation in the brain and spinal cord; his cases, with mine, make such an interesting group that I shall briefly refer to them. The first was "a case of con-

tracted meatus in a physician, associated with mental depression so great as to render all his mental processes unreliable, and to make him feel as if he did not care to live. These symptoms were entirely relieved by simply stretching the meatus 3 or 4 millimetres. The patient would not accept division, and he was obliged to dilate at intervals, each dilatation being followed by prompt relief." Again, a case of "a physician who was subject to attacks of profound mental depression, without apparent cause. This trouble he bore until he was past forty years of age, when to it were added various reflex nervous difficulties—among these a feeling of moisture in the urethra, and a bearing down in the perineum. A sound was passed, and gave immediate relief, which continued for several weeks. A year afterwards the meatus was divided, with the effect of permanently removing his nervous trouble." The same writer speaks of two cases who were subject to daily epileptic attacks, in both of which there was entire relief after division of the meatus. In one case it was found necessary

to cut several times before the tendency to recontraction was entirely overcome and the symptoms permanently relieved. The most interesting case described, and illustrative of another class of cases in which the reflex irritation falls more particularly upon the spinal cord, occurred in a child, aged three. "As an infant it was restless and fretful, had frequent erections and enuresis; at two and a half years it was still in bad general condition, and suffered from bilious attacks. About this time it was circumcised, with relief, though the attacks continued at night. Although there was no evidence of spinal disease, there was marked difficulty in locomotion, the child stumbling in his walk, with the right foot turned in, and falling every few steps. The meatus was found to be contracted and was cut, the operation giving great relief; but the meatus having again contracted, it was found necessary to cut again. To avoid hypospadias this operation was very carefully performed, and repeated ten times, until no further recontraction took place. These numerous

operations were found necessary, as the symptoms would return with the slightest recontraction. The child was seen two years after the date of the last operation, and found to be fat and well." The following case of mine is similar in some respects to this one.

C. had gonorrhœa twenty-two years ago, discharge lasting several months, during which time a piece of nitrate of silver was accidentally dropped in the urethra and allowed to dissolve. Patient complains of sensation of weight in the perineum, and pain in the same region during emission. There are darting pains through thighs and down the legs, the feet feel heavy and numb, and occasionally it is only with great effort that he can walk steadily. There is almost constant occipital pain, and the patient has about made up his mind to give up a good position. Upon examination the normal urethra was found to be 34. There were strictures at 1 inch, No. 24, from $1\frac{3}{4}$ to $2\frac{1}{4}$ inches from 22 to 24 — this one being particularly dense and showing the result of the nitrate—and one at $4\frac{1}{2}$ inches, No. 19.

All were incised to 36, and during the course of the next six weeks all symptoms disappeared.

I present these as an interesting group of cases in support of my theory of urethral irritation. The case of general alopecia leads me to believe that if there could be temporary disturbance in the hair follicles, there could also be a similar condition in the sensory tract of the cord even without destruction.

I would submit therefore that tabes is due to peripheral irritation, which, by continuous impulses going on for many years, culminates in exhaustion of the posterior roots and gives rise to tabetic lesions, aided by the syphilitic virus.

I think my treatment acts upon the greatest number of symptoms, especially those of deep and cutaneous sensibility, in-co-ordination, equilibrium, pain, and incontinence of urine and fæces.

CHAPTER V

CASES REPORTED TO THE NEW YORK ACADEMY OF MEDICINE, OCTOBER 1, 1908

In September, 1910, and again in November, 1911, in New York, I saw and heard from a number of these patients.

Case I.—H. B. February 27, 1907. Male, aged 47. Duration of disease, seven years; syphilis sixteen years ago. Weight 7 stone 4 pounds; general condition very low. Gait fully 50 per cent. off normal; Romberg and Westphal symptoms present, also Argyll-Robertson pupils; frequent gastric crises. Has severe pains and girdle sign. Has analgesia, anæsthesia, and incontinence of urine day and night. Examination revealed erosions in middle third of urethra. These were treated per urethroscope and with sounds during seven months, when all symp-

toms disappeared. Patient walking normally, and weighing 9 stone 12 pounds—a gain of 2 stone 8 pounds. Can walk in dark. April 10, 1909: Has not had treatment for over a year and a half, has gained in every way, and is about to resume his work as an actor. He came to me from the Incurable Hospital at Fordham; earlier was in the New York Hospital suffering from gastric crises. I saw him first at his rooms, he being too weak to go out. September, 1910: This patient is acting seven times a week and playing two parts. November, 1911: After continuous touring for the past year, he has not re-engaged, as the life was too strenuous. He has had a partial relapse.

Case II.—L. S. April 19, 1907. Male, aged 40. Duration of disease, six years; no history of syphilis. Weight 10 stone 5 pounds. General condition poor; unable to walk alone. Romberg, Westphal, and Argyll-Robertson symptoms present. Severe pains daily and nightly. Analgesia and anæsthesia. Examination revealed erosions in middle and

lower third of urethra. Treated with urethroscope and sounds for three months, when he could walk alone and pains had ceased. This patient went away, and has neglected treatment for a year and a half, but has not relapsed.

CASE III.—J. M. November 25, 1907. Male, aged 49. Duration five years; no history of syphilis. Weight 10 stone 8 pounds. General condition poor; gait 50 per cent. off normal. Stumbles, and has fallen. Romberg, Westphal, and Argyll-Robertson signs present; girdle pain; frequent and severe pains in legs and heels; severe intestinal pain constant. Hyperæsthesia intense over body; unable to bathe. Examination revealed middle third urethra erosions and sensitiveness. Local treatment for three months, when gait became nearly normal. All pain gone; incontinence of urine stopped; gained 10 pounds in weight; bathes with comfort. Since March there has been continued general improvement; can walk in the dark. He has not had any treatment for eight months, has been travelling extensively alone, and is at

present engaged in a political campaign. This patient called on me when I visited New York in November, 1911, and reports gait normal; can walk with ease. Only occasional pain at long intervals. Balance good. Has attended to business daily during past three years. No intestinal pains; no incontinence. Sensations normal.

Case IV.—P. K. November 25, 1907. Male, aged 45. Duration one year; syphilis sixteen years ago. Weight 11 stone 4 pounds. General condition very bad; unable to walk alone. Romberg, Westphal, Argyll-Robertson signs present; severe pains almost daily; but little sleep at night. Micturates every hour with great pain; has been told he could live but a short time. Examination: Middle third of urethra sensitive, slightly contracted, and erosions. Treated with sounds during four months, and contractions dilated. Incontinence and frequent micturition stopped; no more pain; gait almost normal; can walk in dark. Weight 12 stone 12 pounds; gained 1 stone 8 pounds, and works hard all day. No treatment since April; no relapse. Novem-

ber, 1911: Seen in New York. Walk normal; no pain. Balance good. Attends to his business of stockbroker from 9 a.m. to 5 p.m. General health, as he expresses it, "fine." Weighs 14 stone 4 pounds. Bladder and bowels normal. He had lost all sexual power. He has had two children in last four years. Passed No. 19 English and found urethra normal. Formerly passed No. 18 English.

