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Gower's statement that "the symptoms (with the possible exception of mental dullness) are due to pressure on to, or extention into, the cerebral hemispheres" thus still holds good. The early physical changes are undoubtedly due to interruption of the association fibres in the corpus callosum. Papillœdema was found in 9 of the 14 cases here described.

Glioma is by far the commonest growth of the corpus callosum, although sarcoma and gliosarcoma may occur. All other growths are relatively rare, but myxosarcoma, carcinoma and lipoma have been met with as primary growths. They appear to be more common in men than in women (3 to 1), and most frequently between the ages of 30 and 40 years.

R. IRONSIDE and M. GUTTMACHER (*Brain*, 1929,
lii., 442 to 483).

TUMOURS OF THE PINEAL, CORPORA QUADRIGEMINA AND THIRD VENTRICLE: THE INTER-RELATIONSHIP OF THEIR SYNDROMES AND THEIR SURGICAL TREAT- MENT.

Tumours involving the mid-central region of the brain may be considered as among the less frequently occurring brain tumours. In the majority of cases the diagnosis was previously only made post-mortem, but recent research has rather tended to show that in most cases the clinical pictures may be similar. Twelve cases are described in the present paper. Experimental studies of the pineal gland have given rise to many contradictory opinions, and have failed so far to discover definitely its function. The symptoms of tumours of the pineal body may be divided into two groups, those of neurological origin and those of endocrine disturbance. The symptoms of neurological origin are mostly due to the fact that the same anatomical structures may be involved in each case. No clinical evidence of the function of the pineal body or corpora quadrigemina is provided by these cases. The neurological symptoms resulting from pressure on, or destruction of, adjacent anatomical areas may be divided into six groups, namely:—(1) ocular, (2) cerebellar, (3) sensory, (4) motor, (5) other cranial nerves, and (6) the signs of increased intracranial pressure. Involvement of the ocular apparatus causes the most outstanding diagnostic sign. This may consist of a loss of associated upward movement of both eyeballs, a failure of conjugate movement downward, rhythmic convergent spasm, as well as unequal immobile and widely dilated pupils, sluggish pupillary reaction to light, Argyll Robertson sign, paralysis of convergence, unilateral or bilateral sixth nerve paralysis, unilateral ptosis and diplopia. Other cranial nerves liable to be involved are the eighth, with unilateral or bilateral deafness

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of central origin, with buzzing, crackling and ringing in the ears. Fifth nerve anæsthesia has also been noted. Anatomically a tumour of the pineal grows in the path of least resistance and quickly obstructs the aqueduct, thus causing sudden onset of increased pressure and resulting in headaches, nausea, vomiting, drowsiness, stupor, nose-rubbing and itching, choked disc, cracked-pot sound, and X-ray indications such as convolitional atrophy, widening of the sutures, erosion of the anterior and posterior clinoid processes and enlargement of the sella turcica. The chronology of events is important.

From an endocrine standpoint there have been reported cases in the pre-adolescent age which presented the characteristic macrogenitosomia præcox. These have been in the minority, and a definite diagnosis could only be made on their neurological signs. This pre-adolescent syndrome includes such signs as enlargement of the body, deep voice, excessive growth, premature sexual development and mental precocity. No such symptoms have been produced by experimental procedures on the pineal gland. On the other hand experimental work on the function of the anterior lobe of the hypophysis has indicated the existence of a hormone which produces a true overgrowth of the body, both skeletal and visceral, the reproductive tract, uterus and oviduct remaining infantile. The ovaries, however, mature.

Surgery is indicated in all these tumours. This was first attempted through the posterior fossa of the skull by advancing between the cerebellum and cerebrum. Later a supratentorial approach was devised between the falx and the hemispheres. The posterior part of the corpus callosum should be separated, and a transverse incision exposes the corpora quadrigemina. Still later a successful removal was effected by taking advantage of the fact that all such tumours cause bilateral hydrocephalus with tremendously dilated ventricles and a thinned and avascular cortex. The frontal lobe is uncovered by an osteoplastic flap, the frontal lobe is elevated, the cortex below is incised, and through the distended lateral ventricle and dilated foramen of Monro the third ventricle could be entered. This may, perhaps, become the best method of removal, and in any case should always be considered.

M. A. GLASER, *Brain*, 1929, lii., 226-261 (11 figs.).

A. N. B.

CARDIAC OUTPUT IN HYPERTHYREOIDISM.

Amongst the circulatory phenomena characteristic of exophthalmic goitre and other forms of hyperthyreoidism are increased pulse rate and a raised pulse pressure, and from these it was inferred that the circulation rate was increased. Several investigators have confirmed this assumption, but have failed to find any definite parallelism between the increased work of the heart and the activity of the