

WHITE SUBSTANCE.—(1) The origin and course of the *superior peduncle* have already been described (page 792).

(2) The **medial (posterior) longitudinal fasciculus** is continuous below with the proper fasciculi of the anterior and lateral funiculi of the medulla spinalis. In the medulla oblongata and pons it runs close to the middle line, near the floor of the fourth ventricle; in the mid-brain it is situated on the ventral aspect of the cerebral aqueduct, below the nuclei of the oculomotor and trochlear nerves. Its connections are imperfectly known, but it consists largely of ascending and descending intersegmental or association fibers, which connect the nuclei of the hind-brain and mid-brain to each other. Many of the fibers arise in **Deiters's nucleus** (*lateral vestibular nucleus*) and divide into ascending and descending branches which send terminals and collaterals to the motor nuclei of the cranial and spinal nerves. Its spinal portion is located in the anterior funiculus and is known as the **vestibulospinal fasciculus**. Other fibers pass to the median longitudinal bundle from cells in the reticular formation of the medulla, pons and mid-brain and also from certain large cells in the terminal nucleus of the trigeminal nerve. According to Edinger it extends to the so-called nucleus of the posterior longitudinal bundle in the hypothalamic region, but this is uncertain and the fibers above the nucleus of the oculomotor are smaller in diameter than the rest of the bundle. According to Held fibers from the posterior commissure can be traced into the posterior longitudinal bundle, and according to the same author many of the descending fibers arise in the superior colliculus, and, after decussating in the middle line, end in the motor nuclei of the pons and medulla oblongata. These fibers from the superior colliculus probably pass into the ventral longitudinal bundle. Fibers are said to pass through the medial longitudinal fasciculus from the nucleus of the abducent nerve into the oculomotor nerve of the opposite side, and through this nerve to the *Rectus medialis oculi*. Fraser, however, denies the existence of such fibers. Again, fibers are said to be prolonged through this fasciculus from the nucleus of the oculomotor nerve into the facial nerve, and are distributed to the *Orbicularis oculi*, the *Corrugator*, and the *Frontalis*.<sup>1</sup>

The **ventral longitudinal bundle** consists for the most part of the **tectospinal fasciculus**, and arises from the superior colliculus, the fibers arch ventrally around the central gray matter and cross the midline in the fountain-decussation of Meynert. They then descend in the tegmentum, part of them passing through the red nucleus ventral to the medial longitudinal bundle. In the medulla oblongata and spinal cord its fibers are more or less intermingled with the medial longitudinal bundle and the rubrospinal tract. It descends in the adjoining region of the ventral and lateral funiculi. Collaterals and terminals are given off to the red nucleus and probably other nuclei of the brain stem and to the anterior column of the spinal cord. It is probably concerned in optic reflexes.

(3) The **medial lemniscus** or **medial fillet** (Fig. 713).—The fibers of the medial lemniscus take origin in the gracile and cuneate nuclei of the medulla oblongata, and as internal arcuate fibers they cross to the opposite side in the sensory decussation (page 777). They then pass in the interolivary stratum upward through the medulla oblongata, in which they are situated behind the cerebrospinal fibers and between the olives. In the pons and lower part of the mid-brain it occupies the ventral part of the reticular formation and tegmentum close to the raphé, while above it gradually shifts to the dorso-lateral part of the tegmentum in the angle between the red nucleus and the substantia nigra. In the pons it assumes a flattened ribbon-like appearance, and is placed dorsal to the trapezium. As the lemniscus ascends, it receives additional fibers from the terminal sensory nuclei of the cranial

<sup>1</sup> A. Bruce and J. H. Harvey Pirrie, "On the Origin of the Facial Nerve," *Review of Neurology and Psychiatry*, December, 1908, No. 12, vol. vi, produce weighty evidence against the view that the facial nerve derives fibers from the nucleus of the oculomotor nerve.