to the view of Weizsäcker and Dusser de Barenne, who arrived at the conclusion that the primary waves are somehow produced by an inherent or autochthonous rhythmic activity of the motor horn cells.

R. M. S.


In former publications on decerebrate rigidity writers have dealt with the subject primarily as physiologists, anatomical considerations coming second. Forced movements backwards in the vertical plane, whether caused by a lesion of the primary vestibular centre, by section of ascending secondary connections, by lesion of the supranuclear centre near the posterior commissure or its palæostriatal connections, are probably always associated with a certain amount of rigidity, recalling Sherrington's "composite postural reflex, the antigravity muscles counteracting the superincumbent weight."

From different observations it is seen that there is a complete reversal of physiological effect at the level of the posterior commissure. (1) In a series of oral to caudal hemisections across the brainstem of a quadruped, temporary rigidity, homo- and hetero-lateral, is noted. (2) If an incision is made in the region of the posterior longitudinal bundle forced movements in the frontal and horizontal planes are directed reversely, according as the incision is on the caudal or the oral side of the commissure. (3) The same complete reversal is observed after faradic stimulation of the same region, when oral-caudal sections are made through the brain of primates.

Since section of the pyramidal tract has probably nothing to do with the origin of decerebrate rigidity, and as the nucleus ruber is frequently found intact, the part played by supravestibular connections in the production of the phenomenon may be supposed to be considerable. This applies especially to the ascending and descending tracts, lesion of which is associated with forced movements in the vertical plane.

S. A. K. W.

**NEUROPATHOLOGY.**

[5] Cerebral softening, its frequency, its site, and the state of the arteries in the affected region (Contribution à l'étude du ramollissement cérébral envisagé au point de vue de sa fréquence, de son siège et de l'état anatomique des artères du territoire nécrosé).—Foix and Ley. *Jour. de Neur. et de Psych.*, 1927, xxvii, 658.

This article was in preparation by the authors jointly at the time of Foix's death, and has been finished by the pupil, following as far as possible the former's ideas. Softening is considered to be synonymous with arterial blockage by thrombosis or embolism.
1. Relative frequency of softening and haemorrhage.—Neglecting small lesions, both thrombotic and haemorrhagic, the examination of the brain in 124 cases of localised vascular lesions in elderly people showed that there were 100 cases (80 per cent.) of softening, and 24 (20 per cent.) of haemorrhage. An engorged softening is probably often mistaken at post-mortem examination for haemorrhage. It is certain that the great majority of hemiplegics who survive the ictus are cases of thrombosis; haemorrhage is much more often primarily fatal. Even allowing for this fact softening is the more frequent. Among 66 cases of stroke fatal within three weeks, there were 47 (71 per cent.) of softening and 19 (29 per cent.) of haemorrhage. Among 60 cases of long-standing hemiplegia there were 53 (88 per cent.) of softening and only 7 (11 per cent.) of haemorrhage.

As regards the prognosis—neglecting the very mild ones—of 24 cases of haemorrhage 17 (70 per cent.) were fatal within three weeks; among 100 cases of softening 47 (47 per cent.) were recent cases and 53 old. In the average of all the cases 64 were recent and 60 old, i.e., a mortality (within three weeks of the stroke) of 51-6 per cent.

2. Site of the softening.—In these 100 cases of softening the authors found the lesion 69 times in the distribution of the middle cerebral artery, 19 times in that of the posterior cerebral, and 12 times in that of the anterior. In the 60 cases of middle cerebral artery blockage, the superficial distribution was affected alone in 50-7 per cent., the deep distribution alone in 29 per cent., while 20-3 per cent. were mixed cases.

3. The state of the arteries in the softening.—The arteries concerned were minutely examined in 63 cases of softening. In 19 cases (30 per cent.) the lumen was obliterated, and in 7 of these the obliteration was due to embolism. There were 14 cases (22 per cent.) in which there was "sub-total obliteration," i.e., the lumen had become filiform, but still macroscopically patent; there were 30 cases (48 per cent.) in which there was incomplete blocking and in three of these the artery appeared almost healthy, but was smaller than normal. It will be seen that complete blockage is far from being the rule (only 30 per cent. of cases).

In the great majority all the cerebral arteries were unhealthy, and the softening had not by any means always occurred in the territory of the most affected artery. Microscopic examination in 26 cases showed the usual characters of chronic arteritis.

There are three conditions which may give rise to softening; in the 63 cases minutely examined the findings were:

1. Embolism . . . . . . . 7 cases (11 per cent.).
2. Arteritis . . . . . . . 53 cases (84 per cent.).
3. No appreciable disease . . . . . 3 cases (4.7 per cent.).

If the cases of arteritis are considered alone it is seen that in more than half of them the artery involved is quite permeable; furthermore the disease is chronic and the state of the arteries cannot be suddenly worse on the day
of the stroke than on preceding days. There must consequently be a precipitating cause of the softening. The authors think that in most cases a relatively acute ischaemia is probably brought about by spasm of a diseased artery, and in some others by general cardiovascular insufficiency, while in a few a toxic state of the blood (uremia) may be a factor in causing the softening. These three factors should be considered in the treatment of a stroke during the acute stage.

J. P. Martin.


The optical properties, staining affinities and solvents of plaques séniles show that they are hyaline and closely related to amyloid substance. They are the expression of a miliary disseminated amyloid process affecting particularly the cerebral cortex.

J. P. M.


The author reports a further series of experiments on animals, performed with material from foci of infection or throats of patients suffering from various diseases of the nervous system. The results corroborate and extend the former observations.

