

THE  
ERVOUS  
SYSTEM  
BARKER



Francis L. McNaughton

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# THE NERVOUS SYSTEM

## AND ITS CONSTITUENT NEURONES

*DESIGNED FOR  
THE USE OF PRACTITIONERS OF MEDICINE AND  
OF STUDENTS OF MEDICINE AND PSYCHOLOGY*

BY

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WITH TWO COLORED PLATES AND  
SIX HUNDRED AND SEVENTY-SIX  
ILLUSTRATIONS IN THE TEXT

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ly and laterally (Fig. 462) as regards the nucleus nervi oculomotorii, and in frontal sections appearing to be dorsally placed as regards the latter (Fig. 463), stands in very intimate connection with the white fibres of no less than three areas. In the first place it is directly associated with the white fibres of the fasciculus longitudinalis medialis; in the second place it is in the direct course of the fibres (distal or ventral part of posterior

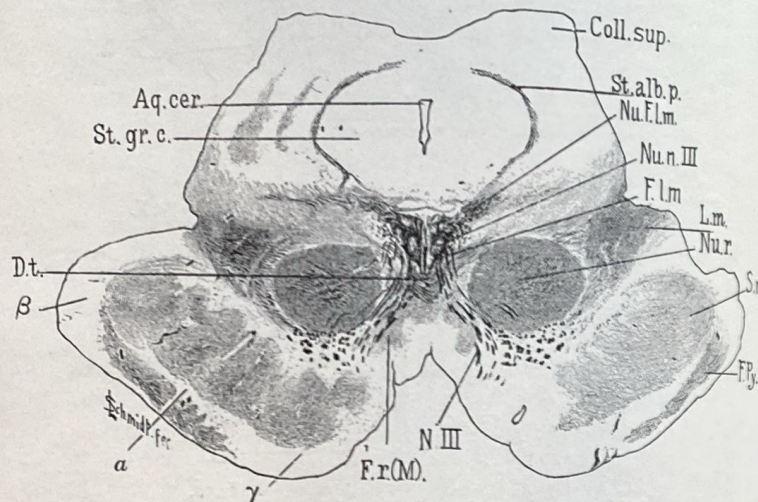


FIG. 463.—Transverse section through mesencephalon, colliculi superiores of corpora quadrigemina and cerebral peduncle of newborn babe. (Weigert-Pal, series ii, section No. 384.) *Aq. cer.*, aqueductus cerebri; *Coll. sup.*, colliculus superior; *Dt.*, decussatio tegmenti dorsalis (*fontaineartige Haubenkreuzung* of Meynert); *F. l. m.*, fasciculus longitudinalis medialis; *F. Py.*, fasciculi pyramidales in the basis pedunculi; *Fr. (M)*, fasciculus retroflexus Meynerti; *L. m.*, lemniscus medialis; *Nu. F. l. m.*, nucleus fasciculi longitudinalis medialis or nucleus commissurae posterioris (*oberer Oculomotoriuskern* of Darkschewitsch); *Nu. n. III*, nucleus N. oculomotorii; *Nu. r.*, nucleus ruber; *N. III*, nucleus N. oculomotorius; *St. alb. p.*, stratum album profundum; *St. gr. c.*, stratum griseum centrale; *S. n.*, substantia nigra; *a*, region of Flechsig's *Fusschleife*; *β*, temporo-occipital tract to pons; *γ*, frontal tract from pallium to pons. (Preparation by Dr. John Hewetson.)

commissure) which extend from the superior colliculus of the corpora quadrigemina of one side across the roof of the aqueduct of Sylvius to the region of the fasciculus longitudinalis medialis of the opposite side. In the third place, ventral to the nucleus of Darkschewitsch is a mass of white fibres which extends from the region of the nucleus ventralward and frontalward and somewhat lateralward, so as to pass between the middle line and the fasciculus retroflexus (Meynerti). The nucleus of

Darkschewitsch is intercalated, as it were, as a nodal point at the junction of these three masses of fibres. The nucleus of Darkschewitsch has a very definite outline just anterior to the nuclei of the third nerve, but farther anterior, just medial to the place where Meynert's bundle merges into the red nucleus, the nucleus of Darkschewitsch comes into relation with the gray matter of the anterior capsule of the red nucleus, and a small bundle of fibres, apparently belonging to the fasciculus longitudinalis medialis, can be followed beyond the nucleus of Darkschewitsch to the ventral portion of the capsule (F. Sabin). It is very difficult to say from the study of Weigert preparations how many of the fibres ventral to the nucleus of Darkschewitsch represent continuations of the fasciculus longitudinalis medialis, and how many represent continuations of the bundle of fibres of the commissure. Nor is it possible to say, from Weigert preparations alone, how many fibres from the opposite superior colliculus go past the nucleus of Darkschewitsch without ending in it to enter the fasciculus longitudinalis medialis. The best Golgi studies of this region are those of Held and van Gehuchten.\* The comparative anatomy is dealt with by Edinger. A full description, which, however, is not altogether satisfactory, is given by von Kolliker.

