Abstracts.

Neurology.

NEURO-ANATOMY AND NEUROPHYSIOLOGY.


The cells lining the arachnoid, known as endothelial cells, are of low, flat type with large, pale, oval nuclei. They cover the arachnoid on both sides and are continuous over the trabeculae which connect the pia with the arachnoid, filling up the subarachnoid space. They also form the outer covering of the pia. The subarachnoid space is thus practically a dense sponge of connective tissue trabecule, lined throughout by the endothelial (or mesothelial) cells. To ascertain to what extent, if at all, these cells react in various pathological conditions, the cells of the spinal arachnoid were studied in 35 cases.

The changes were: (a) simple swelling of the cells; (b) an active proliferation; (c) the formation of macrophages; (d) a focal hyperplasia with formation of cell clusters; (e) a diffuse infiltration with a tendency to syncytial formation, and (f) frequent regressive changes, such as calcification.

These changes may depend on the physicochemical properties of the cerebrospinal fluid.

R. M. S.

[80] Structure and function of the cells of the tuber cinereum (Struttura e funzione delle cellule del tuber cinereum).—U. Poppi. Riv. di pat. nerv. e ment., 1930, xxxvi, 397.

A study of the morphological aspect of the cells of the principal nuclei of the tuber cinereum in man.

The author shows that to the concentration already noticed of tigroid substance at the periphery of these cells, is added a concentration of the neutral net studied by the methods of Donaggio, Bielschowsky and Cajal. The cause of this concentration is the presence of a great quantity of granules of fat among which lipoids abound.
In addition in the cytoplasm are numerous star-shaped granules like those in suprarenal and hypophysis, which constitute the most advanced stage of lipoid secretion. These granules are found in great quantities specially in the large cells of the periventricular nucleus. The author concludes that these cells may have similar functions to those of the hypophysis and that they may secrete a substance into the blood the supply of which is specially rich in the infundibulo-tuberine area. He considers these granules to be products of integration and not of disintegration. This is confirmed by the character of their nuclei.

R. G. G.


There are four definite periods (between 12 weeks' gestation and a year after birth) at which the myelination process appears to receive an impetus. These are: (1) about 14 weeks' gestation; (2) 22-24 weeks' gestation; (3) just before full time; (4) about eight months after birth. Of these, the second is the one at which it is most active.

The quickening movements of the foetus are felt about the fifth month; the weight ratio of the brain remains practically constant from the 24th week; the brain grows most rapidly during the second half of pregnancy; and the majority of the fissures and lobes of the brain are differentiated between the 24th and 28th weeks. There may also be a connexion between the marked increase of myelination at this time and the appearance of lipoid in the suprarenal cortex of the foetus; it first appears in traces after 22 weeks' development, and then increases rapidly during the later months of foetal life.

Myelination first occurs in sensory paths, together with the motor cranial and spinal nerve roots, and the posterior longitudinal bundle. Of association paths, the latter and the anterior ground bundle of the cord are the earliest to myelinate. It is noteworthy that the sensory fibres of the trigeminal and the cochlear fibres of the auditory are later in myelinating than any other nerve roots.

The significance to be attached to the acquisition of the myelin sheath is a debated point, but it is here tentatively suggested that there may be some relationship between the rate of growth and the myelination of afferent fibres.

The late myelination of two of the descending paths (olivo-spinal and aberrant pyramidal fibres in the fillet) corresponds to the time at which the baby begins to maintain its equilibrium and to perform co-ordinated movements such as crawling and standing.

J. V.
ABSTRACTS


In 1891, Robinson found that a new-born human infant is able to support his own weight when holding on to a horizontal rod. He believed that this ability is due to the presence of a primitive grasping response seen in monkeys and apes, by means of which new-born monkeys hold on to the hair on the under surface of the mother's body.

Richter, experimenting with new-born monkeys, found the grasping reflex much stronger in this animal than in the new-born human infant. The longest record obtained by Robinson in human infants hanging from both hands was two minutes and thirty-five seconds, whereas one of the monkeys hung for over thirty-three minutes by one hand alone.