The streptococci isolated in each of these conditions, while much alike, possess very different localising and symptom-producing power when injected intracerebrally into animals and readily lose this property, especially on aerobic cultivation. The specific localising power of the streptococcus, it would seem, is dependent, in part at least, on the production of a toxin or poison that has specific effects. Lethargy, hyperpnea, with marked arrhythmia, and the symptoms characteristic of spasmodic torticollis have been produced with filtrates from nasopharyngeal washings, filtrates of suspensions of pus from tonsils, and filtrates of old cultures of the specific streptococcus in each of these conditions. The fact that the streptococci, having specific effects, and the power to produce a specific poison, has been isolated long after onset indicates that the late manifestations of encephalitis and allied conditions are not sequels but are due to the activity of the causative organism or its toxin, as has been especially emphasized by Freeman.

It is of course realised that the results obtained are not absolute proof of the etiological relationship of the streptococcus isolated. None of the patients in this group died, hence search for the organism could not be made. Agglutination experiments, especially with the serum of patients and the suspension of the suspected organism, while sometimes positive in low dilutions, were not so regularly enough to be convincing. The benefits which follow the removal
of foci proved to contain the organism and the use of autogenous vaccines, while often striking, do not occur regularly enough to be of specific etiological value.

In consideration of all the facts, especially the extremely specific effects obtained in some cases with the streptococcus isolated, and its specific toxin or poison-producing power, the tentative conclusion seems warranted that this organism is of etiological significance in each of the diseases studied.

R. M. S.

Jour. f. Psychol. u. Neurol., 1928, xxxv, 199.

This is a very fine piece of histological research, illustrated by over 80 reproductions of microscopical preparations. Only the conclusions of a long paper can here be summarised.

1. The perivascular reticular connective tissue, the macroglia; and the pia-glia membrane formed by these two, tend to hyperplasia in numerous degenerative and inflammatory conditions of the central nervous system.

2. The perivascular reticular tissue, in such circumstances, is responsible for the appearance of fibroblasts, epitheloid cells, and probably also of phagocytes (Körnchenzellen and macrophages).

3. The lymphocytes, plasma-cells, and polymorphonuclear leucocytes of "inflammatory" states find in the pia-glia sheath a check to their invasion of the neural parenchyma.

4. In cases where these haematogenous elements reach the parenchyma it can be shown that the macroglia cells have undergone pathological change in the form of swelling, vacuolation, loss of processes, failure of fibre-formation, and regressive alteration of nuclear tissue.

5. In degenerative states of neural parenchyma the perivascular pia-glia membrane allows the Körnchenzellen derived from microglia to pass in the direction of blood vessels. In addition to direct diapedesis there would appear to be some encasing of the arriving Körnchenzellen in mesenchymal tissue.

6. Piogenic tumours (meningiomas) respect the pia-glia membrane longer than they do both dura and bone. If sarcomatous, the membrane is broken through.

7. Gliomata usually effect hyperplasia of the membrane, the exception being highly fibrillar gliomata such as unipolar spongioblastoma and fibrillar astrocytoma.

8. As long as glioma cells can produce real glia fibrils and "vessel feet," so long does the connective tissue remain confined to the vascular system; when the former fails, then an entangled connective-tissue network or stroma develops within the tumour.

9. Vessels within gliomata and pial tumours tend to degenerate.

S. A. K. W.

The investigators studied the systemic manifestations of syphilis in rabbits infected intraspinaly with spirochaetes. This resulted in the striking observation that the majority of animals develop syphilitic manifestations when infected by the spinal route only. Of even greater interest is the fact that practically all of the rabbits exhibiting systemic infections developed testicular lesions.

Thus in one instance the animal exhibited a node in the left testis 53 days after being inoculated intraspinaly with spirochaetes; in other cases the latent period was longer, up to 187 days. Examination showed that the nodes contained actively motile spirochaetes. Previous investigations (Brown and Pearce) indicate that spirochaetes migrate from the site of testicular inoculation into the cerebrospinal system; the present series of experiments prove that they travel also in the opposite direction.

S. A. K. W.

[10] Resorption of cerebrospinal fluid through the choroid plexus.—H. S. FORBES, F. FREMONT-SMITH and H. G. WOLFF. Arch. of Neurol. and Psychiat., 1928, xix, 73.

By the method of introducing isotonic potassium ferrocyanide and iron ammonium citrate solution into the subarachnoid space under pressures closely approaching the normal, Weed showed that the chief channels of escape of the cerebrospinal fluid were the arachnoid villi. If, however, a hypertonic solution of sodium chloride were previously injected into a vein, accessory paths of elimination were opened, probably due to a reversal in direction of flow. These observations were substantiated by Foley, who in addition showed the presence of Prussian blue granules within the vessels of the choroid plexus. The present paper deals with the results of experiments designed to demonstrate Prussian blue granules in the same situation after intravenous or intraperitoneal injections of hypertonic salt solution, while maintaining intracranial pressure within physiological limits. In each of the twelve animals examined Prussian blue granules were found within the vessels of the choroid plexus. This would indicate that the direction of flow through the choroid plexus may be reversed by increasing the osmotic pressure of the blood, which in its turn suggests that the choroid plexus is not a secreting gland but a semi-permeable membrane through which the direction of fluid exchange is determined largely by the balance between hydrostatic and osmotic forces.

R. M. S.


The authors applied this test to the spinal fluid of ninety-one patients, and find that it compares favourably with the gum mastic reaction.

R. M. S.