parts affected, although not in all cases, for the anaesthesia may
be incomplete or may be unilateral. The tendon-reflexes are
diminished or abolished and then the limbs are flaccid. Electro-
muscular excitability may be lessened or lost, paralysis of bladder
and rectum may be complete. Bed-sores tend to form. The
usual lesion is an acute central myelitis. Or there may be luetic
spinal lepto-meningitis, chiefly affecting the veins, and partly
implicating the cord itself, in which latter, also, are secondary
changes due to interference with the circulation, and consisting of
colloid exudation in the grey, and areas of nerve-fibre degenera-
tion in the white (Hayem, Julliard, Siemerling, Déjerine, Erb,
Lancereaux and others).

PART IV.
SYphilis and Tabes: their Relationships.

A.

The doctrine of the syphilitic origin of tabes dorsalis is mainly
due to Prof Fournier, of Paris, and to Prof. Erb, of Heidelberg.
But thirty years ago, in his work on tumours, Virchow asserted
that, indubitably, many cases of tabes dorsalis—of grey atrophy
—are syphilitic. Also, previously to Fournier and Erb, had
Wunderlich mentioned, besides permanent paraplegias, tabetiform
symptoms as due to spinal syphilis; and Berger appears to have
observed much the same thing.

Lancereaux admitted the possibility of at least something
analogous to tabes as a result of syphilis.

Erb, in 1883, and in part previously (loc. cit.), declared syphilis
to be one of the most important, or the most important of the
conditions for the origination of tabes, and that a person not pre-
viously affected with syphilis has scarcely any chance of becom-
ing tabetic. And, in 1892, he gave 89 per cent. of tabetics as
having previous syphilitic infection, as compared with twenty-

1 “De l'ataxie locomotrice d'origine syphilitique,” Paris, 1876.
3 Cited by Prof. A. Eulenberg.
5 Berliner Klinische Wochenschrift, 1883, No. 32.
6 Berliner Klinische Wochenschrift, 1892, Nos. 29 and 30.
ON SYPHILIS OF THE NERVOUS SYSTEM.

Two and a-half per cent. of other hospital patients who were not tabetic, Leyden, in 1883 and 1892, took the opposite view.

But while Erb did not consider it proved that tabes is a specific syphilitic disease, or late manifestation of syphilis, Moebius (1884) held empoisonment of the organism as necessary to tabes, admitting as the only efficacious poison—syphilis; and, doubtfully, ergot.

So long ago as 1876, writing on syphilis and insanity, in the part of the article devoted to gross syphilitic nervous disease, I published, amongst other cases, one, the spinal element in which was spoken of as simulating tabes. (There were typical ataxy, Romberg's symptom, &c., and intercurrent strabismus and diplopia, also dimness of vision.) And it was so spoken of because, at that date, syphilis was not, or was scarcely recognised as in any direct aetiological relationship with tabes, i.e., as productive of "systematic" spinal cord disease, and the mental recovery (at least for the time being) and the vast improvement of the tabetic symptoms, under anti-syphilitic treatment, led me, at the time, to conclude that the symptoms were scarcely due to true tabes but to ordinary syphilitic inflammation or neoplastic diffuse growth. Now, some would say it was a case of tabes, and probably it was the first case published in this country as being syphilitic.

The question of recovery, in this and similar cases, will recur after mention of two other cases of well-marked, typical, tabetic symptoms, in persons believed to have had previous syphilitic infection, on whom I made necropsies some years ago. Both were general paralytics. In one there was chronic spinal meningitis and thickening, particularly over the posterior surface of the cord. The posterior columns presented the typical grey degeneration and sclerosis of tabes, chiefly in the lower dorsal and lumbar segments of the cord, in parts of which the whole of the posterior median and posterior external columns was affected, but, above, the lesion gradually becoming limited to the posterior median columns, and invading the bulb. Many of the lower posterior spinal nerve roots were similarly lesed. Some optic nerve atrophy.

In the other, also, was chronic spinal meningitis, all the changes about to be mentioned being confined, or nearly so, to the posterior surface of the cord; namely, thickening of spinal dura

2 Cited by Eulenberg.
ORIGINAL ARTICLES AND CLINICAL CASES.

and arachnoid; numerous white cartilaginous plates in the layer of arachnoid next the cord; numerous adhesions of the meninges between themselves and to the cord, by distinct pseudo-membranous bands and filaments. The arachnoid thickened, opaque, semi-gelatinous in appearance. The posterior columns of the cord were lessened in consistence, altered in appearance, and the seat of myelitis taken to be of subacute type (numerous round cells, infiltrating profusely. Some scattered granule-masses).

Interesting in relation to the mobile recurrent right external strabismus (and to [?] the permanent slight right exophthalmos) was the subacute inflammation found affecting part of the length of the right motor oculi nerve near its root.

B.

