NEUROPATHOLOGY.


This paper contains a summary of Spielmeyer's researches, to which the authors have added by their own observations.

Spielmeyer, being struck with the resemblance, both clinical and pathological, between the affections of the central nervous system in trypanosomiasis on the one hand and tabes and general paralysis on the other, proceeded in 1906 to inoculate trypanosomes into the subarachnoid space in dogs. Working with a special strain of Tryp. brucei, he obtained evidence of degeneration in the fibres of the dorsal spinal roots, the optic nerve, and the sensory root of the 5th cranial, in 18 out of 42 dogs examined. Clinically the animals showed no signs of nervous disease save for a diminution of the tendon-jerks in the fore limbs. Marehi's method of staining showed a selective incidence of degeneration upon the fibres of the dorsal roots at their entrance into the cord, the earliest lesions being found at the point at which these fibres pass through the pia mater—the Redlich-Obersteiner zone. This constitutes a close resemblance between the experimental lesions and those of tabes dorsalis. The affection of the sensory root of the 5th, and of the optic nerve, strengthens this resemblance. No changes were found in the ganglia or peripheral nerves. The authors' own experiments were performed upon three puppies with Tryp. cruzi. The animals were trephined under a general anaesthetic, and a small quantity of the blood of a guinea-pig in which the presence of the trypanosome was verified was injected subdurally into each. One dog only, a new-born puppy, survived the operation, and examination of its blood twenty-five days later revealed the presence of trypanosomes. Clinically it appeared thin and weak. It was killed at the end of three months, when examination of the nervous tissues by Marehi's method showed degeneration of the dorsal root fibres between the ganglia and the cord. By this method the cord itself appeared normal, but in Weigert-stained preparations there were visible in the lumbar region scattered pale areas showing an absence of myelinated fibres, and in the cervical and thoracic regions similar patches confined to the anterolateral columns and the dorsal root zones.

Microphotographs are reproduced in illustration.

C. P. SYMONDS.


In this contribution, which is based on a study of the cord and meninges in sixteen cases of tabes, the author adheres to the old meningeal theory. He considers that both the cranial-nerve involvement and the dorsal-root degeneration are conditioned by subacute syphilitic inflammatory changes in the subarachnoid space, and that these changes may act in one of several ways: (1) Mechanical: (a) by fibrous constriction of the dorsal roots in their perforation of the spinal pia at Obersteiner's area; (b) by root
pressure from increased cerebrospinal fluid pressure in this same locality. 

(2) Inflammatory: by direct extension of meningal inflammation causing a meningo-radieulitis as in Nageotte’s area. (3) Toxie: by toxie products engendered by the meningal inflammation in the subarachnoid space affecting the dorsal roots.

In fourteen cases in his series there was evidence of inflammatory changes in the cord membranes, and he concludes that the primary change in tabes dorsalis is therefore a meningitis affecting the pia-arachnoid. As additional evidence in support of his contention, Schaller assumes that the cerebrospinal fluid reactions in this disease are due to the presence of a subacute syphilitic meningitis.

The meningal theory of tabes is open to several objections. Even if it be granted that the morbid changes in the membranes are of the nature of a true inflammation rather than a secondary thickening, there does not appear to be any constant relationship between the degree of pial inflammation and the extent of cord degeneration. It has been frequently noted by other observers that in the early stages of tabes the intramedullary degeneration is often well marked when the dorsal roots and membranes exhibit no appreciable change. Nor is it easy to see why the ventral roots, which are invested by the same membranes, should escape.

The author concludes by stating that specific therapy in tabes should have for its object the reappearance of normal fluid reactions. Intraspinal injections may be necessary to attain this object. Conversely, intraspinal treatment is contra-indicated when the fluid shows no inflammatory reactions. The paper contains a summary of the theories of the pathogenesis of tabes, and a valuable account of recent experimental work on cord degenerations.

