NEUROLOGY

Abstracts.

Neurology.

NEURO-ANATOMY AND NEUROPHYSIOLOGY.


The author here attempts a new classification of cranial nerve roots, distinguishing 24 according to the nature of their function. This arrangement retains the unity of the roots corresponding to the cranial segments. They are described from the point of origin to the point of distribution without reference to the fact that they may for part of their course be joined up with another root. The exact details of this arrangement must be studied in the original article, as it is impossible to abstract the whole of this careful and elaborate work in any reasonable space. It may be useful, however, to give a list of the roots.

A. Roots concerned with the relation of the individual to the environment.
   a. Motor.
      2. Trochlear oculomotor.
      3. Abducens oculomotor.
      4. Motor to the muscles of mastication.
      5. Facial.
      6. Glossopharyngeal motor to body muscles.
      7. Pneumogastric motor to body muscles.
      8. Accessory.
     10. Spinal.
   b. Of general sensibility.
      11. Trigeminal.
   c. Of special sense.
17. Taste.
18. Equilibrium.

B. Roots concerned with the vegetative life.
   a. Motor.
      20. Pneumogastric visceral motility.
   b. Sensory.
   c. Secretory.
      22. Lachrymal.
      23. Superior salivary.
      24. Inferior salivary.

R. G. G.

[67] Corticofugal and association fibres arising from the cortex of the vermis of the cerebellum.—L. Bender. Arch. of Neurol. and Psychiat., 1932, xxviii, 1.

This is a report of a study of the secondary degeneration of the nerve-fibres resulting from lesions in the cortex of the cerebellar vermis.

It was possible to trace short cerebellofugal fibres from the cortex to the central nuclei, long cerebellofugal fibres in four tracts to the various parts of the brainstem, and intracerebellar association fibres to other parts of the paleocerebellum.

Short corticofugal fibres from the superior part of the vermis pass mainly to the roof nuclei. From the inferior part they pass mainly to the globoid nuclei, and there is also a definite well-formed tract to the phylogenetically oldest part of the dentate nucleus.

Long corticofugal fibres from the vermis may be classified as follows:

Fibres that enter the brachium conjunctivum to end in the opposite red nucleus or in the mesencephalic root of the fifth nerve.

Perforating fibres that pass directly from the cortex to the vestibular nuclei, reticular formation, grey matter accompanying the posterior longitudinal bundle and descending tract of Deiters’ nucleus.

Fibres that arise from the most anterior part of the vermis (especially from the lingula) and take a position between the central nuclei and ventricle where some of them decussate. Both crossed and uncrossed fibres enter the hooked tract of Russel and end in all of the vestibular nuclei and related grey matter, as do those of the second group. They follow especially the spinal vestibular nucleus and end in it at all levels. Some of these also follow the course of external arcuate fibres. To this group the name ‘bundle of the ventral decussation’ is given.
Fibres of similar origin that take a position dorsal to the central nuclei where they form a partial decussation. From here they pass to the lateral surface of the restiform body, where they ascend and descend and course as external arcuate fibres to reach the nuclei of the raphe at all levels and possibly also the olives. This is the 'bundle of the dorsal decussation.'

Intracerebellar association fibres connect all parts of the paleocerebellum (vermis and flocculi), but these are least numerous in the oldest parts and most abundant in the phylogenetically younger, intermediate (i.e., the lobulus medius medianus of Ingvar).

R. M. S.


Experiments on the subject were done on dogs and cats in which different circumscribed cortical areas were poisoned by means of applying strychnine, and then the effect of labyrinthine impulses were studied on these animals. The experiments prove that labyrinth stimulation produces epileptiform attacks (starting in the muscles of the eyelid and the ear) if the posterior parts of the gyrus ecto- and suprasylvius are made sufficiently hypersensitive by strychnine poisoning. In such cases loud noises could produce similar attacks, as described by Clementi. Painful stimulation or violent concussion by repeated striking on the operation board with a hammer did not produce such attacks. After concussion only slight general reflex contractions were observed; it may therefore be concluded that epileptiform convulsions after rotation are caused by simultaneous concussion of the animal instead of the irritation of the labyrinth.

Sometimes poisoning of the dorsal part of the gyrus ectosylvius (Nos. 11, 12, 19) was sufficient to produce such spasms after stimulation of the labyrinth; in most cases, however, the effect was evident only after strychninization of the neighbouring gyri (first, third posterior arcuate gyrus). The experiment was mostly positive when the gyrus sylvius and gyrus suprasylvius posterior were poisoned in their dorsal part.

A further study concerned the question whether removal of the cerebellum would prevent the production of epileptiform attacks by rotation after application of strychnine to the cortex. In spite of almost total extirpation of the cerebellum it was possible to produce convulsions by stimulation of the labyrinth which issued from the ear muscles on the side opposite to the poisoned cortex.

Although labyrinthine impulses may be conducted to the cortex partly over the cerebellum, yet it is by no means necessary that the cerebellar condition should be intact in order to allow the labyrinthine impulses to enter the cerebrum. This is also in conformity with a clinical observation
made by Fischner and Pötzl, who produced labyrinthine vertigo in a patient also after resection of one cerebellar hemisphere.

Further investigations will have to answer the question how far these tracts are commonly used by the labyrinthine impulse on its way to the cortex. The more exact limits of the cortical areas receiving labyrinthine impulses, especially in higher mammals, will likewise require study. The labyrinth is represented in the cortex and its cortical localization is to be sought in a part of the temporal lobe. If this region is hyperexcitable, it is possible to produce epileptiform attacks by irritation of the labyrinth.