Reverting to the recovery of apparent cases of tabes as bearing upon the question of their syphilitic origin, it has been held (as, e.g., by Gowers,1) that as the symptoms of syphilitic disease of the nervous system depend, not on the specific process, but on the alterations it produces in nerve tissue, and as treatment exerts a direct effect on the specific process only, it follows that the persistence of symptoms, in spite of treatment, indicates persistence only of the damage done to the nerve elements, and not a continuance of the lesion producing the damage.

But dissipation of the specific process must in many, especially in early, cases permit the damage of nerve elements, still incomplete, to be repaired, or partly so; and it has been reported by Dinkler2 that of Erb's cases of tabes 58 per cent. showed some improvement under anti-syphilitic treatment. And I have found tabetic symptoms somewhat improved, and the associated mental disorder (for which they came under care), alleviated under iodides. Sachs, also,3 has found vigorous treatment with Hg. and iodides benefit the ocular, atactic, tendon reflex, and painful symptoms of tabes. And going back to my early student days, although we saw tabetic patients treated with nux vomica, cannabis indica, anodynes, arg. nit., and pot. iod., with or without actual cautery or blisters over the spine, yet a renowned clinical teacher, Da Costa, taught us that the only drugs at that time apparently of any ameliorative effect on the disease—as distin-

1 "Syphilis of the Nervous System," 1892.
2 Berliner Klinische Wochenschrift, 1893.
3 New York Medical Journal, Jan., 1894.
guished from mere relief of pain, &c.—were iodide of potassium and nitrate of silver, so that the iodide is a very old friend in the treatment of tabes.

Some cases have been reported of improvement, of great improvement, or even cures of tabes\(^1\) by anti-syphilitic treatment. For obvious reasons this is more likely to occur in private than in hospital practice. The patient is the more entitled to the chance of obtaining the possible benefits of specific treatment (Gerhardt) the nearer the onset of tabes is to the date of primary infection, the stronger and better nourished he is, and the more manifest are signs of syphilis. Moreover, the expectations of improvement under specific treatment are more favourable in the so-called anomalous or atypical examples of tabes, e.g., cases with symptoms predominating on one side, presenting a less tardy course than the typical cases, and advancing by strokes. And Sachs suggests as a point sometimes helping to indicate cerebro-spinal syphilis simulating tabes (and, therefore, more curable than tabes proper)—an unusual irregularity of development of the symptoms; e.g., the light reflex being lost in one eye very much earlier than in the other, or while the one is lost the other remains normal for years, or one or both pupils respond neither to light nor in accommodation, or any active syphilitic process at the brain-base is apt to be associated with or to long precede genuine tabes.

Are the alleged cures of tabes really examples of recovery from so-called pseudo-tabes? Syphilitic disease of spinal meninges with tabetiform symptoms may be accepted as one form of pseudo-tabes. And in "atypical" cases of tabes, instead of merely the ordinary typical tabetic sclerosis or grey degeneration of posterior columns and nerve roots, there may be a fresher and specific syphilitic morbid process.

Dr. Adamkiewicz has had several cases, a very careful study of which has led him to the belief that there is a special form of tabes having certain characteristic symptoms, and a specially defined clinical course, which is positively curable by early anti-syphilitic treatment.

"The symptoms of this curable form of locomotor ataxia are: Ataxic paresis with loss of the tendon reflexes, paresis in the distribution of certain cerebral nerves, tabetic paraesthesia without objective disturbances of sensibility, and pain especially on pressure in the lumbar region. The clinical course of the disease

\(^1\) Cure in one case lasting 18 years (Reumont).
is characterised by a rapid advance of the paresis of the lower extremities into complete paralysis, by ascent of this paralysis up to the lower part of the cervical spine, and, when the anti-syphilitic treatment is early begun and energetically carried out, by a final complete restoration to health. The duration of the disease, when so treated, is three or four months. The most important clinical symptoms of the disease—ataxia and motor paresis—point to an involvement of the pyramidal tract as well as of the posterior columns, and the fact of a cure by means of iodides and mercury, to functional disturbance resulting from a not irreparable process. There can be question here of syphilitic products only, which appear under the form of obliterating endarteritis and syphilitic pachy-meningitis.

"When, through lack of proper specific treatment, there is no resolution of the syphilitic products in the spinal cord, the diseased vessels become obliterated, and the parts of the cord supplied by them become sclerosed. In this case, similarly to what he has shown to occur in tuberculous pachymeningitis, wedge-shaped lesions are formed in the substance of the cord in which the nerves are destroyed. He has called this lesion, which results in incurable spinal paralysis, infarct of the cord."

The general belief that syphilitic vascular lesions of the brain only, and not of the spinal cord, are curable, is disproved, he said, by his observation.¹

It is probable that most of us have erred in giving insufficient doses of iodides in syphilitic nervous diseases when heroic doses are needed. In cases of general paralysis and of tabes, apparently springing from syphilis, large quantities of K.I., or of Na.I., are given by some.