CASE V.—J. G. December 23, 1907. Male, aged 43. Duration of disease one and a half years; no history of syphilis. Weight 11 stone 11 pounds. General condition good. Gait is off normal fully one-half. Romberg, Westphal, and Argyll-Robertson signs present. Pain moderate at night; tires easily when walking. Examination: Erosions at $3\frac{1}{2}$ inches, otherwise normal. Treated by urethroscope and sounds until August 1, 1908. Gait improved. September 28, 1908: Returned after two months' vacation with marked improvement in gait, no pain, and able to walk during ordinary occupations without fatigue. November, 1911: Seen in

New York. Passed No. 20 English. Urethra normal. Reports gait practically normal. No pains. Balance good. Actively engaged in his profession of the law. General health excellent. Weight normal.

Case VI.—H. P. December 26, 1907. Male, aged 50. Duration six years. General condition poor; gait about 50 per cent. off normal; uses cane. Romberg, Westphal, and Argyll-Robertson signs. Severe pain every two or three days; girdle and chest constriction. General anæsthesia and analgesia. Micturition very difficult. Unable to walk without stick. Examination: Lower third of urethra erosions. Treatment local during four months. All pains stopped; can walk without stick; general condition good; micturition free. No relapse during five months. November, 1911: Called on me in New York, but I did not see him.

Case VII.—W. L. January 9, 1908. Male, aged 51. Duration ten months. Syphilis twenty-five years ago. Weight 9 stone 10 pounds. General condition very poor; Westphal, Argyll-Robertson pupil right

eye, left injured. Absolutely helpless; carried in to me; cannot move hand or foot. Intense hyperæsthesia and pain in head and face, also some general pains. Incontinence of urine and constipation. On March 23, 1907, this patient was struck by a street car, after which all his present symptoms developed rapidly. Prior to this he was apparently well. This was a case where possibly all the factors were present for the development of tabes, but the cord was able to resist until a great shock put it below par. (A similar case was treated in 1905, when rapid development of tabetic symptoms followed within six months after the patient was knocked down by an omnibus, and he as quickly recovered upon removal of the irritation.) On examination, erosions found in middle third of urethra, with slight contraction of anterior portion. For erosions local treatment per urethroscope and sounds carried out for four months; contraction cut. Very early in treatment all pain and hyperæsthesia of head and face and incontinence of urine stopped. He was able in a month to sit at table with his family,

and while lying down or in sitting position to move all his limbs and take all kinds of exercises. Bowels regular. He has had no treatment now for three months; during that time has steadily gained in strength, general health, agility, and weight—10 stone 8 pounds, 12 pounds gain. One thing he cannot do—stand. (It has been noticed in another case of rapid development—when the patient, like this one, has remained in bed or in a chair for three months, the ability to walk was not recovered. Whereas in two cases, where helplessness had existed less than two months, the gait was recovered. What is lost by this short time of disuse we do not know, when in a case of ten years' duration, five of which had been spent in bed in a helpless condition, the ability to walk, with the aid of an assistant, was recovered in two months.) November 11, 1911: This patient, when heard from, reports that he is in good health; no incontinence. Can sit at table, use his hands, and move his legs in any direction, but he cannot stand. Otherwise he is normal.

Case VIII.—F. T. February 8, 1908. Male, aged 49. Duration ten years. Syphilis fifteen years ago. Weight 8 stone 5 pounds. General condition poor; practically carried in between two attendants, and helpless since October 30, 1907. Westphal and Argyll-Robertson signs present. Incontinence of urine for six years, incontinence of fæces when bowels loose. Anæsthesia and analgesia. Examination: Middle third of urethra was found contracted, also erosions. Treatment of erosions local for about three months, with dilatation of contractions. Patient could soon walk, with aid of an attendant's arm, a half-mile daily. Incontinence of urine and fæces stopped. Patient is still doing well. Weight 8 stone 12 pounds; gain of 7 pounds. November, 1911: This patient has not been heard from.

Case IX.—J. L. February 21, 1908. Male, aged 41. Duration eight or nine years. Syphilitic history not obtainable. Weight 10 stone. General condition wretched; weak and unable to walk but a short distance without great fatigue. Romberg and Westphal

signs present. Pupils slow. Principal complaint severe pain in abdomen; hyperæsthesia abdomen and back. Has been operated on three times for gallstones and appendicitis; no lesions found at either time. Examination: Anterior two-thirds of urethra contraction and erosions. Treatment for erosions, contractions cut and dilated to normal, local only, during four months, with great improvement in general health and relief of abdominal pains. Can walk without fatigue whenever he is obliged to in pursuit of his work. No relapse in last three months. November, 1911: This patient called on me, but I did not see him.

Case X.—C. F. A. June 17, 1908. Aged 39. Duration ten months. No history of syphilis obtainable. Weight 11 stone 10 pounds. General condition fair. Can only walk with assistance. Pain intense and frequent, lasting from one to three days. Romberg, Westphal, and Argyll-Robertson signs present. Both legs anæsthetic and analgesic; incontinence of urine and fæces. Examination: Upper and lower third urethra

contracted and erosions. Treated locally during three months; upper contraction cut, lower one dilated. Patient could soon walk alone with ease. Pains ceased; return of sensation to legs; incontinence of urine and fæces stopped. General health much improved. November, 1911: Reports can walk alone easily. Some pain at times during rain. Can partly attend to his affairs. Bladder, as he says, "troubles him at times," but has complete control of bowels.

Case XI.—W. S. June 26, 1908. Aged 44. Duration two years. No history of syphilis obtainable. Gait ataxic; pain almost daily. Romberg, Westphal, and Argyll-Robertson signs present. Incontinence of fæces and diarrhœa; has eight or ten movements a day. Examination showed lower half of urethra contracted and erosions. Treated locally for three months; contraction dilated. Almost immediately after treatment commenced the incontinence of fæces stopped, and the bowels moved with normal formation morning and night. Gait nearly normal, and he resumed his occupation of cook on a

steamboat. Pain ceased. November, 1911: When seen in New York, reports perfect control of bladder and bowels, with normal stools. Gait much improved, almost normal. Balance normal. Pain occasionally at night, not severe. General health good.

