

The human brain is heavier than that of any of the lower animals, except the elephant and whale. The brain of the former weighs from 3.5 to 5.4 kilogr., and that of a whale, in a specimen 19 metres long, weighed rather more than 6.7 kilogr.

Cerebral Localization.—Physiological and pathological research have now gone far to prove that a considerable part of the surface of the brain may be mapped out into a series of more or less definite areas, each of which is intimately connected with some well-defined function.

The chief areas are indicated in Figs. 756 and 757.

Motor Areas.—The motor area occupies the anterior central and frontal gyri and the paracentral lobule. The centers for the lower limb are located on the uppermost part of the anterior central gyrus and its continuation on to the paracentral lobule; those for the trunk are on the upper portion, and those for the upper limb on the middle portion of the anterior central gyrus. The facial centers are situated on the lower part of the anterior central gyrus, those for the tongue, larynx, muscles of mastication, and pharynx on the frontal operculum, while those for the head and neck occupy the posterior end of the middle frontal gyrus.

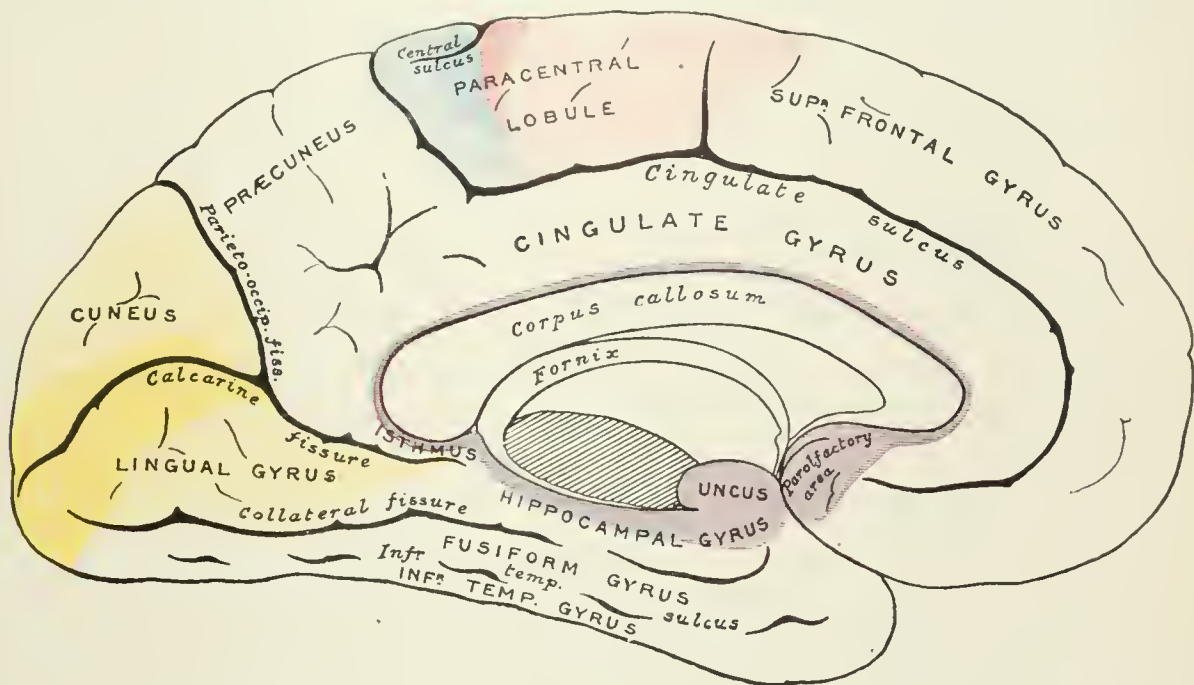


FIG. 757.—Areas of localization on medial surface of hemisphere. Motor area in red. Area of general sensations in blue. Visual area in yellow. Olfactory area in purple. The psychic portions are in lighter tints.

Sensory Areas.—Tactile and temperature senses are located on the posterior central gyrus, while the sense of form and solidity is on the superior parietal lobule and precuneus. With regard to the special senses, the area for the sense of taste is probably related to the uncus and hippocampal gyrus. The auditory area occupies the middle third of the superior temporal gyrus and the adjacent gyri in the lateral fissure; the visual area, the calcarine fissure and cuneus; the olfactory area, the rhinencephalon. As special centers of much importance may be noted: the emissive center for speech on the left inferior frontal and anterior central gyri (Broca); the auditory receptive center on the transverse and superior temporal gyri, and the visual receptive center on the lingual gyrus and cuneus.

COMPOSITION AND CENTRAL CONNECTIONS OF THE SPINAL NERVES.

The typical spinal nerve consists of at least four types of fibers, the **somatic sensory**, **sympathetic afferent** or **sensory**, **somatic motor** and **sympathetic efferent** or **preganglionic**. The somatic sensory fibers, afferent fibers, arise from cells in the spinal ganglia and are found in all the spinal nerves, except occasionally the first cervical, and conduct impulses of pain, touch and temperature from the surface of the body through the posterior roots to the spinal cord and impulses of muscle sense, tendon sense and joint sense from the deeper structures. The sympathetic afferent fibers, conduct sensory impulses from the viscera through the rami communicantes and posterior roots to the spinal cord. They are probably limited to the white rami connected with the spinal nerves in two groups, viz., the first thoracic to the second