For example, Max Weiss² describes a case of advanced tabes, in which the connection between that disease and syphilis was very clear. "This case is especially noteworthy from the fact that a regular and steady specific treatment markedly and rapidly diminished pronounced objective and subjective tabetic symptoms, a few of these even disappearing entirely. The treatment consisted solely of rather large daily doses of iodide of sodium, increasing from 5 to 8 grammes (1½ to 2 drachms) for several months. The patient was an engineer, 35 years old, who had never suffered from illness during childhood; in 1883 he

¹ Int. Med. Cong., Rome, Medical Record, May 5, 1894.
acquired an indurated specific ulcer, with secondary symptoms. He was given twenty injections of corrosive sublimate and small doses of iodide of potassium; in July, 1884, a lingual ulcer developed, which underwent complete resolution after twenty-four injections of corrosive sublimate. Since that time there had been no specific eruption either on the body or the visible mucous membrane. In 1886 several attacks of nausea and vomiting occurred, each lasting about fourteen days, accompanied by severe pain in the back. In the autumn of 1887 renewed attacks of vomiting occurred early in the morning (gastric crises). From 1889 there were almost daily attacks of vomiting. Nutrition was much impaired and the body-weight decreased. He suffered from lancinating pains over the entire surface of the skin, more particularly in the arms and legs, most frequent after a change of weather.” In 1890, static and dynamic inco-ordination was first noticed, with paræsthesia of the toes, soles of the feet, and the two small fingers of each hand, diminished tactile sensibility in the epigastric region, and fatigue, after the least attempt at walking. “Constipation, cramp-like pains in the abdomen (intestinal crises), some retention of urine, and severe boring pains in the urethral canal were added to the other symptoms. In the spring of 1893 the sight was poor at a distance of from twenty to thirty steps, but there was no trouble in reading and writing. In August, 1893, the patient was submitted to a systematic iodide treatment. For the first two weeks he took daily 5 grammes (1½ drachms) of diluted iodide of sodium, no symptoms of iodism being observed. The daily dose was increased 2 grammes (31 grains), and for some time 3 grammes (46 grains). Within a month the daily gastric crises ceased suddenly, and have never since reappeared; in September disturbances of co-ordination diminished perceptibly, and in October, when the patient was taking 8 grammes (2 drachms) of iodide of sodium daily, and had already consumed 500 grammes (1 pound) in all, without any untoward symptoms, no evidences of ataxia were present.¹ The cloudiness of vision had also disappeared, the lancinating pains occurred but seldom, and were much less severe than formerly. The patient, even after walking several hours, did not feel any fatigue. His appetite has greatly increased, and his weight has increased 6 kilos (12 pounds). Treatment is still being continued in daily doses of from 6 to 8

¹ Purity of the iodide of sodium employed is an essential condition of such treatment.
grammes (1½ to 2 drachms), with short intermissions. The paraesthetic symptoms have almost entirely disappeared." The urethral crises and the weakness of the detrusors persisted longest, and galvanization through the lumbar cord, perineum and bladder, was resorted to, with internal administration of ergot and strychnine, the result being that for three weeks before the time of report the patient no longer complained of urinary disturbance or of pain in the urethra.

Weiss refers to a similar case treated by Werner Stark. The patient was a woman, aged 43, who had become infected thirteen years previously and recovered without relapse. Eight years later the first indications of tabes appeared, the symptoms increasing in intensity until the patient was unable to walk. "No disturbances of the digestive or urinary organs occurred. When the patient was first seen by Stark, in 1890, she was pale and thin; there was complete ataxia of the legs, analgesia and partial anaesthesia of the skin, as well as weakness and atrophy of the muscles of the legs; the patellar reflex was absent. Psychic and ocular disturbances were not present. The patient had been discharged from hospital as incurable. Stark first gave 50 grammes (1½ ounces) in 400 grammes (13 ounces) of water, a tablespoonful being taken three times daily. After some time the pains became less severe." The solution was then strengthened to 60 in 400 grammes (1¾ to 13 ounces); after three months to 75 in 400 grammes (2½ to 13 ounces); and again after three months to 100 in 400 grammes (3½ to 13 ounces), four tablespoonfuls daily, this strong solution being taken for four months. "After the first increase of the dose improvement soon occurred, so that the patient was able to do a little light work; after the second increase the pains disappeared and the ataxia and anaesthesia decreased. After the last increase, when the patient was taking 12 grammes (3½ drachms) ¹ of the iodide of potassium daily, there was perceptible improvement; the anaesthesia and ataxia disappeared, and the muscular atrophy diminished; the patient could walk quite well with the aid of a cane or support. During the entire time she did not suffer from any disturbances of the digestive or other organs. Sometimes the treatment was continued steadily for weeks, and again it was interrupted at intervals; during these, however, Stark observed that improvement was not progressive, and that there was occasionally a tendency to relapse. At the time of writing, the patient had, for a year only, occasionally been taking the iodide of potassium, feeling stronger after each treatment."

¹ Fifteen grammes (4 drachms)?
C.

