Ol. menth. pip. . . .	$\mathfrak{m}\frac{1}{6}$
Tr. auranti	$\mathfrak{m}$x
Sodi benzoat. . . .	gr.x
Acid carbol.	$\mathfrak{m}$ij
Ol. gaultheriæ . . .	$\mathfrak{m}\frac{1}{6}$
Saccharin	gr.$\frac{1}{2}$
Thymol.	gr.$\frac{1}{4}$
Aqua ad	$\overline{3}$j

Careful attention to the diet of those patients who are more or less edentulous should not be omitted.

Only second in importance to the treatment of the paroxysms is the observation and management of the psychic manifestations of this disease and the episodic symptoms occurring in conjunction with the attack or its equivalent; attention to the general health and the study of individual cases and their reaction to drugs, in order to arrive at that point where, with a satisfactory diminution of the paroxysms, there is the least disturbance of the mental equilibrium, will, in the majority of these incurable cases, meet with the best results.

In publishing these notes the writer has the kind permission of Dr. Robert Jones, under whose supervision these observations have been made.

REFERENCES.

(1) *Revue de Psych.*, No. 1, 1900.
(2) *Ungar med. Presse*, February 16th, 1903.
(3) *Bulletin Médical*, 1891.
(4) *Revue de Médecine*, 1895, p. 750.
(5) *Traité de Thérapeutique des Maladies Mentales et Nerveuses.*
(6) *Ibid.*, p. 385.

A Demonstration of the Lesions, experimentally produced, in the Spinal Cord and Cranial Nerves by the Action of Toxins. BY Drs. ORR and ROWS.[1]

IN a previous paper we described the lesions in the posterior columns of the spinal cord in cases of general paralysis, and pointed out their similarity with those in early tabes dorsalis. We showed that the degeneration always commenced at the point where the posterior roots enter the cord. It is here that

https://doi.org/10.1192/bjp.53.221.367 Published online by Cambridge University Press

the sensory fibres become part of the central nervous system and lose their neurilemma sheath; and in all cases we found that precisely at this point degeneration began.

While studying these lesions we had indications that it would be advisable to inquire into what was known of the lymphatic system of the posterior roots and columns; and we found indisputable evidence that there was a continuous flow of lymph upwards along the nerves to the cord.

Let us briefly review the data on which these assertions are based. It is well known that tetanus and rabies spread to the cord by the nerve-paths; and in this connection we might mention the experiments of Marie and Morax, who, after cutting the nerve to the fore-limb of an animal, and, later, injecting a lethal dose of the toxin into its paw, found that no convulsions followed.

Homén and Laitinen, after injection of streptococci into the sciatic nerve, traced the organisms upwards into the meninges of the cord; while Pirrone, experimenting with the pneumococcus, found changes in the cord, but limited to the side corresponding to the nerve injected.

But, in addition to organisms, chemical and inert substances have been used with like results, *e.g.*, Guillain injected ferric chloride into the sciatic nerve, subsequently introducing potassium ferrocyanide into the general circulation, and they found Prussian blue in the posterior roots. Sicard and Bauer, using China ink, found after injection into the nerve that the granules ascended along the nerves towards the cord.

It was evident that, if these views were correct, we ought to find in the cord of cases in which some septic focus existed, lesions of the posterior columns occasioned by the presence of toxins ascending in the lymph-stream. On examining cases of brachial neuritis (infective), bed-sores, suppurating knee-joints, septic psoas abscess, we found in the cord of all the lesions expected.

We then submitted our theories to experimental test, and were successful in inducing posterior column lesions in rabbits exactly similar to those already found in man.

The method we employed consisted in the introduction of celloidin capsules containing organisms under the gluteal muscles of rabbits, in close apposition to the sciatic nerve. As we anticipated, the toxins, escaping through the celloidin, passed

https://doi.org/10.1192/bjp.53.221.367 Published online by Cambridge University Press

upwards, and in the posterior columns of the cord produced lesions of varying intensity.

Turning our attention next to the pons and medulla, we found that lesions of the cranial nerves commenced exactly at a corresponding point to those of the spinal cord in both sensory and motor nerves; and by the experimental method we were able to reproduce these cranial nerve lesions in rabbits. In this instance the celloidin capsules were placed under the skin of the cheek.

Conclusions.—(1) Toxins readily travel up spinal and cranial nerves to the central nervous system. (2) While these nerves in their extra-medullary portion possess a neurilemma sheath, and are protected by its vital action, in their intra-medullary part, having lost their neurilemma, they at once undergo degeneration. (3) The first change is a primary degeneration of the myelin; axis cylinders and nerve-cells are evidently affected later. By the osmic acid reaction the myelin degeneration is shown in the form of large and small fusiform masses, isolated globules, and elongated thin threads on which are seen moniliform swellings.

It seems to us that the results of our investigation suggest the possible lymphogenous origin of some nervous affections. We know that tabetiform and cranial nerve lesions in General Paralysis, and in Tabes itself, are not the result of nerve-cell degeneration, but are initially a primary affection of the myelin sheath commencing where the neurilemma is lost. In our clinical cases and experimentally we have shown similar lesions starting at the same point, the result of absorption from a definite toxic focus situated outside the central nervous system, the toxins gaining access by the lymph-stream. May it not be possible that the former lesions are also the result of toxins passing to the cord and pons by the lymph-stream from some external, but as yet unknown, focus?

(1) This demonstration was given at the Quarterly Meeting of the Medico-Psychological Association held at the County Asylum, Radcliffe, on February 22nd, 1907. The experimental portion of this investigation has been carried out under a grant from the British Medical Association and will be published shortly *in extenso*.

https://doi.org/10.1192/bjp.53.221.367 Published online by Cambridge University Press