Miss Gertrude Stein, who is now studying a series of sagittal sections through this region from the brain of a babe a few weeks old, describes the nucleus of Darkschewitsch as follows: "The nucleus is more or less conical in shape. It lies dorso-medial from the red nucleus, being about as thick in a dorso-ventral direction as is the dorsal capsule of the red nucleus in which it lies. At this period of medullation the commissura posterior cerebri, considered simply topographically (that is, as a medullated fibre-mass without particular reference to the course of the fibres), appears as a dorso-ventral bundle, solid in the middle, subdivided dorsally into an anterior (proximal) portion and a posterior (distal) portion, while ventrally it expands in the form of a hollow pyramid, which rests directly upon the nucleus of Darkschewitsch." As to the bundle of fibres described above as being situated ventral to the nucleus, and passing forward and ventralward, Miss Stein in the brain she is studying can follow the fibres only as far as the fasciculus retro-

\* van Gehuchten, A. Le ganglion basal, la commissure post-habéculaire, le faisceau longitudinal postérieur et les cellules médullaires dorsales du neuraxe de la Salamandre. *Verhandl. d. anat. Gesellsch., Jena*, Bd. xi (1899).



flexus. The fibres most ventrally situated are very complex in arrangement, forming a whirl in the substance of the nucleus ruber. Indeed, the nucleus ruber is divisible into two parts by this whirl of fibres—one part anterior and smaller, the other part posterior and much larger. In the anterior portion there are only delicate and dullated fibres, and these are directed almost straight antero-posteriorly. In the posterior part the medullated fibres are much coarser in calibre, are arranged in small bundles, are directed diagonally, and appear to correspond to the continuation inside the red nucleus of the fibres of the brachium conjunctivum and of the formatio reticularis. The anterior fine fibres and the posterior coarse fibres are separated from one another in the medial part of the nucleus ruber by the fasciculus retroflexus. In the lateral part of the nucleus the two areas approach one another, and the peculiar differences between the two masses of fibres gradually disappear. Some of the coarse fibres of the posterior part of the red nucleus curve dorsalward to come into relation with the nucleus of Darkschewitsch at the point where the ventral bundle above mentioned originates.

The upward continuations of the fasciculus longitudinalis medialis, which could be looked upon as being concerned in the conduction of sensory impulses toward the somæsthetic area of the cortex, are not at all well understood. So far as we can find in serial sections through the baby's brain cut in all three dimensions of space, it is not possible to follow any direct upward continuations far into the hypothalamic region, and if the fasciculus longitudinalis medialis is to be regarded as one of the paths mediating sensory impulses on their way to the cerebral cortex, this path is almost certainly interrupted in the hypothalamus or thalamus.

## CHAPTER XLIX.

### CENTRIPETAL AXONES IN THE FORMATIO RETICULARIS.

Forel's *Haubenfascikeln*—Honegger's *hintere Längsbündel-formation*—  
Central paths of vagal, glossopharyngeal, and trigeminal nerves—  
Fasciculi tegmenti centrales.

#### (c) The *Formatio Reticularis Alba*.

As to the upward continuations of longitudinal bundles of fibres in the formatio reticularis we have also little information that is definite. It has been shown by von Monakow that, after extensive defect in the hemisphere of the dog, degeneration of Forel's *Haubenfascikeln*, and of many other fibres in the formatio reticularis, results. The change is that of simple atrophy rather than of actual degeneration.

It has been observed in human cases as well as in experimental animals, so that there can be but little doubt that many of these longitudinal bands of the formatio reticularis are connected by means of neurones of a higher order with the cerebral cortex. Just where the medullated axones of the formatio reticularis end is not certain. But it seems probable that the place may be the hypothalamic region, or the ventral group of nuclei of the thalamus, and that a new neurone thence sends an axone out through the internal capsule to the cerebral cortex. It seems probable that Honegger's *hintere Längsbündel-formation* is to be here included. The bundles described by Honegger do not coincide with the fasciculus longitudinalis medialis, but include the longitudinal bands of the formatio reticularis, which go between the two brachia conjunctiva dorsal to the decussation, and beyond the red nucleus into the hypothalamic region. They become mingled with the frontal and medial bundles of the capsule of white matter which surrounds the red nucleus.



THE SYSTEM  
NERVOUS \*  
GERTRUDE STEIN

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