From the third Part of this communication, namely, that on syphilitic spinal cord disease generally, we carry forward a reminder of the cases linking tabes with spinal cord disease clearly due to the specific lesions of syphilis. Such, especially, are the cases of syphilitic lepto-meningitis invading the cord, particularly its posterior columns and horns, sometimes producing a more or less tabetic, or quasi-tabetic, posterior sclerosis, and diagnosed during life as examples of tabes, or of anomalous, atypical, or pseudo, tabes. Of such kind are cases therein cited from Ewald, Eisenlohr, Kuh, Dinkler, Brasch, Schulz, Siemering, and one or two of the present writer's cases.

Moreover, syphilitic spinal lesions have been found associated with the recognised lesions of typical or classical tabes. In this communication (see Parts I. and III.) have already been described in abstract two such cases, one from Raymond, and one from Hoffmann, and the second of the present writer's three cases, mentioned in this Part IV., was probably of that nature.

Here another may be added from Sachs. 1 "Clinically it was a typical example of tabes dorsalis."

Posteriorly, the spinal pia was covered by a thick gelatinous mass, from lower cervical to upper lumbar segments. The pia was thickened both in front and behind, and of leathery consistency. Microscopically, was diffuse sclerosis of posterior columns, extending from the lower cervical region to the lumbar enlargement, but best marked in the cervical and dorsal segments, and it included Lissauer's tract. In the lumbar segments, only the posterior portion of the posterior columns was affected much, the rest but little. "A few cells of Clarke's column could be made out only in the lower dorsal segments. The sclerotic tissue differed in no respect from the classical order of spinal sclerosis." Nerve fibres of cord elsewhere, and anterior grey matter, normal. In lumbar and dorsal segments was a widespread meningeal infiltration; also, there, the pia was firmly agglutinated to the cord, particularly in the posterior and lateral column regions; there, also, the posterior nerve roots were degenerate, and the small blood vessels showed changes characteristic of syphilis. These changes were most in the lumbar region, where the sclerosis, on the contrary, was least. The pia was "characterised by an invasion and proliferation of round cells, and by very typical changes in its blood vessels, large and small."

1 New York Medical Journal, January 4, 1894.
Consequently, besides posterior spinal sclerosis was a syphilitic lepto-meningitis "invading the cord at different levels, and occasionally invading a distinctly sclerotic area, also a very typical specific arteritis. Whether it was an endarteritis or a mesial arteritis cannot be determined easily," but in the majority of the vessels the innermost coat had undergone the greater changes.

The condition was taken to be a syphilitic process, superimposed upon the sclerosis, the sclerosis coming first, the syphilitic infiltration later on. So far as it invaded areas already occupied by sclerosis it would not occasion new symptoms. It is possible, or even probable, that the blood vessel change preceded the sclerosis.

A case of typical tabes dorsalis with central gliosis, in a syphilitic subject is reported by Nonne. Beside the lesions of both conditions, were a recent focus of softening, explaining the paralysis of upper limbs; old ulnar neuritis; chronic cerebral lepto-meningitis; syphilitic endarteritis and mesarteritis of basilar.

In reference to cases of these kinds, besides what has already been stated, we shall notice presently that not only may myelitis or gumma be followed by tabes, but also that myelitis may come on in the course of tabes.

Clinically, also, we, in fact, get at least a close approximation to, perhaps an identity with, several clearly defined clinical entities according to the part or parts of the cord predominantly affected by syphilitic lesions. If these parts are the posterior columns (nerve roots and horns), the clinical image of tabes presents itself. If the postero-lateral columns (including crossed pyramidal tracts) are chiefly affected, and the posterior horns also somewhat invaded, the posterior columns less affected, the posterior root zones and nerve roots suffering little; then we get the symptom-group of Erb’s so-called "syphilitic spinal paralysis." If the posterior, pyramidal-tract, part of the lateral columns chiefly suffered, there would be a symptomatic appearance as of primary spastic spinal paralysis, but in such cases other degenerations would perhaps be present, as may be in ordinary primary spastic paralysis, namely in Goll’s and Burdach’s columns, and direct cerebellar tracts. If, as occurs rarely, the anterior horns suffer most, there are, with other symptoms,

1 Archiv für Psychiat., Band, xxiv. H. 2.
2 Ad. Schule, loc. cit.
the phenomena of spinal progressive muscular atrophy, or, more
cutely, anterior poliomyelitis; perhaps or possibly still more
cutely, that form of it with, clinically, the acute ascending spinal
paralysis (of Landry); if, with the degeneration of nerve cells of
anterior horns, there is also predominant change in the lateral
pyramidal tracts, the clinical aspect will be that of amyotrophic
lateral sclerosis. Syphilitic cervical spinal cord change may
simulate syringomyelia or Morvan’s disease; and the syphilitic
incidence chiefly on many of the posterior spinal nerve roots
occasions a special symptom-group, as in cases by Kahler and
Buttersack.

Likewise, the image of ataxic paraplegia may be the manifes-
tation of syphilitic disease affecting both the posterior and the
lateral columns, although such cases, finally, are apt to pass into
a more spastic phase, and present the symptom-group of the
spastic condition, already fully discussed in the Third Part of
this communication.