Case XII.—E. M. July 15, 1908. Aged 38. Duration two years; syphilitic history. Weight 8 stone 13 pounds. General condition fair. Can just manage to get about with aid of two sticks; no pain since last winter except girdle. Romberg, Westphal, and Argyll-Robertson signs present. Incontinence of urine for a year and a half; constipation. Examination: Middle third contracted and erosions. Treatment, sounds for two and a half months past. Incontinence of urine stopped; bowels regular. Gait so much improved that, with the aid of one stick, he gets about for from six to eight hours a day canvassing. November, 1911: Seen in New York. Can walk without stick, but carries one. No girdle or other pains. Can stand one half minute without support with eyes closed. No incontinence; urine

and bowels regular. Actively at work in kindling wood saw-mill. Where there was atrophy of the thenars, he can now play the banjo and violin. His general health is good, and he is up to normal weight. His sensations both of hands and feet are normal. Passed 18 English sound.

CASE XIII.—J. L June 17, 1908. Aged 46. Duration four years. Weight 10 stone 10 pounds. Syphilitic history. Gait ataxic and stumbles. Pain very severe almost daily. Romberg, Westphal, and Argyll-Robertson signs present. General hyperæsthesia over trunk. Unable to go into water for ten years. Examination: Slight erosion middle third urethra. Treated locally with sounds three months. Gait practically normal; can walk in dark. Pains ceased; sensation over trunk normal; has been swimming during summer. September, 1910: Seen in New York. No pain. Sensations normal. Muscles of left leg commencing to atrophy. Is unable to work.

CASE XIV.—G. A. June 17, 1908. Aged 42. Duration six years. Weight 9 stone 5 pounds. No history of syphilis obtainable.

Gait ataxic; cannot attend to his work as waiter; pains very severe two or three times a week. Romberg, Westphal, and Argyll-Robertson signs present. Incontinence of urine. Examination: Whole urethra sensitive; first third contracted and lower third erosions. Treated locally during three months and contraction cut. Pains relieved. For past two months has been able to resume his occupation as waiter. Incontinence of urine stopped. Gait nearly normal. Has not been seen since September, 1908.

Case XV.—T. O'R. August 2, 1908. Aged 44. Duration of disease seven years. Weight 10 stone 4 pounds. General condition fair. Gait ataxic. Romberg, Westphal, and Argyll-Robertson signs present. Pain severe two or three times a week. Incontinence of urine and fæces and constant diarrhœa. Examination: Lower half of urethra sensitive and erosions. Treated locally with sounds. Early in treatment incontinence of urine and fæces stopped; bowels became normal, moving once or twice a day, and pain is relieved. Gait much improved. Novem-

ber, 1911 : Seen in New York. No incontinence of urine or fæces; bowels normal. Pain very seldom and moderate. Gait remains much improved. General health good, and able to work regularly. Up to full weight.

Case XVI.—H. F. August 2, 1908. Aged 42. Duration of disease nine years. No syphilitic history obtainable. Weight 8 stone 12 pounds. General condition poor. Using stick for six months; much difficulty in walking. Pain very severe, sometimes lasting two weeks. Romberg, Westphal, and Argyll-Robertson signs present. Incontinence of urine, also fæces after taking cathartics. Examination : Contraction anterior urethra, also in lower half, with erosions. Treated locally for two months; anterior contractions cut, lower dilated; incontinence of urine and fæces stopped; pain relieved and gait improved. Not seen since December, 1908.

Case XVII.—C. A. August 10, 1908. Aged 37. Duration three years. Gait good, but staggers in dark. Romberg slight, Westphal and Argyll-Robertson signs present, with right ptosis and paralysis of internal rectus.

For three years has had gastric crises twice a month, lasting from three to seven days. Examination: Slight erosion and contraction in middle third of urethra. Treated locally and dilated for six weeks. Ptosis relieved, internal rectus acts, and no gastric crises have occurred since commencing treatment. Can now walk in the dark. September, 1910: Seen in New York. Slight ptosis. Internal rectus still weak. No gastric crises. Gait normal. Passed No. 19 English. Is at work. November, 1911: Seen in New York. Slight ptosis. Internal rectus weak at times. No gastric crises. Gait normal. Passed No. 20 English. At his regular work as a barber.

Four Cases from "Annals of Surgery," May, 1909.

B. M. H. October 18, 1908. Male, aged 46. Duration of disease thirteen years. No history of syphilis. Weight 10 stone. General condition poor. Gait about 25 per cent. off. Romberg, Westphal, and Argyll-Robertson

signs present. Very severe pain once or twice a month, and continuous for two or three days. Anæsthesia of hands slight. Hyperæsthesia of second right toe. General weakness very marked, with almost sleepless nights. Examination revealed contraction in anterior third, also numerous contractions in lower half, with erosions throughout most of the urethra. Anterior contractions cut, lower dilated, and erosions treated as with others. November 14, 1908: No pains for three weeks. Hyperæsthesia in second toe stopped immediately after operation. General condition of strength markedly improved. December 13, 1908: Still greater improvement in general health. No pain; has gained 7 pounds in weight. February 15, 1909: Practically well; no pains; no longer nervous; sleeps well all night; general strength normal; has resumed occupation, and has been travelling 2,000 miles a week for two months. September, 1910: When in New York saw this patient. He was in good health and spirits, and able to travel one or two thousand miles a week without fatigue during the

seasons as travelling salesman. I saw this patient in New York in 1911. He was still in good condition, and well able to do his travelling as before, although he has had treatment only once during 1910 and 1911. His gait is normal. Pains rarely and slight. Balance good. November 1, 1911: Operated; cut anterior urethra to 20 English. November 25, 1911: Reports "he is feeling much better in every way; circulation and general health improved. No pain whatever since operation."

D. W. October 20, 1908. Male, aged 39. Duration of disease four years. No history of syphilis. Weight 10 stone 10 pounds. General condition and nutrition fair. Gait off fully three-quarters. Is unable to stand over two or three minutes. Romberg, Westphal, and Argyll-Robertson signs present. Pains moderate once a month. Anæsthesia and analgesia of legs and feet. Urination difficult, and incontinence of urine frequent. Unable to stand or walk in dark. Examination revealed a succession of contractions with erosions throughout the lower two-thirds of

the urethra. The contractions were dilated, and later erosions treated per urethroscope. October 24, 1908: Urination normal, no incontinence. Can walk in dark. November 9, 1908: Comes to see me alone. Can walk in moving tram-car. Can go up and down stairs without aid of the hand-rail. On November 12, 1908, was in night railroad wreck, and walked with aid of lantern two miles. December 7, 1908: Can stand an hour at a time at his work. March 30, 1909: In better health than for five years. Gait practically normal; attends to all his ordinary vocations with ease. Sensations much improved. Bladder functions normal. September, 1911: Reports gait normal. Scarcely any pain. Balance good. Has been able to attend to business every day since last seen in March, 1909. Weight normal. Bladder and bowels normal. No treatment since March 30, 1909.

