Abstracts.

Neurology.

NEURO-ANATOMY AND NEUROPHYSIOLOGY.


An instructive study of the origin and evolution of the cerebellum, approached from the standpoint of comparative anatomy, embryology, and physiology. Herrick concludes that the cerebellum does not appear to participate in the analysis of sensory impressions for determining what the appropriate response shall be; but after the character of the response has been established, unconsciously in lower centres or consciously in the cerebral cortex, the cerebellum participates in the execution of the movements. Its own activities are wholly unconscious.

The cerebellum functions not merely as a chain reflex in response to proprioceptive reports of bodily movements after they have happened, but the primary sensorimotor centres and the correlation centres (and especially the cerebral cortex) discharge collateral impulses into it, so that this adjuster can act in anticipation of the actual response and throw its own machinery into gear with all the lower motor apparatus necessary to execute it properly.

R. M. S.


The problem of cerebellar function is far indeed from being settled. In a clearly expressed review the authors begin by indicating that it is impossible to assign to the cerebellum the origin of certain spastic phenomena observed in lesions of the pyramidal system. To it cannot be attributed any preponderant rôle in the regulation of tonic-postural reflexes, though, without question, it plays some part in tonisation. The view that all cerebellar symptoms are the expression of one single insufficiency, viz., tonic-postural insufficiency, is open to objections. We know that postural tone is also regulated by mechanisms that are essentially extracerebellar. In comparison with our knowledge of the corticospinal system, "we must admit that on the subject of cerebellar function we can only offer hypotheses and phrases."

The authors' conclusion on localization of cerebellar function is that only some cerebellar functions are localizable, others are not. Simonelli is
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convinced from a series of careful experiments that lesions strictly confined to the cortex of the organ are capable of giving rise to symptoms. The cortex, however, is inexcitable electrically, mechanically, and chemically, with the exception of the well-known inhibitory zone of Sherrington. There must, accordingly, be a marked difference of function between this region and the rest. It is possible that the cerebellum modifies the activity of other centres in relation with it. Rossi has demonstrated the facilitating action of stimulation of the cerebellum on the motor cortex of the opposite side, though no response is obtainable from the cerebellum itself. Various clinical and experimental facts are cited to show this interrelation of cerebrum and cerebellum; hence on occasion similar symptoms may be produced by lesions of either. Beck and Bickeles have shown that impulses pass from the motor cerebral cortex to produce a state of activity in that of the cerebellum. This facilitating interaction has nothing to do with tonico-postural influence; the symptoms by which it is revealed are certainly not attributable to atonia. Rather does the sthenic action of the cerebellum come in here. These phenomena have not been taken sufficiently in account by those who assign all cerebellar symptoms to loss of tone.

The authors think the cerebellar 'astasia' of Luciani depends on atonia and asthenia.

They are drawn by certain considerations to the conclusion that the cerebellum has a more complex function still than that purely sthenic and tonico-postural. It must have kinetic functions of some kind, for movement is necessary in changing from one posture to another. The distinction between reflexes of posture and reflexes of movement, as Sherrington declares, is by no means always clear-cut. The paper ends with a question: Does the cerebellum fix the attitudes effected by extracerebellar motor mechanisms, or does it intervene by bringing the fixating muscle to the precise point at which fixation occurs? In other words, has it solely a function of fixation, or one also of 'mise à point'?

S. A. K. W.


Method.—The part of the cortex to be experimented on is exposed in the usual way and the cerebrospinal fluid drained off with cotton wool soaked in hot saline and squeezed out before application. A small piece of filter paper, say 5 by 2 mm., is soaked in a 3 per cent. strychnine solution coloured with toluidine blue, and the extra moisture of this filter paper is taken off with another piece. It is then applied to the cortex and the spot dabbed with another clean dry piece of the same material, after which the poisoned area is at once visible as a small blue patch measuring only a few square millimetres in extent. The scalp wound is then closed with a few stitches.

Results.—There exists on the convexity of the cerebral cortex of the monkey a large zone, strychnization of a very small area of which gives rise to intense and typical sensory disturbances, symptoms of sensory excitation.
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These symptoms are strong hyperæsthesia and hyperalgesia of the skin and deep structures (muscles, tendons and bones), and more or less marked spontaneous, paresthetic disturbances. The disorders of cutaneous sensitivity are always present on both sides of the body, but are strongest on the contralateral side; those of deep sensitivity are sometimes contralateral only, sometimes bilateral, but then strongest also on the contralateral side. When present in the limbs, they are most pronounced distally.

This sensory zone lies on both sides of the sulcus centralis of Rolando, comprising the gyrus postcentralis, parietalis inferior, and precentralis. The frontal boundary is the sulcus areatus, the occipital boundary is the fissure of Sylvius and the upper end of the first temporal sulcus. The sensory zone is divided into a leg, arm, and face area. Between the leg and arm areas probably lies a narrow area, where the sensitivity of the trunk is represented.

The importance of these experiments will be at once obvious to the neurologist, confirming as they do the contentions of not a few workers whose opinions have been rather submerged by the arguments of those who have confined their experimental investigations to the use of the stimulating electrode.

S. A. K. W.

NEUROPATHOLOGY.


The inexactitude of our knowledge as to the precise localization of the lesion in tetanus is mentioned and the importance of changes in the reticular network within nerve-cells in toxic states is discussed. The experiments were carried out on adult guinea pigs and it was found that the chief incidence of neurofibrillar reticular changes occurred in the Purkinje cells and in those of the cerebellar nuclei. The significance of these findings in relation to symptoms is not discussed.

R. G. Gordon.


After a brief review of the literature, Nicholson records the results of a carefully-controlled study of nerve-cell changes following ligation of axons. Common white rats were used, and the axon reactions were studied under the experimental procedures of ligation and of tearing the axons. The hypoglossal nerve and its nuclear cells were chosen for observation because of their easy accessibility and bilateral unities.

The changes in the structural elements of the motor nerve cells were found to differ under the two dissimilar modes of injury. Reaction of nerve