But usually the lesions are multiple, partly diffuse, and partly
concentrated in place, and the symptomatology correspondent
thereto is mixed, combined, multiple; the disease being more
or less widespread, yet selective of loci—selective, yet having a
variety of affinities or tastes, so to speak.

In some of these cases of doubt whether there is genuine
tabes; or, on the other hand, spinal syphilis, that is to say, in
the sense of syphilitic morbid processes; the symptoms point to
tabes, but there occurs a return of the knee-jerks which had been
lost, or a restoration of equality between them on the two sides
which had failed; and in some instances a cessation of external
ocular paralyses, which had previously accompanied the failure
in patella tendon reflexes.

The fact is also to be borne in mind that certain cases of
tabes (contrary to what has been held by some) present not only
the typical lesions, but also degeneration of the comma-shaped
bundle more distinctly than of the surrounding parts. Or cases
may present degeneration of the antero-lateral ascending tract;
or of the direct cerebellar. In fact, the complications attending,
sometimes, the lesions of genuine tabes are numerous.

D.

We may now turn to the studies of some observers on the
proportion, per cent., of tabetic cases presenting a previous
history, or indications of syphilis.
Dr. Gowers, in private consulting practice, found 58 per cent. of male cases give a history of hard chancre or of secondary syphilis. Two-thirds, he thinks, would be nearer the truth, could all facts be ascertained. In women he found antecedent syphilis to be traced rather less frequently than in men. "In the cases of tabes that succeed syphilis, the lesion is not syphilitic in histological character. In these, as in the cases in which syphilis can be excluded, the disease is a degenerative one. It is, moreover, rarely influenced by anti-syphilitic treatment. Hence it must be regarded as a degenerative sequel of syphilis rather than as a true syphilitic disease. . . . In a few cases, perhaps 10 per cent. of the whole, syphilis can be excluded with confidence. The causes operative in these can be traced also in some of the patients who present a history of syphilis, and in such cases the causation of the malady is probably complex."

Such other causes are spinal injury, exposure to wet and cold, excessive fatigue and over-exertion, acute diseases, e.g., rheumatism and enteric fever, alcoholic excesses.

In the second case of tabes ever seen by the writer, excessively hard work and over-exertion, six years previously to the time the patient was seen, were apparently the (or the chief) etiological factors.

Fournier has stated that over 90 per cent. of persons suffering from tabes have incurred syphilis. Yet in only 76.7 per cent. of these (112 in 146) was antecedent syphilis alleged to be indubitable. On the other hand, Borgherini has recently collected statistics in Italy, according to which scarcely 30 per cent. of those with tabes were syphilitic. In A. Fraenkel's experience, the percentage was 50.7 per cent.; in Senator's and Mendel's, 70 to 75 per cent. G. Lewin denied these high percentages. Virchow considers the relations of tabes and syphilis not yet decided, and notes the rarity of visceral syphilis in tabes.

Of 102 cases of tabes, Gerhardt concluded that 51, or exactly half, were persons previously syphilitic. The average interval between the time when syphilis was incurred and the onset of tabes in these cases, was found to be ten years; from collected statistics, another places it at eight and a-half years.

Compare with this the average interval of only four years, in examples of spastic spinal paralysis, taken to be syphilitic.

Yet the same observer speaks of seeing syphilitic spinal cord

2 Medical Record, May 5, 1894.
3 Loc. cit.
ON SYPHILIS OF THE NERVOUS SYSTEM.

365

disease supervene at from three months to twenty years after primary infection, and take similar forms under such very dissimilar time-circumstances.

On the other hand, in 17 cases of insular sclerosis, no mention of syphilis was found.

Prof. A. Eulenberg¹ discusses "syphilitic tabes" in the pathologico-anatomical sense, i.e., the occasional appearance of syphilis of the spinal cord under the clinical form of tabes dorsalis. He published brief particulars of 125 cases of tabes diagnosed with certainty, all other examples, he says, being excluded. Of these, 19 were women: for reasons given, he excepts them from consideration, as to the aetiological factors; but it is to be noted that in only one of them was syphilis certain; a few others were sterile, and one had a husband probably tabetic, points which raise a suspicion of syphilis. But the majority of the women were certainly not syphilitic.

Of the 106 male cases, 39 had some venereal infection; but of these, 11 had had only simple or "soft" venereal sores or chancre, without subsequent appearance of general syphilis. These, I think, we must exclude. The remaining 28 had had typical hard chancre, and general constitutional syphilis. These we may accept as syphilitic, and these only. Thus, for male tabetics there would be 26½ per cent. (nearly), previously affected with syphilis. (The percentage would be 36½, if we include, as Eulenberg does, the eleven cases with simple, soft venereal sores, and no subsequent external, or constitutional or general manifestation of syphilis.)

Neuropathic heredity was observed in 12 per cent.

Atmospheric noxes (chills, wettings, &c.), in more than one-third.

Severe bodily exertions in one-fifth.

Severe depressing emotions, previously, in 13 per cent.