R. M. S.


This method is based on the observation that a mixture of syphilitic serum and cholesterolized organic extract causes the formation of floeuli of globulin, more or less macroscopic, which are precipitated and collect in the bottom of the tube in which the test has been performed. The cholesterol extract has the following formula: 100 c.c. of an alcoholic extract of ox-heart (1 grm. of heart to 5 c.c. of alcohol), 200 c.c. of alcohol, 13'5 c.c. of a 1 per cent alcoholic solution of cholesterol. When the test is to be performed, one part of this extract is mixed with one part of a 0'85 per cent solution of sodium chloride, the tube is gently shaken, and four parts of the same physiological solution are then added rapidly. The opalescent liquid obtained thereby should be utilized at once for the reaction. It is very important to use only saline solution of 0'85 per cent, and it should be fresh, sterile, and clear. The control serums should also be fresh and clear; they must be inactivated by being kept at 55° to 50° C. for half an hour.

The very simple technique is as follows: To 1 c.c. of the patient’s serum diluted ten times with the 0'85 per cent saline solution, there is
added $\frac{1}{2}$ c.c. of the extract diluted in the way described above. After thoroughly mixing, the tube is placed in the incubator at $37^\circ$ C. for two hours, and then for twenty, twenty-four, or forty-eight hours at room temperature. The results can be controlled more quickly if, after three or four hours in the incubator, the tubes are centrifuged. At the same time a control reaction is performed with normal serum and saline solution, mixed with the extract by the same technique. If an agglutinroscope is not available, the tubes may be examined on the black stage of a Leitz dissection microscope, using a No. 8 objective. Galli-Valerio examined 241 serums from suspected cases of syphilis. In 77.59 per cent the Sachs-Georgi and Wassermann reactions gave similar results; in 20.74 per cent the results were discordant, owing to the fact that the Wassermann reaction apparently remains positive for longer periods than that of Sachs-Georgi.

The author concludes that this new reaction is of great diagnostic value, and may ultimately replace the more complicated method of Wassermann.

R. M. S.


In this paper Cornaz gives the results of over 500 examinations of the cerebrospinal fluid in syphilis at all stages, taking as the normal lymphocytosis 5 per c.mm., and '02 to '03 per cent as the normal albumin content. He points out how frequent and early is the extension of the syphilitic infection into the meninges, as demonstrated by an increase in lymphocytosis in the cerebrospinal fluid in cases of hard chancre alone without secondary manifestations. The lymphocytosis may occur when the percentage of albumin is normal and the fluid Wassermann is negative, and even when the blood Wassermann is still negative. The increase in cells is most constant in those cases in which the fluid Wassermann is positive, and may occur either independently of, or parallel with, the increase of the albumin. In neurosyphilis both cells and albumin are constantly increased, excepting in a certain percentage of cases of tabes. The fluid Wassermann is positive in a considerable percentage of cases showing only secondary manifestations, and in a lower percentage in tertiary.

In hereditary syphilis the cerebrospinal fluid is normal in cells, albumin, and Wassermann, with the Wassermann positive in the blood. In meningeal neurosyphilis the Wassermann is positive in every fluid, but is frequently negative in the blood. In tabes not quite a third have positive Wassermans in both blood and fluid. Treatment increases the positive Wassermann in the latter to 100 per cent, leaving that in the blood unaffected. In general paresis the Wassermann is positive in every case in both blood and cerebrospinal fluid.

Treatment (arsenobensol or neosalvarsan) definitely lessens the lymphocytosis, especially in the primary and secondary periods, and also in tabes, but does not affect the albumin; at the same time it increases the percentage of positive Wassermans in the cerebrospinal fluid, leaving the blood unaffected. Mercurial treatment seems to modify the increased lymphocytosis much more slowly.

M. A. Blandy.

An investigation of the larger cranial vessels in their extracerebral course, from nine cases of general paralysis.

The author refers to the predilection of the syphilitic virus to affect especially the frontal pole and anterior parts of the convexity of the brain. In a comparative study of fifty cases of paresis made in 1913, he found that the areas most severely involved were those supplied by branches of the internal carotid artery, and he subscribes to the view that the path of invasion by the spirochaetes is along the perivascular lymphatic channels, and the mesodermal tissues of the perivascular spaces. The material in the present investigation was taken from the intracranial but extracerebral portions of the carotid and basilar arteries, and in some cases from the carotids in the neck.