R. G. G.


The authors have attempted to demonstrate physiologically that the nerve-supply to the vessels of the pia mater (which has been proved beyond question) possesses sensory as well as motor functions.

Bulbocapnine administration provided an adequate method by which cats under local anaesthesia could be immobilized without interfering with the galvanic skin responses.

Galvanic skin responses were obtained by faradic stimulation on the pial blood-vessels and on the relatively nonvascular pia over the cerebral cortex.

Stimulation on the pial vessels produced galvanic skin responses more than twice as often as did stimulation on the relatively nonvascular pia. Further, stimulation on the vessels produced galvanic skin responses which were much larger than those that resulted from stimulation on the relatively nonvascular pia.

It was concluded that the impulses produced by the stimulation were afferent rather than efferent; that these afferent impulses had arisen in blood vessels and pia rather than in the underlying cortex; that the responses had more than twice the frequency and magnitude when the afferent impulses arose from blood-vessels than when they arose from the relatively nonvascular pia, and therefore, that the pial blood-vessels possess an afferent as well as an efferent nerve-supply.

Afferent impulses from the pial blood-vessels may be of importance physiologically in the mechanisms involved in the maintenance of a constant internal environment through the regulation of the cerebral circulation, as well as pathologically in the production of certain headaches and convulsions.

R. M. S.
MEASUREMENTS have been made of the temperature changes in the forearm, hand or fingers on release of stasis, both with the limb in air and immersed in water at varying temperature, and the values obtained have been compared with the sensations induced so as to test Ebbecke’s hypothesis of the origin of temperature sensations, which assumes that the appreciation of both warmth and cold depends on thermal gradients of varying intensity set up at different depths as warm blood enters cooled skin or vice versa.

Sensations of intense warmth or heat were found to be induced on release of stasis in a limb maintained before, during and after stasis in a bath at the blood temperature level, so that on release no changes in temperature occurred, and no thermal gradient was established. These sensations were found to vary roughly according to the probable acidity of blood flowing into the dermal area, to be more intense with long periods of stasis than with shorter, and greater with stasis of the whole forearm than with that of a finger only. They are considered to be elicited by a chemical stimulus (acting probably through the establishment of a chemical gradient) derived from metabolic processes, particularly in muscle tissue, and by a substance that varies in concentration both during asphyxia and as the result of temperature changes in a manner similar to that of acid. The possibility of acid itself being the stimulus is discussed but is considered somewhat improbable.

The sensations at other temperatures are considered as caused by chemical changes of the same type antagonized to a greater or less extent by opposite chemical changes induced by thermal differences.

Some data are presented of the thermal changes and gradients in the dermis associated with temperature sensations induced by varying the bath temperature. They are considered to be most readily explained by some modification of Ebbecke’s hypothesis.

Tingling sensations occurring during stasis and on its release are shown to originate peripherally in the area exposed to stasis and to be modified by the temperature of this part; they are not dependent on pressure on the nerve-trunks.

R. M. S.


The vagus, cervical sympathetic and various somatic nerves were severed aseptically in fifteen young adult cats and one monkey. The animals were
killed at intervals from twelve to one hundred and seventeen hours and the
distal segments examined by physiological and histological methods. For
the functional study, the cathode-ray oscillograph was employed to record
the conducted action potentials of the severed nerves and their controls.
For microscopic examination, chief reliance was placed on the appearance of
fragmentation in the medullary sheaths, as evidenced in osmic acid-stained
preparations. Ranson's pyridine-silver modification of the Cajal method was
used to check the relative rates of degeneration in myelinated and
nonmyelinated fibres.

Results of the physiological study showed that increase in the absolutely
refractory period may be detected as early as twelve hours after section.
Significant reduction in potential area was usually not apparent before thirty-
six hours. The fibre groups of somatic and visceral nerves characterized by
different physiological properties lose their action potentials in sequence.
The potential from visceral afferents disappears first at from fifty to seventy
hours; the potential from somatic motor and sensory fibres, five to ten hours
later; then the potential from myelinated autonomics, and finally, the
potential from unmyelinated fibres. A potential from unmyelinated fibres
has not been elicited later than ninety hours postoperatively.

In differential counts of three groups of myelinated fibres (large fibres,
selected range, diameter from 6.7 to 18.1 microns, sheath thickness, from
1.4 to 2.4 microns; medium-sized, selected range, diameter from 4.8 to 6.5
microns, sheath thickness, from 0.43 to 0.85 micron; fine, selected range,
diameter from 1.4 to 3.0 microns, sheath thickness, from 0.4 to 0.65 micron),
fragmentation was set as an arbitrary criterion of degeneration. Those fibres
not exhibiting fragmentation in the portion available for study in a 5-micron
longitudinal section, stained with osmic acid, were counted in one group;
those exhibiting fragmentation in at least one place, in another. The
comparative values indicate that fragmentation occurs earlier on the average
in the medium-sized, relatively thin-sheathed group, next in the large,
myelinated fibres, and finally in the smallest, myelinated ones. Numerous
nonfragmented unmyelinated axons persist at a stage when in osmic acid
stained preparations the sheaths of almost all myelinated fibres appear to
be fragmented.

R. M. S.

NEUROPATHOLOGY.

[72] The histopathology and pathogenesis of poliomyelitis (Zur Histopatho-
logie und Pathogenese der Poliomyelitis).—W. Spielmeyer. Zeits.
f. d. g. Neurol. u. Psychiat., 1932, cxlii, 159.

In contrast with what obtains in other cases of meningoencephalitis, the
lesions of poliomyelitis in the brain first cause infiltration of the