Debilitating conditions, leading to general weakness and exhaustion, in 10 to 11 per cent. (e.g., pulmonary, intestinal, ovario-uterine, or malarial diseases; sexual and alcoholic excesses).

Traumatic damages in about 5 per cent.

Deformity of vertebral column in a few cases.

Previous acute disease in 5 cases (typhoid fever 4, dysentery 1). Very often two or more of the above alleged factors were supposed to have acted conjointly.

Taking persons affected with all forms of nervous disease,

collectively, Minor\(^1\) found a syphilitic history about five times as frequent in Russians as in Russian Jews. In the latter, syphilis is very rare, owing to alleged reasons, which are duly set forth. And he found tabes about five times per cent. more frequent in Russians than in Russian Jews, and general paralysis about seven times more frequent. And yet to nervous diseases generally, the Russians are less obnoxious than are Russian Jews.

In eight tabetic women he found seven certainly syphilitic, and the remaining case probably so.

The combined statistics in Russia (his, Korsakoff's and Kojewnikoff's), if correct, show that, among those affected with various nervous diseases, there were:

- In 4,700 Russians, 137 cases of tabes, or 2.9 per cent. (29 per 1,000).
- In 696 Russian Jews, 6 cases of tabes, or 0.86 per cent. (8\(\frac{1}{2}\) per 1,000).

These combined statistics thus show the racial proportion, per cent., to be only about (not 5, but) 3\(\frac{1}{2}\) times greater in the former than in the latter race.

Of the Russian tabetics, syphilis was believed to have existed in 60 per cent., for certain; and probably in some more. Of the eight Russian Jewish male tabetic cases he had known of (partly in above statistics), seven are stated to have been syphilitic.

The time between primary infection with syphilis and the onset of tabes, was found by A. Eulenberg to vary from either one or two years to twenty-nine years. Isaac cites an interval of from one to twenty-five years.

The last named\(^2\) gives importance to the old objection that, whereas tabes is a system-disease of the cord, syphilitic disease, on the contrary, is characterised by interstitial or tumour-forming processes, so different from the primary parenchymatous morbid processes affecting the nerve elements in tabes, and holds that the statistics have too many sources of error to attain certainty on the aetiological connection between syphilis and tabes; that there is not an aetiological relation between them; but syphilis, like other influences leading to tabes, may act by enfeebling a disposed nervous system; and that anti-luetic treatment is contra-indicated in tabes.

Too often, we think, the statement of a pre-existent syphilis, or even a simple venereal sore, real or supposed, has been taken

\(^1\) Archives de Neurologie, t. xvii.
\(^2\) Berliner Klinische Wochenschrift, April 16, 1894.
as sufficient proof of the existence of syphilitic infection, and, impliedly, of the syphilitic origin of a subsequently existing tabes. The same objections hold here as do also regarding the similar statistics in relation to general paralysis (see Part I.).

Some of the errors into which observers and compilers of statistics have fallen, in this matter, are referred to by Hr. G. Lewin.¹ One is that genital scars have been taken as indication or proof of antecedent syphilis; whereas a soft venereal sore usually leaves a cicatrix, but a true hard one (sclerosis) only does so very rarely.

Moreover, and this is another source of error, a soft sore may become indurated, and such non-syphilitic hard (hardened?) chancres he designates, in their several kinds, as (1) follicular, (2) cicatrised, (3) artificial, and (4) phlegmonous. It is unnecessary to point out how misleading, therefore, may be a history of a hard sore.

Another error concerns the diagnostic difficulties as to the rashes, the ophthalmias, &c., of syphilis.

Following Virchow, he has found atrophy or aphasia of glands of the tongue, a valuable indication of syphilis in several cases where other specific lesion was scarcely to be found.

Blaschko emphasizes the importance of examining the patient's children when the personal examination fails to reveal any clear indication of tertiary syphilis, such as gummatous orchitis or smooth atrophy of tongue-root. In the children, "Hutchinson's teeth," and similar dental anomalies, are important for diagnosis of the parental malady.

E.

Is the morbid process in tabes proper due to syphilitic infection, including here, not only the spinal, but also the cerebral elements of tabes?

The posterior horns and columns, including Lissauer's tract and the root zones in postero-external columns, in which tabic changes first appear are quasi-accessories to the spinal cord, and represent, quantitatively and qualitatively, the entrance of posterior root fibres at the various levels of the cord. So that, in one sense, tabes appears to be a degeneration of posterior roots as they enter the grey and white of the cord.

As to the question whether this degeneration is primary or

¹ Berliner Klinische Wochenschrift, 1894, p. 657.
not, Sachs reminds one that degeneration of nerves occurs if they are cut off from the influence of their trophic nerve cells. For the sensory posterior nerve roots and fibres, these cells are in the spinal ganglia on posterior roots, and in the terminal nervous end organs, chiefly in skin and musculature. Sufficient disease in those ganglia or in these bodies, or lesion of the nerves in their course, may give rise to the degeneration; ascending degeneration of sensory fibres in the cord would therefore follow (inter alia) a lesion between the spinal ganglia and the posterior horns of the cord. This lesion may be set up by syphilitic spinal meningeal disease; explaining a relation between the morbid anatomy of syphilis and of tabes. Thus further questions arise: (a) whether the syphilitic poison acts through the medium of the blood vessels, (b) whether the syphilitic poison brings about changes in the blood, and, if so, (c) whether these hæmatomic changes are the cause of the changes in the walls of the blood vessels.