The lesions encountered fell into two groups: (1) Those in which the process was evidently stationary; and (2) Those which showed evidence of progressive chronic inflammation. Both types of lesion were present in eight cases. Orton concludes that the lesions found were quite comparable in their type with those of the cerebral vessels, though modified somewhat by the different anatomical conditions. He regards the disease process as of the nature of "a persistent vascular infection with a very even balance between the invasive power of the parasite and the resistance of the host, lasting over a number of years, which constitutes the incubation period of paresis, with ultimate invasive spread in multiple small foci to the brain parenchyma".

In his description of the arterial lesions the author leaves the reader in some doubt as to which particular group of vessels he is specifying. In view of the relative integrity of the occipital poles in this disease, an account of the histological appearances in the vertebral and basilar arteries, and a comparison of these with the morbid changes in the carotid system, would have added to the value of this contribution.

R. M. S.


This paper contains: (1) A review of the case for an infective origin of disseminated sclerosis based upon data before 1913; (2) A brief summary of recent work by others upon the subject; (3) An account of the author's own researches.

1. From the nature and distribution of the histological lesions found in the central nervous system, and from the clinical course of the disease, the writer argues that it is primarily an inflammatory process, and that the cause is an infective agent. He considers that the vascular lesions are primary, consisting in the first place of perivascular infiltration with lymphocytes and plasma-cells, especially in the adventitial sheaths of the veins, and that the abnormalities of nervous tissue and neuroglia are secondary.
to this. The accumulation of macrophages is secondary to degeneration of myelin. When the inflammatory process extends to the surface it invades the pia-arachnoid. The localization of the lesions in the white matter is explained by the distribution of the vessels, particularly the small veins.

Marinesco quotes the opinion expressed by P. Marie that disseminated sclerosis is the result of a disseminated arteritis occurring in the brain and cord in the course of various infections—typhus, scarlatina, pneumonia, etc.—a view which has been supported by many German authorities. He considers that the frequent occurrence of lesions around the Sylvian aqueduct favours the theory that the cerebrospinal fluid is the vehicle of the virus, and proceeds to assert his belief that the latter reaches the central nervous system by means of the lymphatics (citing in his support the early cell reaction in the adventitial sheaths of the veins), and causes malnutrition and degeneration of the myelin sheaths, leaving the axis cylinders more or less intact.

He has not been able to confirm Ribbert’s observation of vascular thrombosis in disseminated sclerosis, but has always found the intima intact.

The progress of the disease, with its remissions and exacerbations, is more in accord with the infective than the toxic theory of origin, being due to the periodic multiplication and spread of living micro-organisms. The endogenous theory of Strümpell and Müller is untenable. Siemerling and Raecke have maintained that the disease is preceded by signs of general infection, such as fever and rigors, and these have been put down to influenza, etc. But it is more probable that it is a specific disease sui generis.

There is no true resemblance between the nature of the lesions and those of syphilis, and no observers have succeeded in making out a case for a syphilitic origin on the basis of Wassermann’s reaction.

2. Briefly referring to the work of Bullock, who succeeded, by inoculation into rabbits of the cerebrospinal fluid of a case of disseminated sclerosis, in producing in them certain nervous symptoms, the author passes to that done by Kuhn and Steiner in 1917. From recent cases of disseminated sclerosis they injected cerebrospinal fluid, blood, or a mixture of the two, into guinea-pigs and rabbits, the routes of choice being intraperitoneal and intra-ocular. After three to fourteen days they obtained in most of the animals symptoms of motor paresis and inco-ordination, ending in some cases in paralysis and death. Positive results were obtained from all of four cases of the disease, but not in all the animals inoculated. Examination of the blood of infected animals with dark-ground illumination revealed spirochetes resembling those of Weil’s disease. These were also seen in appropriately stained sections within the vessels of the liver. The transmission of the virus to rabbits was also confirmed by Simon, subdural inoculation of the cerebrospinal fluid of patients with disseminated sclerosis being followed by paralysis and death.