C. L. October 24, 1908. Male, aged 39. Duration of disease fourteen years. No history of syphilis. Weight 13 stone 3 pounds. General condition fair, but in very nervous state. Gait 50 per cent. off normal, and for

past year has been obliged to use a stick. Romberg, Westphal, and Argyll-Robertson signs present. Pains very severe for fourteen years, occurring two to three times a week, lasting ten to twelve hours; for the past eighteen months the pains have been excruciating and of daily occurrence, lasting the better part of the twenty-four hours. General analgesia and anæsthesia, more particularly in feet. Incontinence of urine during the day. Examination revealed contraction in lower third of urethra and entire urethra in exquisitely sensitive condition, bleeding on touch. Treated by incision, dilation and applications per urethroscope. November 4, 1908: Pains daily, but not so intense. Incontinence of urine stopped. Gait improved. January 10, 1909: Pains stopped for past week. No return of incontinence. Gait almost normal. April 7, 1909: Has been without treatment for six weeks. No pain for past three months. Gait practically normal, can walk with ease without stick; bladder function normal. November, 1911: Gait practically normal. Some pain. Is able to attend to business.

Bladder a little irregular, but no incontinence. This patient I saw in New York, and gave him treatment for first time since April 7, 1909.

N. H. J. December 26, 1908. Male, aged 57. Duration of disease ten years. No history of syphilis. Weight 12 stone 10 pounds. General condition poor; very nervous. Gait has been one-third off normal for five years. Romberg, Westphal, and Argyll-Robertson signs present. Pain severe for three years, three or four times a week, lasting from six to twelve hours; for past year pain at night has been almost continuous. Analgesia and anæsthesia general, slight; hands marked anæsthesia. Incontinence of urine, up two or three times a night for three years. Incontinence of fæces for past year; nights almost sleepless—when sleep occurs it is accompanied by horrible dreams. January 5, 1909: Examination revealed contraction slight in middle urethra, lower third sensitive, with erosions. Treated by incision, dilatation, and application per urethroscope. January 20, 1909: No pain since operation, balance and gait improved, incontinence of urine and

fæces stopped. March 30, 1909: No pains; balance, gait, and sensations markedly improved. Bladder and bowels normal. No more nervousness; sleeps all night; general health good. September, 1911: Gait normal. Pain seldom and slight. Balance fair. Attends active business as contractor. Gained 12 pounds in two years. Bladder and bowels normal. This patient has not had treatment since March 30, 1909.

I have reason to believe that three other cases are doing well, as they were in normal condition as to gait, pain, bladder and bowels, when last seen in March, 1909.

CHAPTER VI

CASES TREATED BY ME AT THE CHARCOT CLINIC, SALPÊTRIÈRE HOSPITAL, PARIS, THROUGH THE COURTESY OF THE LATE PROFESSOR RAYMOND*

CASE I.—D., aged 36, market porter; August 5, 1909. Had a chancre in 1901. Tabes began a year ago, in October, 1908. Moderate pain every day. Pains rather generalized; pains also at the waist. No knee-jerks; Romberg and Argyll-Robertson signs. With eyes opened, gait 33 per cent. below normal; closed, 75 per cent. Never had vomitings, but was constipated. This patient had extreme ataxia of the arms, the power of movement being 80 per cent. below

* From August 15 to November 18, 1909, at which date I was called to New York, when Dr. Jaworski, who had been assisting me, was left in charge.

normal, to such an extent that some days he could scarcely manage to eat. No incontinence ; some retention.

At the examination the urethra, beginning 6 centimetres from the meatus, was found to have narrowed to 25 millimetres ; operation performed on August 5. Patient returned August 10 : pains had ceased, gait almost normal with eyes opened, and much improved with them closed, only one-third below normal. No change in the arms. Another dilatation was made. August 16, the patient walked better, and had no pains. A laxative had been given him to help the constipation. He had never taken a laxative before. He made the following most important assertion : "*He had always noticed great fluctuations in the condition of the ataxia in his hands, and this fluctuation was directly attributable to the state of the bowels; when he was most constipated he could use his hands only with the greatest difficulty.*"

August 23, the patient felt somewhat weak ; had no further pain, but felt a slight degree of numbness. Dilatations continued.

August 26, showed continued improvement and no pain, but condition of the hands same as before treatment was begun. August 30, he looked well, appeared satisfied, and was continuing to grow better and better. September 2, patient well; has no pain at all; walks equally well with eyes open or shut, without fatigue and in a normal manner. No modification in symptoms of arms or hands. On September 6 dilatation was done; the last visit he paid. He told us then how much he regretted being obliged to drop the treatment; but owing to his extreme poverty, without any resources whatever, and incapacitated from work by the ataxia, he was forced to enter an asylum. This patient had been treated with mercury previous to this time at one of the Paris hospitals, but without receiving the slightest benefit. He had undergone this treatment only about a month.

Case II.—V., aged 39, began the treatment August 5, 1909. Has been tabetic for a year, and has not worked for two months. For three months, four days out of the seven every week he has had severe

pains in the legs and arms. Westphal, Argyll-Robertson, and Romberg signs. Inequality of the pupils. With eyes open, gait 25 per cent. below normal; closed, 33 per cent. below. This patient had also a perforating sore on the left foot, and it was to have this dressed that he came to the clinic. Suffered from rectal tenesmus and pain in the perineum; incontinence during the day, but not at night.

On examination, we found the urethra 8 centimetres from the meatus to be strictured. Stricture cut and dilated. August 12, pains had disappeared for two days; bowels moved twice daily. August 23, pain had returned for a day, at which time he had suffered from diarrhœa. Urinated easily, and sore on his foot was much better; could walk up and down stairs without holding on to the banisters. For a month before he began treatment he had been uneasy and apprehensive; this phenomenon has disappeared. September 2, the patient was better in every respect, and could go upstairs in the dark. Dilatations were continued. September 13, his foot was well, but he had

had severe pains the previous evening. September 20, found him well and perfectly satisfied with the treatment; began work again. On October 4 the patient was not suffering in any way whatever; walked well, had no more pain, and his foot was cured; still has a slight degree of incontinence of urine. October 7, dilatation provoked a slight hæmorrhage. On October 18 he told us that the incontinence had ceased. He is practically cured. Having occasion to see this patient again on November 8, the good results of the treatment were confirmed by him. This patient was seen as late as December 16, when clinical cure was found to be well sustained; patient perfectly well. He urinated well, walked well, had no pain whatever, and could stand with his eyes closed. Sense of posture normal. Concluded not to continue treatment, as he considered himself entirely cured.