Ergot, a potent agent on the vascular system, also occasions a so-called form of tabes.

We must now briefly refer, more pointedly, to the intoxications of the organism—its toxic or toæmæc states—whether self-produced, or coming from without—whether chemical, or the results of perverted metabolism, or of microbial origin. These states are apt to manifest themselves by organic changes in the nervous system, and preferably by alterations either in the peripheral nerves, or in the posterior spinal columns, or in both. Thus, posterior columnar spinal changes are found in many infectious microbial diseases; in some maladies consisting of alterations in the constitution and life of the blood, however these may be produced; or consisting in perversions of metabolism, and of excretion; or are found in systemic intoxications which are to be directly connected with prejudicial drinks and foods.

Thus, like the peripheral nerves, the posterior columns appear to be particularly vulnerable in toæmæc, or exhausted cachectic states.

As to the relations between syphilis and tabes, and the question of toæmæcia, the former are brought out more clearly in cases of tabes in the upper classes of society, in gentlewomen, and in children with hereditary syphilis.

If we admit a connection between syphilis and tabes, of what kind is it? That, at present, we cannot accept tabes as simply
or absolutely a tertiary syphilitic disease is the view of Professor Strümpell; and that to form a more exact conception of the kind of connection will assist one to meet objections raised against the very existence of a connection. The most important of these objections are two, namely: (1) first, the often alleged total or comparative failure of anti-luetic treatment to control or to cure tabes; and (2) second, that the pathological anatomy of tabes is not akin to genuine syphilitic changes, but fundamentally represents a simple degeneration of some nerve fibre tracts. It is unsatisfactory to meet these objections by over-estimating the effect of anti-luetic treatment in tabes, and by deducing the morbid anatomy of tabes from vascular disease. A more satisfactory basis on which to take stand, is the recognition that tabes after syphilis would form no isolated phenomenon in pathology, but would fall into the large group of nervous consecutive diseases or lesions following infections of the most different kinds. For, after diphtheria, typhus, dysentery, and many similar infections, degeneration may affect definite portions of the nervous system—degenerations which are secondary simple degenerative processes, and not specific primary anatomical changes. In paralysis after diphtheria and typhus we do not find croupous inflammation, or typhous new formation, in the degenerated nerves. So, in chronic infectious disease, as, for example, in tuberculosis, there may be peripheral nerve degeneration.

Just as ataxy may be a nervous disease, or sequel consecutive to diphtheria, &c., so may tabes be a nervous disease, or sequel consecutive to syphilis. Possibly a persistent chronic slight intoxication by a chemical poison, occurring in the once-infected organism, may induce gradual atrophy in definite lines of nerve fibres.

And, continues Strümpell, the same holds good of general paralysis as of tabes; nearly related, they are in a certain measure, only different localisations of the same morbid process.

As to the above subject, some accept the general principle that syphilis is very important in the production of tabes; others support these views more or less, and either indirectly or directly. For example, concerning the alleged comparative non-effect of anti-luetic treatment, as ordinarily used, in tabes, it has been held by Fürstner that the failure to cure grey degeneration of the posterior columns by anti-luetic treatment, is paralleled by the

1 Versammlung deutscher Naturforscher und Aerzte zu Heidelberg, Sept., 1889.
fact that diffuse diseases of the central nervous system of specific character are usually not ameliorated by anti-luetic treatment.

On the other hand, objections have been made. Thus, Prof. Schultze, of Bonn, demurs to Strümpell's analogy between tabes and diphtheritic paralysis, for the latter, like ergotin-tabes, is distinguished from genuine tabes, inasmuch as they are regressive, but tabes progressive. In syphilis, there must be a persistent formation of its toxine, against which anti-luetic medication is powerless. Lead-paralysis would be a better analogue of syphilitic tabes than post-diphtheritic paralysis is; for in spite of cessation of the ingestion of lead, the disease often advances.

And as regards the assertion that tabes and general paralysis are so closely akin, or that they are even in a measure only different localisations of the same morbid process, it has been urged by Mendel that, although syphilis is one of the most important predisposing causes of tabes, yet tabes and general paralysis are not to be taken as being related in the way just mentioned; very few general paralytics having grey degeneration of the posterior columns; about 18 or 20 per cent. having loss of knee-jerks; only a very small number, proportionally, of true tabetics becoming general paralytics.

Tuczek affirmed that posterior column changes in general paralysis, do not always (he might have said, do not often) affect the posterior root zones. Lateral column changes mostly co-exist.

H. Schüle's experience is, that so-called classical general paralysis is not so often or so certainly in connection with syphilis as tabes is.