Finally, in March, 1918, Siemerling announced the discovery, under dark-ground illumination, of spirochetes resembling those of Kuhn and Steiner in the brain of a patient dying of disseminated sclerosis.

3. In October, 1918, the author performed the following experiments.
ABSTRACTS

Two cases of disseminated sclerosis were selected from the Salpêtrière clinic, one of six, the other of five years' duration, the latter showing an exacerbation of symptoms at the time. The cerebrospinal fluid of these two cases was injected into six guinea-pigs by intracerebral, intraperitoneal, and intrathecal routes, and of these the two inoculated intracerebrally showed, three to four days later, symptoms of paresis, especially of the hind limbs. Cerebrospinal fluid obtained from these animals by puncture of the fourth ventricle revealed under dark-ground illumination a number of spirochetes of the type described by Kuhn and Steiner. Their presence was confirmed on examination by Pettit and Roux. Pettit, inoculating fresh guinea-pigs with the spirochete-containing fluid, obtained negative results, and later experimental inoculations of the cerebrospinal fluid of both patients into guinea-pigs and rabbits were all negative; this, in the opinion of the author, means only that the spirochete is not constantly present at all stages of the disease. Recent experimental work on disseminated sclerosis, therefore, suggests the existence of a transmissible virus which is a specific spirochete distinct from the Spirocheta pallida.

In view of the possible importance of his work it is unfortunate that the author does not give protocols of his experiments, the details of which are somewhat meagre. No bibliography is appended.

C. P. Symonds.


The older work on the paths of spread of tetanus toxin was reviewed by the use of various methods. It was found:

1. That although tetanus toxin ascends to the central nervous system by way of the axis-cylinders of the nerves, it also, to a very great extent, passes up the nerves to the cord by way of the perineural lymphatics. Blocking of the latter paths greatly delays, and in some cases completely prevents, the occurrence of tetanus in the part corresponding to the nerve whose lymph path has been blocked. This blocking was achieved by injections into the nerve, not only of tetanus antitoxin, but also of horse serum and egg-albumen. It could also be effected by injecting iodine into the nerve ten days before the injection of tetanus toxin.

2. Although tetanus toxin passes rapidly into the lymphatics of the injected limb, and can be demonstrated in the glands at the root of the limb and in the ehye within an hour after injection, it does not reach the nervous system directly from the blood-stream. Blocking of the lymphatics of a limb prevents that limb being involved in tetanic spasms, even after an intravenous injection of tetanus toxin large enough to cause generalized tetanus.

3. Section of all the ventral roots of a limb prevented the onset of tetanus, which would otherwise have resulted from the injection of a large dose of toxin into the nerve of the limb. Colloidal dyes injected into a sciatric nerve were seen to spread to the cord along the ventral nerve roots, but to be stopped at the dorsal root ganglion. It seemed, therefore, to
be demonstrated that the dorsal root ganglia have a blocking action on
tetanus toxin similar to that exerted on colloidal dyes, and the rarity of
tetanus dolorosus is thus explained.

4. Although the action of nervous tissue in neutralizing tetanus toxin
made it impossible directly to test whether the toxin passed from the capil-
laries into the brain substance, the following considerations suggested that
it did not do so: (a) It was impossible even by massive intravenous doses
of toxin to produce symptoms of cerebral tetanus similar to those follow-
ing intracerebral injections of minute amounts of toxin. (b) Anaphylaxis
experiments with horse serum showed that no sensitizing effect could be
produced in guinea-pigs by emulsions of brain tissue from other guinea-
pigs which had received large intravenous doses of horse serum. A sensi-
tizing effect was, however, produced by emulsions of liver, spleen, and
omentum from the same animals. It therefore seems to be proved that
substances with as large a molecule as horse serum cannot pass out from
the capillaries into the central nervous system; nor does tetanus toxin
pass through the choroid plexus to the cerebrospinal fluid.