Case III.—G. P., aged 43, coachman; began treatment on August 7, 1909. Had syphilis in 1897, and felt the first fulgurant pains in 1903. For seven years he had

endured the most excruciating pains in the body and limbs; going frequently to the Salpêtrière, he had been given injections of morphine, the only thing they could do to relieve his suffering. He was a confirmed invalid. Presented signs of Westphal, Romberg, and Argyll-Robertson. With eyes open, his gait was 75 per cent. below normal; eyes closed, he was unable to walk at all. Had constipation and painful micturition. Notwithstanding, he could feel his limbs very well in bed, and had preserved almost intact the sense of posture.

Examination showed a stricture of 28 millimetres just within the meatus, the rest of the urethra normal. Operation and dilatation. August 10, the patient had an increase in the pain, but walked much better. August 12, he appeared quite happy, having worked for a day; pains much lessened. With open eyes he walked quite well, and could run; with closed eyes, moderately well, 25 per cent. below normal; no treatment was given that day. August 23, he walked and ran well, but the pains were a little more severe.

Treatment continued. He complained on August 30 of a severe crisis of pain lasting four days, confining him to bed. Same treatment. September 6, found the patient quite well and delighted at being able to sleep nights, which he had been unable to do for a long time. Walks well, Romberg's sign much less, slight retention of urine. September 9, much better, and asked leave to make a visit to Belgium. Returned on September 30 very much better; no pains in the limbs, a slight one in the back. As before, he walked normally; only continues to be very constipated. October 7, able to work several consecutive days; it has been a long time since he had done this. October 24, had two days of severe pain. October 28, patient is well; no pain. November 1, the same; disappearance of Romberg's sign. December 16, the patient walked well with the eyes open, but hesitated with the eyes shut, cure not being completely maintained; he could stand on one limb with the eyes closed, but pain had returned. *At the same time he was very constipated.*

Case IV.—J. N., aged 57, carpenter; began treatment August 7, 1909. Initial chancre at twenty-four years of age, in 1876. For eighteen months he had endured terrible general pains every day. Westphal, Argyll-Robertson, and Romberg signs. Patient's gait 75 per cent. below normal with eyes open; closed, could not walk at all. Very constipated; daily and nightly incontinence of urine. Has at the same time an attack of deafness.

Examination: The first 5 centimetres beginning from the meatus restricted to 25 millimetres; rest of the urethra was normal. Operation and dilatation. August 10: Pains more severe; incontinence somewhat better. August 12, suffered atrociously; walk somewhat improved. Deafness, vertigo, and buzzing of the ears. August 23, found him considerably altered for the better. The facies was better, he was less deaf, and the vertigo and buzzing had ceased. Dilatations were continued. August 26, his pains had diminished considerably; he no longer showed Romberg's sign; had some little

vesical tenesmus. On August 30 he had only a slight pain in the back, and took a short trip to help on his convalescence.

Two weeks later we met him by chance while returning from an excursion on the railroad. This man, who at the commencement of the treatment was almost helpless, showed not the faintest trace of his former condition. He said that he had been taking a walk in the country with his family, being absolutely free from pain.

CASE V.—P. I., aged 46; began his treatment August 12, 1909. Patient denied ever having syphilis, and remembered only "excoriations on the penis." This man, who presented a classical tabetic gait, claimed not to have been ill over six months. Reflexes were intact; showed most clearly Romberg and Argyll-Robertson signs, with great pupillary inequality, the right pupil very small, the left much dilated. With eyes open he walked badly, and with eyes closed still worse. He cannot locate his legs in bed; sense of posture of legs completely abolished. Incontinence and retention of urine, and is very constipated.

Examination : Whole urethra was found to be normal, except for a stricture $1\frac{1}{4}$ centimetres long, starting from the meatus Operation and dilatation as far as the bladder. August 16, patient has improved ; gait somewhat better. August 26, found him improved ; feels strong on his legs. On the 30th he was much pleased, stating he could walk much better. September 9, the slow improvement continued ; he urinated more easily, and had less incontinence. Treatment continued. October 7, no more incontinence of urine and scarcely any retention. On October 21 he complained that sensation in the foot had not returned, but he slept better, and for the past two weeks he felt his limbs in bed. He noticed the sense of posture had returned. Walked better with closed eyes. Treatment continued. November 4, said he no longer suffered from retention, and had but a slight incontinence of urine. Could stand steadily for a full moment with his eyes closed and feet together. Still complains of anæsthesia of feet, and it had returned to his arms.

Case VI. — E. C., aged 32, painter; presented August 12, 1909. Says he has never had syphilis. Married. His children appear to be healthy. No sign of Westphal; Romberg's sign present. Pupils react feebly to the light. For seven years the patient observed a difficulty in urinating, but had suffered only six months with fulgurant pains. For a month his pains have been atrocious, continual, and unbearable, with nocturnal exacerbations and swelling of his left abdomen, during which time the retention of urine has been distressing. He has never shown incontinence. He is not constipated. Walks fairly well with his eyes open; very badly with them shut. Loses his limbs in bed. Sense of posture very imperfectly preserved, and has a slight ataxia in the arms.

Examination showed an unequal urethra and slight stricture. The first centimetre reduced to 27 millimetres, and starting $3\frac{1}{2}$ centimetres from the meatus, extending $2\frac{1}{2}$ centimetres, the contraction is 25 millimetres (near the meatus). Operation and dilatation. Patient returned August 16; his

pain still worse, but urinates somewhat better. August 19, much worse, and dilatation is suspended. August 23, his condition became alarming. Dilatation was done. August 26, his condition was unaltered. Pain so severe he said he could not endure it; was weak, walked worse than at the beginning of the treatment, had diarrhœa, and great difficulty in urinating. August 30, the pains began to diminish; complained of pain in the belly. Retention of urine almost complete, and the bladder so large that we used the evacuator catheter and continued with the dilatation. September 2, after more than a month's treatment he had been able to sleep the preceding night, had but little pain, and complained only of his inability to stoop. Examining the bladder, we found it enormously distended, and drew off 2 litres of urine. Complete vesical anæsthesia. September 6, the patient was well, had no pain, slept seven hours every night, but retention of urine persisted. As he was unable to command the services of a physician at his home, we lent him a soft catheter,

previously cautioning him to use extreme care in its manipulation.

Operated again and continued the dilatation. September 9, the patient told us he had taken no pyramidon for eight days; began to urinate voluntarily. September 13, had hardly any pain and less retention, but complained of smarting of the urethra. September 16, retention in the day and incontinence at night. We took the catheter away from him. Complained of continual burning in the urethra, becoming severe after evacuation of urine. On the 20th he urinated with but slight difficulty, and had less incontinence; had no more pain, but was very weak. September 27, he arrived suffering from severe pain; examination showed an acute epididymitis on the left side, due to his careless use of the catheter. Treatment was stopped, and he was ordered to wear a suspensory. September 30, was slightly better; no tabetic pain, but suffered constantly from his testicle. October 4, his strength began to return; he urinated much better, and asked leave to practise coition,

which was positively denied him. Dilatations continued. Examination showed the sense of position much improved in the lower limbs. On the 18th some tabetic pains returned, with some slight increase in retention of the urine; he walked better. October 28, fresh pain; treatment continued. November 1, the patient had but little pain, and urinated with but slight difficulty. We saw this patient on December 10. Effect of the treatment was well maintained; he looked well, had gained flesh, and was well satisfied. He came to us voluntarily, as he had not undergone treatment for a sufficiently long period. Attitude normal. We continued treatment in order to cure the pains, which returned occasionally, and to correct the slight remaining retention. Early in March, 1910, he went back to work after months of interruption.

