THE APPLICATION OF NEUROANATOMICAL DATA TO THE DIAGNOSIS OF SELECTED NEUROSURGICAL AND NEUROLOGICAL CASES*

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It is a very great and deeply appreciated honor to be the first speaker on the Max Minor Peet Lectureship. Dr. Peet's international reputation as one of the great neurosurgeons of his day is a matter of common knowledge. His diagnostic skill, his wide experience, and his magnificent technique are most appreciated by those who worked with him, but everyone who knew him, not only in his own Department, at University Hospital and in the University of Michigan as a whole, but also in his professional and social contacts outside, felt the vivid personality and the lovelableness of the man.

This lectureship was instituted by the group of neurosurgeons whom Dr. Peet had trained. They felt that it was the kind of expression of their devotion to him and of their unbounded respect for him that would give him great pleasure. Plans were made for a series of lectures dealing with various aspects of neurosurgery and these plans had been almost completed at the time of Dr. Peet's death.

The subject for the first lecture was chosen because anatomy was one of Dr. Peet's many scientific interests, and his practical knowledge of it, particularly in its gross aspects, was astonishing. His interest in anatomy extended far beyond the application of anatomical data to his own field, to a real enthusiasm for anatomical teaching and research. He was never too busy to counsel the man in difficulties with an anatomical problem; he lectured, on occasion, to the classes in applied anatomy; and he not only permitted but actively encouraged those in charge of neuroanatomy to make ward rounds with the neurosurgery staff—a course followed since by Dr. Kahn. As a most fortunate and very grateful recipient of this privilege, your speaker believes that probably the most important benefits that a clinical field can confer upon those who teach or do research in related preclinical subjects are the opportunity of seeing the application of the facts with which they deal to the solution of actual cases and the inestimable privilege of acquiring first-hand knowledge of the kind of information most likely to be of value to those under their tutelage.

ILLUSTRATIONS OF THE APPLICATION OF NEUROANATOMICAL DATA TO CLINICAL DIAGNOSIS

Consideration may now be given to the application of neuroanatomical

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NEUROANATOMICAL DATA APPLIED TO DIAGNOSIS

567
data to a few selected clinical cases.† In order to give continuity to the dis-
cussion, easily recognized, related types of clinical disturbance—the inter-
ference with or the loss of conjugate deviation of the eyes in the horizontal
plane (or, in one case, the significant retention of such conjugate deviation,
associated with the loss of upward eye movements)—have been chosen for
discussion.

Interference with Normal Conjugate Deviation of the Eyes in
the Horizontal Plane Together with Other Clinical Signs
of a Ponto-bulbar Lesion

Anatomical Considerations. Conjugate deviation of the eyes in the hori-
zontal plane depends basically upon the simultaneous contraction of the
lateral rectus of one eye and the medial rectus of the other. As is generally
known, the lateral rectus is supplied by the abducens nerve arising from the
abduces nucleus (Fig. 1). The medial rectus is innervated by crossed and
uncrossed oculomotor fibers (Bernheimer9) from the median portion of the
oculomotor nuclear complex which is termed the nucleus of Perlia (Fig. 2).
Each abduces complex (Fig. 2) consists of larger neurons, constituting the
abduces nucleus proper, from which arise the motor fibers of the abduces
nerve, and small cells, forming the parabduces nucleus, which send fas-
cicles through the homolateral medial longitudinal fasciculus (Spiegel and
Sommer43) to the nucleus of Perlia.

Various observers (Spitzer,44 see Fig. 3, page 469; Spiegel and Sommer;43
and others) have considered that the impulses concerned with the conjugate
deviation of the eyes toward one side are mediated by the medial longitudinal
fasciculus of the same side. Such relations are indicated in Figs. 2 and 3.
That there is still some question about the matter is evident, however, since
in an account of 7 clinical cases showing unilateral internuclear opthalmo-
plegia (with postmortem findings in 1 case) Cogan, Kubik, and Smith9
reported that the medial longitudinal fasciculus was involved a little cep-
halad to the abduces nucleus on the side of the ophthalmoplegia. By means
of the connections through the medial longitudinal fasciculus, coordinate
contraction of the lateral rectus of one eye and the medial rectus of the other
becomes possible, and thus conjugate deviation of the eyes in the horizontal
plane toward the side of the contracting lateral rectus occurs. Destruction
of the parabduces nucleus or of the medial longitudinal fasciculus (Spiegel

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