5. The assumption that tetanus antitoxin can pass from the sub-
arachnoid space into the tissues of the cord was negativised by three exper-
iments in which large doses of tetanus antitoxin were injected into the sub-
arachnoid space thirty-six to forty-eight hours after the injection of tetanus
Toxin into the hind leg. In none of these was there any reduction in the
spasms of the affected limb. Nor was any such reduction obtained by
injecting antitoxin into the sciatic nerve high up. There was therefore no
evidence that antitoxin spread up the neural lymphatics to the cord.

J. G. GREENFIELD.

[15] The pathological examination of forty intracranial neoplasms.—
J. G. GREENFIELD. Brain, 1919, xlii, 29.

A series of 40 successive intracranial neoplasms, 3 of which were removed
during life, was examined pathologically. The list comprised 2 tuberou-
loma, 1 granuloma (? gumma), 10 endothelioma, 3 perivasculcar sarcome-
oma, 11 glioma, 3 neuroblastoma, 1 ganglioneuroma, and 6 cases of
acoustic-nerve tumours. One anomalous case of meningeal infiltration
with tumour-like cells was also included. In this series tumours of nervous
tissue, including glioma, neuroblastoma, and acoustic-nerve tumours,
formed 52.5 per cent, and tumours of mesoblastic origin 40 per cent. The
remainder is made up by the tuberoulooma and granuloma, the small
proportion of which is accounted for by their low rate of mortality.

In the case of ganglioneuroma included in the series the tumour
seemed to arise from the pituitary and gave rise to symptoms of acromegaly.
In two of the neuroblastoma there was no evidence of nerve cells or
fibres, but the arrangement of large pyriform cells around the vessels
seemed to justify the classification adopted. These cells seemed to be
related to glia cells rather than to nerve cells, and to represent an early
stage in the development of the neuroglia.

Among the acoustic-nerve tumours was a case of bilateral acoustic-
nerve tumour associated with multiple neurofibromata of the dorsal roots,
some of which had invaded the cord, and also with a large psammoma on the occipital cortex. This case appeared to be closely allied to one described by Verocay in 1910. There seemed to be no doubt that all these tumours of the acoustic nerve were of one type, and should be classed along with neurofibromata occurring in other situations, which they resemble histologically, and along with which they occur sometimes. A general agreement on this point would avoid the misleading use of names such as 'myxofibroma' and 'fibro-glioma' for tumours of the acoustic nerve, which, in the writer's opinion, are derived from the cells of the nucleated sheath of Schwann.

Author's Abstract.

VEGETATIVE NEUROLOGY AND ENDOCRINOLOGY.

[16] The pilomotor reflex (Le réflexe pilomoteur).—André Thomas. *La Médecine,* 1920, i, 283.

Pilomotor reflexes are easily elicited, but they vary widely in different individuals, and even in the same healthy person under different conditions. Researches on wounded men confirm the results of Langley's experiments. The centres for the head and neck are in the first three dorsal segments; for the upper limb in the 4th to 7th dorsal segments; for the lower limbs in the 9th dorsal to 2nd lumbar. Alterations in lesions of the cord and nerves are described. The reflexes are modified in all lesions of the sympathetic, and vary with the nature of the lesion. In spite of their extreme variability, the ease with which they can be examined makes them very useful in cases where investigation of the state of different parts of the sympathetic nervous system is called for.

W. J. Adie.


The name Quineke's disease, used in Germany, is incorrect and unjust, for the condition is not a disease but a syndrome, and the first exact description was given by Graves. Ten new cases are described by Bolten. The main symptom has fairly constant characteristics, but the accompanying phenomena are very varied. Urticaria, intermittent hydrops of the joints, acrocyanosis, erythromelalgia, acroparæsthesiae, idiosynerasies to drugs and food, even gout and migraine, must be considered as related to, or analogous with, angioneurotic œdema. The underlying cause in all the above-mentioned conditions is the same—sympathetic hypotonia. Treatment, according to the author, though protracted, is simple and rational; increase the tone of the sympathetic by thyroid or other glandular extracts, and the results will be very satisfactory.

W. J. Adie.


This condition is characterized by a progressive disappearance of the subcutaneous fat in the face and upper part of the body, followed at a later