CASE VII.—A. H., aged 52, employed on the railroad; began treatment August 12, 1909. Had been ill a long while; never had syphilis. For twelve years had been having fulgurant pains, which had become severe only in the

past eighteen months, and were confined to the hands and feet. Signs of Romberg and Argyll-Robertson, not Westphal. His condition fluctuated; he walked one-fourth below the normal with eyes open, and one-third below with the eyes closed. Sense of attitude very imperfect; at times could not feel his limbs in bed. Frequent incontinence of urine at night; retention was rare. No constipation.

It was found on examination that the urethra was contracted to 27 millimetres 5 centimetres within the meatus; the meatus was equally narrowed. Meatus and stricture were freed and dilatation begun. August 23, the patient had no pain in his legs; slight in the hands; no urinary trouble. August 30, the general appearance of the patient was much improved; he walked with more confidence, and the painful paroxysms were less frequent and less severe than at any time since the commencement of the treatment. He told us on September 9 that for about three years he had been unable to wash his hands in cold water; had been

doing it the past three days, and his appetite had returned. He began work on the 30th, and came to us wearing the uniform of his company. On October 11 he reported to us that his occupation compelled him to walk a great deal, and he was able to do it without using a stick; he was standing nearly the whole day. The sense of position of legs still imperfect; dilatations continued. On November 1 had some slight pains; recognized much better the position of his lower limbs. November 8, although the pains had not completely disappeared, they continued to diminish. This man was able to fulfil the duties of a most arduous position, being employed on the Orleans Line; he stayed on duty from November 10 to the Aviation Week in 1910.

Case VIII.—A. I., aged 50; began treatment August 12. Declared he had never had syphilis, but had several attacks of gonorrhœa. He had suffered for seven years with the various phases of the disease; had gastric crises, which had ceased to worry him, but had fulgurant pains day and night

in the legs and pelvis. Westphal, Romberg, and Argyll-Robertson signs; complete incontinence of urine. Had the tabetic walk, and obliged to have the support of a stick. Very constipated. Deep sensibility entirely abolished.

Examination showed a slight stricture, 11 millimetres long, 1 centimetre from the meatus; urethra in a deplorable condition. The examination was very painful; the organ bled and suppurated, being ulcerated through its entire length. Under great difficulty, he was operated on and dilatation begun. August 19, the patient gave evidence of retention of urine. Dilatation was made on the 23rd against great obstacles; the urine was less purulent. On the 30th he walked better, the urethra became exceedingly irritable, and treatment became almost impossible. It was stopped September 13, as the patient was unable to endure the dilatations.

Case IX.—F. R., aged 50, artist; began treatment August 16, 1909. Has had syphilis twenty years, and been tabetic ten.

Has pains that are intense at times, and suffers daily. Signs of Romberg, Westphal, and Argyll-Robertson. From time to time has had vomitings; none during the past year. This patient walks one-third below normal with the eyes open, and very badly with the eyes closed. Cannot completely empty the bladder, and at the same time has incontinence of urine and fæces. Frequently loses sense of legs in bed. Incontinence in bowels when he urinates; he has tenesmus and colic.

Examination found the urethra excessively sensitive, slightly strictured (unequally), to the extent of 7 millimetres to 3 millimetres from the meatus. Operation and dilatation. He improved very slowly. August 30, he had fresh attacks of colic and severe pains; tabetic cough. September 9, it was proposed to him that he have a digital rectal dilatation, which he hesitated about having done on account of the anæsthetic. September 30, found him better, with less pain. October 7, the pains are less frequent. A trial of rectal dilatation was made with the finger. The 14th he walked better. Improvement con-

tinued on the 25th. On November 8 he urinated easily; pains about the same as at the last visit. On November 22 the patient had more pain. He had a paroxysm of pain on December 2, but walks better. He never walked very badly, but to-day no one could detect anything amiss with his gait. Patient himself said that now, when he walked in the dark, he no longer found it necessary to strike matches, as he had formerly been obliged to do. Sense of attitude normal. December 12, the patient appeared well satisfied with his improvement, but suffered with gripes. It must be remembered that this patient had had a siege of rectal irritation, which he refused to have treated; but under urethral treatment he made immense improvement. If his pains have not entirely disappeared, nor his cough been modified, it is due to his refusal to follow the treatment advised, without which he cannot look for a clinical cure. February 17, the patient was well, and expected to resume his work, though he still had some slight pain from time to time.

Case X.—G., aged 59, masseur; began treatment September 16, 1909. Had syphilis in 1873. In 1886 he had very severe pains, which at present are diminished and very variable. Trouble with walking ensued in 1903; this improved later. His principal complaint is pain. At times he loses sense of legs in bed. Sense of attitude almost normal. He has had for five years an arthropathy of the left tibio-tarsal articulation. Argyll's sign, Romberg weak, normal reflexes.

Examination found the urethra contracted for 7 millimetres from the meatus (27 millimetres). Operation and dilatation.

Case XI.—J. S., aged 40, clerk; began treatment August 20, 1909. Had syphilis sixteen years ago, and the tabes dated back two years and a half; moderate pains in legs about once a week. Signs of Westphal and Romberg, that of Romberg very decided. Gait badly inco-ordinated—about 33 per cent. below the normal. Loses his limbs in bed, and sense of attitude much affected. No incontinence of urine; slight retention.

On examination, found 1 centimetre of his urethra, starting from the meatus, 25 millimetres, the following 5 centimetres 26 millimetres, and the following 10 centimetres 28 millimetres in diameter. Operation performed and dilatation begun. September 27, the patient declared he had less pain and walks better. On October 7, with eyes open or closed, his gait had improved. Romberg less. The 18th he urinated easily, had no pains, and but little of the Romberg sign. He walked very well with the eyes shut. The 28th the patient had no pain; gait was good, and there was but a faint indication of Romberg. November 1, no pain; urinated without difficulty; still some slight Romberg. November 8, pains had not recurred for three weeks. The improvement was continuing on December 16. He walked well, but said he was not quite so confident. Had no pain of moment, and micturition good. The sensation in his legs is almost normal. January 17, 1910: The patient was well, and could walk and turn round with closed eyes. January 27, he was able to jump.

