A dogfish from which all six ampullæ have been removed but which retained its utricular otolith uninjured shows definitely the following reactions. (1) Compensatory movements of the eyes and fins occur on rotation of the animal around the longitudinal axis of the body; *e.g.*, on rotation to the right, the right eye goes up and the left eye goes down. This position of the eyes is retained as long as the abnormal body position is continued. (2) Compensatory movements of the eyes and fins occur on rotation around the transverse axis of the body. (3) No compensatory movement is made in response to rotation around the dorsoventral axis, that is, to rotation in a horizontal plane. (4) The animal swims in a manner differing little from the normal. (5) The righting reaction takes place promptly and vigorously; if the animal is placed belly up in water it turns over at once.

2. Removal of the otoliths. After removal of all the otoliths from both ears the following results are seen in successful cases. (1) Compensatory movements of the eyes are made in the regular way to rotations about all three body axes, longitudinal, transverse and dorsoventral. If the animal is rotated around a longitudinal or transverse axis and held in the abnormal position the compensatory position of the eyes is retained. The movements appear to differ from those in the normal animal only in being slower and less vigorous. (2) The animal swims in normal orientation and maintains its equilibrium in the water. (3) If turned belly up in the water it rights itself.

The animals which possess ampullæ only (without otoliths) and the animals which possess otoliths alone (without ampullæ) are somewhat slower and weaker in their reactions, and swim less steadily than normal animals. The only marked difference in the results of the two operations is that the response to rotations in the horizontal plane is lost in those with otoliths only and is retained in those with ampullæ only.

The experiments therefore show that the ampullæ alone (without the otoliths) suffice for all the dynamic and all the static functions of the ear; and that the otoliths alone (without the ampullæ), suffice for all the static and all the dynamic functions of equilibrium of the ear with the exception of the response to rotation of the animal in a horizontal plane. [Author's abstract.]

Ivy, A. C. STUDY OF RELATION OF CEREBRAL CORTEX TO VESTIBULAR NYSTAGMUS. [Jl. Comp., Neurol., Oct., 1919.]

This was studied in frogs, turtles, pigeons, rabbits, kittens, cats, pups and dogs. Various cerebral ablations were performed and their effects upon vestibular nystagmus was observed, rotation being the stimulus used. Decerebration in the frog, turtle, and pigeon does not disturb vestibular nystagmus nor complete decerebration with extensive destruction of the thalamus in the rabbit abolish the quick component of nystagmus, provided the body temperature is kept normal. F. T. Rogers' obser-

vations on reduction of body temperature following thalamus lesions and the effect upon reflexes have been confirmed for the rabbit. In the cat and dog ablation of the motor cortex in the region of the eye area causes a temporary, with some permanence, five to fifteen fold increase in the duration of the after-nystagmus when the animal is rotated opposite to the side of the lesion. There is an increase in the nystagmus reaction when the deviation is opposite to the side of the lesion, with some diminution, but not abolition, when the deviation is to the side of the lesion. A general conclusion is warranted that the quick component of vestibular nystagmus is not due to the integrity of a cerebral reflex arc, but is dependent upon some center below the thalamus, over which the cerebrum exercises its well recognized inhibitory influence. [Author's abstract.]

v. Eiselsberg, A. Freih, and O. Marburg. THE QUESTION OF OPERABILITY OF INTERMEDULLARY TUMORS OF THE MEDULLA OBLONGATA. [Archiv. f. Psych., 1919, Vol. 59, p. 453.]

From the clinical symptoms of the case here reported the diagnosis of tumor medullae spinalis corresponding to the eighth cervical and first dorsal segment, principally on the right, probably intraspinal was made. At operation a tumor as large as a date stone was found shining through the posterior columns; this was successfully removed. The patient died eight weeks later, not as a result of the operation, but from pneumonia and a stomachic disturbance with which the patient was troubled before the operation. Histological examination of the extirpated tumor revealed a spindle-celled sarcoma, probably a primary growth. This case shows conclusively that intramedullary tumors can be operated on and that the medulla oblongata recovers from the injury without great difficulty. In the present case segments of the anterior cornua were affected as well as parts of the lateral columns near the tumor. Through the operation only the right posterior column was injured, evidenced by the fact that after operation a disturbance of the deep sensibility of the toes made its appearance, a relatively insignificant one. One of the most important symptoms for the diagnosis of the intramedullary site of the tumor is the disturbance of sensibility. In the majority of cases there is serious disturbance of sensibility from the level of the tumor downwards.

Phelps, Eduard. CLINICAL FEATURES AND DIAGNOSIS OF TUMORS OF THE MEDULLA OBLONGATA. [Archiv. f. Psych., 1919, Vol. 59, p. 1014.]

There is necessity for further elaboration of diagnostic characteristics of tumors of the medulla oblongata, especially of those clinical signs which permit early diagnosis, as an operation, to be effective, must be undertaken at the earliest possible moment. The author describes eight cases, one of intramedullary, four of intradural and three of vertebral