That the connection between syphilis and tabes is much more simple than that between syphilis and general paralysis is held by Fürstner. Posterior columnar disease, alone, is not frequent in general paralysis; more frequent is that of posterior and lateral, or of lateral columns only. In syphilitic general paralysis the complicating spinal cord disease does not always invade the posterior columns.

Recurring to the asserted existence of a close kinship of tabes to general paralysis, or that they are different localisations of the same morbid process, I think we must bear in mind that (as compared with tabes) syphilitic general paralysis is an earlier manifestation of syphilis; is of a more active type; has indeed, usually, irritative inflammatory, exudative and degenerative elements—new formation, destruction, and degeneration, often
ON SYMPHILIS OF THE NERVOUS SYSTEM. 371

simultaneously occupying the tableau—is less chronic and slow than tabes, often, indeed, is subacute; is a primary condition (as a rule) even partly in its degeneration. Whereas, in tabes, the grey degeneration is somewhat analogous to, or partly identical with, secondary Wallerian degeneration (degeneration of nerves consecutive to various lesions, injuries, &c.). But probably it is more precisely akin to peripheral neural degeneration or neuritis, from the toxines of infectious diseases, or from chemical poisons—in a general word, from toxæmic states, including infections, dietetic and chemical poisons, ptomaines, leucomaines; but herein it shows close kinship with general paralysis.

Therefore I think that tabes may be accepted as at least mainly of toxæmic origin, whether from:

Auto-intoxications, altered metabolism; or from
Chronic infections; as syphilis, tuberculosis, leprosy; or from
Acute infections, possibly; (such as diphtheria, typhus, enteric
fever, influenza, variola); or from
Ergot—lead—Hg.?—I.?—CO.?

Lithæmia, gouty and rheumatic blood-states generally, diabetes, anæmia perniciosa. (See also auto-intoxications, above.) In a preceding part of this article, I have mentioned the assertion of some that the lesion of true tabes is only deuteropathic, is only a secondary, a consecutive change in the neuropathic sense. Undoubtedly, in many examples it is a secondary consecutive lesion in the neuropathic sense, and, in such cases, often consecutive to syphilitic disease, sometimes to other aetiological factors. For instance, syphilitic meningitis or gummatous infiltration, or gumma, may give rise to an ascending secondary degeneration or sclerosis; and so of other conditions, such as implication of the spinal ganglia on the posterior nerve roots in some morbid process, however set up; or from peripheral sensory-nerve neuritis or degeneration invading the spinal ganglia, whence, possibly, the morbid process may restart to the cord by way of the posterior nerve roots.

But in many cases of tabes there are not—or not such marked—indications of preceding pachy- or lepto-meningitis, myelitis, gumma, or implication of spinal ganglia or peripheral nerves, or disease of nervous sensory apparatus in skin and muscles—as to explain the posterior nerve root and posterior column change, satisfactorily, as a secondary neuropathic lesion. And the only explanation that commends itself to me, of the tabic lesions occurring primarily, is that there is a selective action upon and of the nerve fibres primarily affected by and to-
poison (toxine, &c.) circulating in the blood chronically, much as occurs in nerves in other toxæmic conditions.

The degenerative tendency effective alone may be determined in its operation by local disease. As examples of this, one author cites that set up by a cold bath or by a severe fall, very soon followed by loss of power, undergoing improvement or recovery, but succeeded by the ataxy of tabes.

An ascending neuritic or degenerative change, arising from the seat of primary infection on the genitals, and passing to the spinal cord, whether set up by a toxine, generated locally at first, or coming as an irritative-degenerative process extending upwards by continuity of tissue, is an alternative possibility, to which there are obvious points of demur. In fact, also, the cord and nerve root alterations would not be primary in such case.

G.—The Connection between Tabetic-Arthropathy and Syphilis.

Two examples are described by Dr. N. Muchin.¹

The first, a ship captain, aged 41, had incurred primary syphilis eight years previously to his coming under the reporter's notice, and two years after that infection he felt the first evidences of spinal disease. Anti-luetic treatment partially relieved these, but in less than a year the arthropathy of the left foot made appearance. This was greatly ameliorated, indeed practically cured, by specific treatment. Syphilitic spinal paralysis of Erb's type had become fully developed. Clinically the arthropathy was manifestly of nervous origin; the effect of specific treatment, and the clear traces of syphilis, show its syphilitic nature.

The second patient, a merchant, aged 53, had incurred syphilis eighteen years before coming under the reporter's observation. Treated by inunction (Hg.?) he felt no further effects for nearly fourteen years, but then the symptoms of tabes dorsalis began. Two and a-half years later, the arthropathy of the left foot began. This recovered under specific treatment.

Muchin concludes that:

In subjects of tabes, syphilis of the joints may in no wise differ from Charcot's joint disease.

A causative connection between Charcot's arthropathy and disorders of innervation of the joints may be taken as proved.

Yet, not rarely, there are arthropathies which are not of purely

¹ Deutsche Zeitschr. für Nervenheilkunde, Bd. v., S. 255.