He told us on that day he would consider himself perfectly restored to health were it not for the apprehension of falling which still clung to him. He never suffered from pain.

Case XII.—C. C., aged 41, innkeeper; began treatment September 30, 1909. Syphilis in 1879. Suffered for five years from incontinence of fæces after taking a laxative. Has had difficulty in walking for fifteen months; loses sense of position of legs in bed, and has no sense of posture. He has but few pains. Signs of Romberg. Argyll-Robertson, and Westphal; unequal pupils. With eyes open his gait was one-third below the normal, and with eyes shut one-half; was unable to walk longer than a quarter of an hour, even with the aid of a stick. Had difficulty in urinating. Has had no erections for six months, but complains of seminal losses.

Examination found the urethra very irritable, and contracted to the extent of 5 centimetres in the middle third of the anterior urethra. Operation and dilatation begun. October 4, the patient experienced

less difficulty in urinating and walked better. October 7, improvement continued, but the incontinence of fæces persisted. The 14th he walked much better with the eyes shut. On October 25 we found he no longer lost sense of his legs in bed, and could give some idea of the position in which we had placed his feet. Still had seminal losses. October 28, he said that sensibility of the penis had returned. Had very slight Romberg; gait only one-fourth below the normal, eyes open or closed. November 1, he urinated with much less difficulty; had incontinence of fæcal matter only when he took a purgative. November 4, felt sensation returning to his feet. November 8, he walked a long way without the use of a stick. He is perfectly satisfied with the result of his treatment. On November 22 there was no relapse in the improved condition; he grew a little more fatigued in walking; continued to complain of seminal losses and failure of erections. On December 2 he walked equally well with closed or open eyes; sense of posture normal. On Decem-

ber 6 we remarked that the dilatations were most painful, thus showing return of urethral sensibility; seminal losses continued. Finally, on December 13, erections began to return. On January 3, 1910, he was much pleased, as he could run, was conscious of the erections, and could thus avoid the seminal losses. On January 17, 1910, he complained only of a slight stiffness in the left leg; cutaneous sensation had returned, and he could walk for an hour carrying packages. On January 24, 1910, he told us he had been abandoned by his wife, who carried off with her all his savings. He was in a most despondent state, but did not suffer relapse. Examination again on February 14 found him practically cured.

Case XIII. — C. A., aged 31, pork-butcher; began treatment September 30, 1909. Syphilis in 1898. Fulgurant pains began three years ago; are almost constant, and increase in intensity more and more. Every ten days he has a crisis lasting an entire day. Pains are generally localized,

more especially in the legs and knees. Marked signs of Argyll-Robertson, Westphal, and Romberg. The patient said to have been worse after trying re-education. Loses all sense of legs in bed, and the sense of posture completely abolished. General condition very bad; even the sitting posture is a torment by reason of weakness of the trunk. Walking with the eyes open is almost impossible, accomplished painfully with the aid of his wife. With closed eyes he is incapable of standing. Marked ataxia of legs. Finds great difficulty in urinating. Has rectal tenesmus, and, almost continually, incontinence of fæces; diarrhœa.

Examination showed the urethra sensibly and lightly contracted to the extent of 2 centimetres from the meatus. While performing operation the patient soiled the bed. Dilatations were begun. He came to see us October 4; gait already improved, and had had no further escape of fæcal matter since the operation. The pains persisted. October 21, he could walk without his stick, urinated well, had no pain, and

incontinence of fæcal matter had ceased. October 28, the pains had returned; he had vomiting spells, which he attributed to indigestion; deep sensibility had not returned. A second operation was performed. On November 1 this patient, who previously had been unable to walk at all, told me he was able to walk in the house without his stick, and did it before us, though with some difficulty. We found him specially improved in regard to the sense of posture. When he commenced treatment he had been unable to give us the faintest information on the position of his legs; his wife told us he frequently mistook her legs for his own in bed. On the 4th says he has no pain. Can walk with closed eyes, and Romberg less pronounced. On the 8th he walked with greater facility. Superficial sensibility of the legs returned, he told us, spontaneously. This patient was seen by us on November 22, and found to be in the same condition. He was much better on December 2, and could take some steps with his eyes closed. Complete sense of posture in the legs normal, but

segmentary sensibility incomplete. Urinated easily. Pains slight. On December 6 he showed how he could stand on his toes. On the 10th sensation was returning to his feet. January 3, 1910: On the day of the last treatment he had such intense heat in his limbs that it amounted to burning, which was followed by a segmentary and subacute œdema —a simple nervous accident, disappearing the next day. Since that time he has had warm legs and feet, where before they had been "cold as ice," unable to get warm, although he had sat for hours before a hot fire. In a different degree we have observed the same effect on fresh cases treated since. January 6, 1910, we found the patient still improving; Romberg diminished, and was able to take some steps with closed eyes. We were struck with his fine appearance and remarkable increase in flesh, but on January 20 he complained that he was unable to see clearly; had diplopia, caused by external strabismus of the right eye. Treatment continued. He felt peculiar sensations in the arms and legs, and some fatigue after

the dilatations His diplopia diminished after January 31, at which date he drew our attention to his mental state, which he declared was clearly better, as his memory was returning. In examining the Romberg he could feel the direction of the oscillations; this had been impossible before. Could move apart the toes of his foot. February 14, the patient had still a little pain. He remarked to several physicians who had come to see these patients that he and those around him had noticed the improvement in his mental condition since his treatment. He felt, he said, "more intelligent" than before. Same observation has been made by other patients. He can stand with closed eyes, and his diplopia has entirely disappeared; but since development of this last we have noted a slight relapse in the deep sensibility, as well as some loss of flesh. On March 3, 1910, he was well, and had regained all he had lost.

Case XIV.—L. D., aged 46, clerk; began treatment September 30, 1909. This patient denied any previous syphilis or

gonorrhœa. Had suffered for four or five years with severe pains, generally distributed, and constant for the past month. He could sleep only with the aid of narcotics. Westphal's sign and slight Romberg. Myosis, the pupils reacting feebly to light. Deep sensibility appeared intact. Walked well with eyes open, and almost as well with them closed. Micturition difficult, and incontinence during the day; constipated and had hæmorrhoids.

Upon examination we found the urethra very sensitive, irritable, and slightly constricted. Operation and dilatation. The patient returned on October 4 with less pain; has had no incontinence of urine since his last visit. The 11th, pains diminishing; urinates easily; still no incontinence. The 28th, pains returned slightly, but urinates with less and less difficulty.

Case XV.—H. M., aged 45, clerk; began treatment on October 4, 1909.