There is no doubt that, as the monkey can hold on with only one hand for thirty minutes, it can hold on for hours with both hands and feet.

The reflex is not strongest at birth, but reaches its maximum from 15 to 38 days later. The reflex disappeared in four animals at the ages of 41, 65, and 71 days, and was still present at 83 days in the fifth animal. It was equally strong in the two hands, but there were marked and unaccountable variations in strength from day to day.

R. M. S.


Associated movements are those resulting from the combined action of different groups of muscles producing simultaneous and related motion of two or more well separated parts of the body, such as the two arms; they can be performed on proper synchrony without direct, attentive, conscious guidance. It is common clinical experience that some movements that fall into this class are, if not lost, at least poorly executed in paralysis agitans, and there is considerable evidence that these impairments do not depend wholly on the rigidity. It can hardly be denied that there must be some sort of anatomical patterning behind the co-ordinating of complex movements which can be executed without full attention, and it is suggested by Lyons and Brickner that such patterning exists in a specific way, and that the disturbance of certain performances in Parkinsonism rests on a more profound basis than rigidity alone. The evidence for this consists entirely in the observed preservation of grace and ease (in spite of weakness and rigidity) in the execution of certain specific action in patients with well-marked Parkinsonism. A baseball player of exceptional skill showed a fairly extreme feature of Parkinsonism and made all his routine motions with the usual
retardation. Yet when a ball was thrown to him, he made a perfect catch, the whole act being characterized by a beauty and grace not attainable by the ordinary normal man. Individually learned movements of this sort are to be separated from the seriously impaired associated movements which are phylogenetically older. The patterning of the latter is probably a striatal function, while that of the individually acquired ones is a process of some other part of the brain, presumably some part of the cortex.

R. M. S.


A long critical review of the physiopathology of pain which discloses the following conclusions. Pain in the strict sense is the result of stimuli which damage or threaten the integrity of the tissues. To a certain extent pain may be regarded as having a useful function of defence, but often it is an excessive, useless and harmful reaction provoked by destructive stimuli to which the organism cannot reply. There is no argument which demonstrates the existence of fibres and peripheral endings specific for pain. There are no special stimuli for pain; all sensory stimuli may produce pain if sufficiently energetic and diffuse. Nor are there any painful stimuli which if moderated in intensity cannot give rise to non-painful sensations.

Stimuli brought to the central nervous system by one peripheral path passing to the centripetal neurones of the second arc can canalize various paths, reaching in this way different levels. Sensations vary in intensity according to the number of neurones which are stimulated simultaneously. When the sensation changes in quality with an increase of intensity, it is a sign that the stimuli brought by the peripheral nerves have spread to another path in the central nervous system and reached a higher level. Pain-producing stimuli acquire the value of specific pain-stimuli when they have succeeded by their intensity in overcoming the level of the central paths, for pain which arises from the posterior horn cell and homologous bulbar nuclei passes to the opposite anterolateral column and reaches the optic thalamus by way of the reticular substance. Stimuli which do not reach this level can prepare the way for future stimuli by irradiation and latent addition. Effective stimuli which cause reference of pain to a certain area induce a area of latent response which will vary in accordance with the intensity of the stimulus. The different forms of sensory stimuli vary in their power of producing pain. First are pressure and heat. Touch in the strict sense and muscular sensibility cannot cause pain under ordinary circumstances, but work together to maintain tone in the pain-paths.
Doubtless thermal stimuli can become painful. This transformation is not due to stimulation of other non-thermal endings, but to the phenomena of addition of levels reached in the pain-paths. All methods of anaesthesia abolish pain before producing complete anaesthesia, because they restrict the neurones capable of responding to sensory stimuli. The methods of combating neuralgia by compression, injection or recision of the nerve, similarly act by reducing the number of neurones which can be affected and reducing the level in the pain-paths. In treating a neuralgia, it is not necessary to do more than reduce the number of sensory nerve-paths from an area and any sort of sensation which can be interrupted will reduce the pain.

