

## SURGERY OF THE BRAIN—BASED ON THE PRINCIPLES OF CEREBRAL LOCALIZATION.

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### *Brain Tumors.*

The various tumors of the brain are no longer of interest solely to the clinician and the pathologist. Thanks to the researches of these gentlemen, a field of cerebral, and I may add cerebellar, surgery has been opened to us which was a few years ago literally *terra incognita*. Prompted by the brilliant discoveries of Hitzig, Fritsch, Ferrier and others only less well-known, Macewen, Godlee and Horsley were quick to take practical advantage of their results and to inaugurate a new era in surgical achievements—an epoch, indeed, whose remarkable results have only been surpassed by Mr. Horsley's recent successful removal of a myxoma from the spinal cord, and Macewen's somewhat similar cases.

Indeed, if you will pardon the moment's digression, so astonishing have been the advances of the past twenty years that one finds ample justification in maintaining that, with the sole exception of the science of electricity, nowhere in the whole domain of theoretical or applied science has progress been so rapid or visible results so remarkable as in surgery. So far as operative surgery is concerned, it can now rank as an exact science.

But little must here be said of brain tumors save in a purely operative sense. Their general features, which most concern the surgeon, have been well summarized in a paper read by Dr. Zenner before the Cincinnati Academy of Medicine, February 1, 1886. The principle features of a brain tumor which produces symptoms are: first, its location; second, its size; third, its character; fourth, rapidity and manner of its growth; and fifth, extent to which it affects the surrounding brain. The various ways in which a tumor may produce symptoms are: first, by increased pressure; second, by direct influence on brain tissue. When a tumor is in the cortex, the adjoining brain gradually accommodates itself, to a certain extent, to the increasing pressure; at the base or in the neighborhood of the nerve trunks such condition is not met with in many cases. When a part of the cortex has been destroyed, another part assumes a certain portion of its function. The symptoms produced by these changes may arise either from loss of function or from irritation. Nerves may be compressed where they pass through the dura, or directly in their course, or by enlarged blood-vessels. Convulsions may occur from tumors in any part of the brain; optic neuritis is by no means common. The chief localizing symptoms are paralysis of the cranial nerves, hemiplegia,

monoplegia, hemianæsthesia, partial spasms, reeling gait, aphasia, and hemiopia. In the frontal lobes, the corpora striata, and the optic thalami, brain tumors are frequently latent. When an individual suffers from constant headache that is not relieved by ordinary methods of treatment, he should be examined for brain tumor. Wernicke has suggested an operative procedure in cases where removal is not to be thought of—namely, tapping the ventricles in order to relieve intracranial pressure. This may be of value in rare or unusual cases. Tumors in the posterior fossæ of the skull usually cause a large accumulation of fluid in the ventricles. The distended third ventricle presses downward on the optic chiasm and produces optic-nerve atrophy; these are the cases in which blindness appears early—in other words, atrophy of these nerves is usually the result of a tumor in the posterior fossæ of the skull, generally in the cerebellum.

Considered in their surgical relations, we may, with Bergmann, divide brain tumors into (a) the circumscribed (encapsulated); (b) the infiltrated (diffuse), around which, as a rule, there is a zone of softening.

The former displace the brain substance, the latter destroy and supplant it. The former may be enucleated, the latter not. In order to remove the latter, one must remove a wide margin of surrounding tissue, as in removal of similar growths in other parts, or he must take total ablation, which is only possible in two places—the frontal and occipital extremities. Obviously these limitations reduce at once the number of cases suitable for operation.

Yet another class of neoplasms deserves at least mention here—i.e., those growing from the interior of the cranium. These by pressure may give rise to meningeal irritation or pressure symptoms, or both. Providing that a reasonably satisfactory diagnosis can be made, it must be indeed an extensive growth from the cranial vault which shall contra-indicate operation. It is not so uncommon an event at present to see large areas of the bony covering of the brain removed for the extirpation of neoplasms involving them or the membranes, and pressing on the brain. Gussenbauer has removed half the frontal bone with a little of the great wing of the sphenoid and the squamous, recovery following without disturbance of any kind. Macewen has done nearly the same thing. Langenbeck and Bergmann have excised large pieces of the dura, and the latter, as well as Küster, not only has done this, but has removed a portion of the superior longitudinal sinus. No hesitation need then be felt in attacking any such lesion so long as the general condition of the patient may warrant it.

But supposing the case of a tumor in or near the cortex, we are, if possible, to learn yet more