The patient never had syphilis; had suffered from fulgurant pains for four years, which would last a year and then cease,

leaving him well; pains returned two weeks ago, particularly in the left knee and the right foot; loses his limbs in bed, and deep feeling greatly affected. Signs of Westphal, Romberg, and of Argyll-Robertson in the left eye. For a year, complete amaurosis of the right eye from atrophy. With the eyes open, gait 33 per cent. below normal; closed, 50 per cent. For past six months he has not had dyspnœa that he had been suffering from for a year previously. Difficult micturition and frequent incontinence of urine, especially during the day.

Examination showed the urethra very sensitive 4 centimetres from the meatus. Dilatation only. October 14, the patient was walking well with eyes open or closed; no pain; urinated easily. October 21, almost normal gait; very slight retention of urine, hardly any pain, and feels his limbs in bed. Sense of posture appears normal. No incontinence of urine. Same November 4; walks better with eyes closed. November 8, had walked the previous evening two miles without pain or fatigue. When

seen on November 22, the good results obtained had kept up; patient had still a slight difficulty in urinating; leg slightly stiff. December 2, complete sense of posture. Urinates well. Cutaneous sensibility returning. December 6, all pain gone; patient well, and able to resume his avocations. He will travel, and return to see us from time to time.

Case XVI.—E. S., butcher, aged 36; began treatment on October 7, 1909. Patient declared he never had syphilis, but had numerous attacks of gonorrhœa. Six years ago first began to have fulgurant pains, which ceased at the end of three years, reappearing after a fall. After a radiography, he was operated on. His chief symptom had been pain. He presented the classical tabetic gait, and the Argyll-Robertson, Romberg, and Westphal signs. Urinary disorders.

Along an extent of 5 centimetres we found granulations in the middle third of the anterior urethra. Operation and dilatation. The patient returned to us on October 21,

said he was well and had no pain, but had been forced to discontinue the treatment, as he had been obliged to undergo an operation for anal fistula. Since this time pains have returned slightly. He urinates better.

Case XVII.—A. D., aged 51, draughtsman, began treatment October 11, 1909. He may have had a chancre thirty years ago. He has been ill for six years; had the fulgurant pains for four. For the past two months the paroxysms have been frequent and very severe. He cannot sleep. Every week he passes two days of intolerable pain. He has an ever-constant sensation of having his chest compressed. For seven or eight years insomnia. This man told us that his life was a veritable misery. Sense of attitude much affected; can scarcely feel his limbs in bed. Unequal pupils. Signs of Argyll-Robertson, Romberg, Westphal. With eyes open, gait is 50 per cent. below normal; with them closed, walking is impossible. Urinates with difficulty, but has never had incontinence.

Examination showed his urethra very sensitive and constricted along an extent of 10 centimetres from the meatus. Operated and dilatations begun. October 14, he had more severe pains and a paroxysm lasting three days. Dilatation continued. A great change was noticed on the 18th; patient had less pain, and could walk with closed eyes. The 28th, he had slept two consecutive hours. He had not done this for seven or eight years. Deep sensibility returned slightly. November 4, he had pains again but said that they were not so violent nor did they last as long as formerly; he was able to sleep the same night. The sensation of being squeezed had left after he began treatment. His appetite returned. Improvement had been well kept up on November 22, although he suffered from the cold. No pains and no retention. November 25, the patient told us he had had a severe paroxysm of pain after taking the treatment. He was improved November 29, but spoke about his difficulty in walking, from œdema of the legs. He had a cardiac murmur,

and we prescribed tincture of strophanthus. December 2, he said he began to feel his toes move and feeling return in the sole of his foot. Sense of attitudes still imperfect. December 10, he was much better; had no pains; walked better, and could stand upright with his eyes closed. January 17, 1910, has been growing better and better. Has walked for a half-hour in the street, and never has cold feet. Sense of attitudes almost normal. Cutaneous feeling is returning to the feet. Has pain still, but it is slight and of short duration. January 27, he told us he slept well, but said the dilatation produced a tingling in his hands. February 17, he presented himself, well satisfied with his treatment. He was specially surprised at the return of his strength, which was greater than formerly, although he had been taking no stimulant. February 24, he walked much better, had better balance, and could stand some time without support. This change was due to treatment of the deep urethra.

Case XVIII. — L. K., aged 42; first

treatment October 11, 1909 Patient had syphilis in 1892. Had been suffering from tabes five years. The onset was marked by cystalgic crises, that ceased about two years ago. Now he has vesical tenesmus, and has had cramps for a year. This patient presented a picture of marked ataxia. He could hardly walk with his eyes open, and not at all with them closed. Signs of Westphal, Argyll-Robertson, and Romberg. Deep sensibility totally abolished. Much difficulty in urinating, sometimes coming drop by drop; some incontinence; very constipated. He is a confirmed invalid.

Examination showed the urethra strictured 4 centimetres from the meatus. This stricture measures 16 millimetres. Operated. Dilatation had to be very slow, owing to the extreme sensitiveness of the urethra. October 21, no change.

This patient came voluntarily to see us on January 9, 1910. His condition had become still more aggravated in the month of November, after he had stopped treatment. He was operated on again. Was incapable of

walking, and had to be supported by his wife and the other patients. Dilatation most painful by reason of the sensitive urethra. January 20, less retention and less fatigue. January 27, urinates quite well. January 31, his state is stationary; he is still more fatigued, but is able to tell us something about the position of his limbs. February 3, we saw for the first time a clear improvement: patient had more appetite; general condition was better; he could stand upright, and had better balance. February 7 showed an immense change in him. Since the 5th, he told us, he had been walking as he had not walked for four years. February 14, sense of posture had returned to the left leg. Dilatations become more and more easy. Seen on March 21, it is plain that he improves every day. His face has changed totally; his strength has returned. He can take some steps without a stick, and with a stick he is able to walk for a long time. To those who saw him at the Salpêtrière he is absolutely unrecognizable.

CASE XIX. — P. B., aged 37; began treatment October 22, 1909. Syphilitic since he was eight years old. Tabes declared itself about three years ago. He first tried injections of benzoate, and has tried nearly all treatments. He has severe fulgurant pains, increasing daily, which culminate in violent crises every week. They are general and knife-like. Signs of Argyll-Robertson, Romberg, and Westphal. When washing at basin, if he closes his eyes he falls. His gait is one-third below the normal with the eyes open, and he falls when they are closed. He does not feel his limbs in bed. For three months the patient has had incontinence of urine three or four times weekly, and for a long time retention.

Examination showed the first centimetre of the urethra, starting from the meatus, for 5 centimetres strictured to 27 millimetres, with a very pronounced spasmodic condition, so much so that we were unable to pass any of the ordinary sounds usually employed for dilatation. Operation and dilatation com-

menced. November 1, the patient has had no pain since the first treatment; Romberg much fainter, and he feels the position of his limbs in bed. November 8, he is apparently well.

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