Stimuli which do not usually produce pain may do so if their action becomes more efficient or by a lowering of the threshold of stimulus or by an increase of simultaneous stimuli. Hyperesthesia is due to the condition of lowered threshold and stimulation of more neurones. Hyperesthesia of central origin is due to an increase of tone in the central paths by increase of adjuvant stimulation or by removal of inhibition, or from stimuli coming from psychic centres.

The visceral organs have an affective type of sensation with little postural content which has much to do with emotivity. Visceral sensation comes more from the muscular than the glandular part of the organs. Contractions of plain muscle give rise to an affective tone which may be pleasurable or unpleasurable. Striated muscle gives rise to sensations with an objective character; but an indifferent tone. Visceral sensibility may start painful stimuli, spasmodic contraction or strong passive relaxation of muscles. Chemical stimuli, compression, torsion and stretching all give rise to pain, while electrical stimulation of sympathetic nerves and ganglia may produce violent pain. Visceral sensibility giving rise to pain is unequally distributed. The glandular substance is least sensitive, muscles are more so and serous surfaces notably so. The most sensitive parts are the suspensory ligaments and round the most conspicuous blood-vessels of the viscera. The most sensitive parts are those in which the sensory fibres run in bundles and can therefore be stimulated in greatest numbers, and the least sensitive parts are where these are most dispersed.

Surgical wounds are not sensitive because other sensations do not induce increased tonus of the parts and there is no adventitious stimulation owing to the rapidity and limited area of the cut. Adequate stimuli to visceral sensation do not produce pain. Visceral pain is always caused by stimuli inadequate by nature, by intensity and by seat of action. Cutaneous reference of visceral pain is not a constant feature. Localization of referred pain is due to irradiation and is irregular from such organs as the heart, lungs, etc., which do not normally give rise to much sensation, but no more regular from the stomach or intestine, which do.
Irradiated stimuli before joining to cause pain determine by latent addition a more or less accentuated hyperalgesia. Referred pain due to irradiation is a more or less accidental phenomenon and cannot be regarded as exact in its significance. When cutaneous pain irradiates, pain may be referred to the viscera, especially if these are in a condition of latent hyperalgesia. When an analgesic is injected into a cutaneous area of referred pain it may or may not suppress the visceral pain. If it does, it acts by cutting down the amount of stimuli below the threshold level which produces pain. Pain in phantom limbs shows that the pain is really due not to peripheral stimulation but to central radiation.

R. G. G.

[85] Clonic contractions induced by stimulation of the spinal medulla at different levels (Contrazioni cloniche messe in evidenza colla stimolazione del midollo spinale a differente altezza).—A. RIZZOLI. Riv. di pat. nerv. e ment., 1931, xxxvii, 626.

The clonic component is always functionally present at the level of the cortex, the corona, and the spinal medulla.

The contention that clonic contractions can only be induced by stimulus of the spinal medulla after ten or more days have elapsed after lesions of the cerebral cortex is not confirmed, since these were obtained within two hours after removal of the gyrus cruciatus on both sides and immediately after interruption of the corticospinal tracts.

The author thinks that the clonic component in movement is primary and the tonic component is secondary, the latter following the former.

R. G. G.

NEUROPATHOLOGY.

[86] Experimental poliomyelitis: Histology of the persistent lesions of the central nervous system.—B. WARBURG. Arch. of Neurol. and Psychiat., 1931, xxv, 1191.

Histological studies were made of the central nervous systems of fifteen macacus rhesus monkeys surviving from 19 to 309 days after the onset of acute poliomyelitis. In all cases pathological changes were seen.

The type of pathological lesions found in the acute and reparative phases of poliomyelitis corresponded roughly to the duration of the disease.

Inflammatory areas persisted in the central nervous systems of four animals which had made a good functional recovery.

A detailed study was made of the distribution and character of the lesions in the various levels of the nervous system, viz.: spinal cord, spinal