radiata; its fibers radiate in a fan-like manner and pass into the occipital and temporal lobes lateral to the posterior and inferior cornua. Déjerine regards the fibers of the tapetum as being derived from this fasciculus, and not from the corpus callosum.

(*g*) The *fornix* connects the hippocampal gyrus with the corpus mammillare and, by means of the thalamomammillary fasciculus, with the thalamus (see page 839). Through the fibers of the hippocampal commissure it probably also unites the opposite hippocampal gyri.

The **gray substance of the hemisphere** is divided into: (1) that of the cerebral cortex, and (2) that of the caudate nucleus, the lentiform nucleus, the claustrum, and the nucleus amygdalæ.

Structure of the Cerebral Cortex (Fig. 754).—The cerebral cortex differs in thickness and structure in different parts of the hemisphere. It is thinner in the occipital region than in the anterior and posterior central gyri, and it is also much thinner at the bottom of the sulci than on the top of the gyri. Again, the minute structure of the anterior central differs from that of the posterior central gyrus, and areas possessing a specialized type of cortex can be mapped out in the occipital lobe.

On examining a section of the cortex with a lens, it is seen to consist of alternating white and gray layers thus disposed from the surface inward: (1) a thin layer of white substance; (2) a layer of gray substance; (3) a second white layer (*outer band of Baillarger* or *band of Gennari*); (4) a second gray layer; (5) a third white layer (*inner band of Baillarger*); (6) a third gray layer, which rests on the medullary substance of the gyrus.

The cortex is made up of nerve cells of varying size and shape, and of nerve fibers which are either medullated or naked axis-cylinders, imbedded in a matrix of neuroglia.

Nerve Cells.—According to Cajal, the nerve cells are arranged in four layers, named from the surface inward as follows: (1) the molecular layer, (2) the layer of small pyramidal cells, (3) the layer of large pyramidal cells, (4) the layer of polymorphous cells.

The Molecular Layer.—In this layer the cells are polygonal, triangular, or fusiform in shape. Each polygonal cell gives off some four or five dendrites, while its axon may arise directly from the cell or from one of its dendrites. Each triangular cell gives off two or three dendrites, from one of which the axon arises. The fusiform cells are placed with their long axes parallel to the surface and are mostly bipolar, each pole being prolonged into a dendrite, which runs horizontally for some distance and furnishes ascending branches. Their axons, two or three in number, arise from the dendrites, and, like them, take a horizontal course, giving off numerous ascending collaterals. The distribution of the axons and dendrites of all three sets of cells is limited to the molecular layer.

The Layer of Small and the Layer of Large Pyramidal Cells.—The cells in these two layers may be studied together, since, with the exception of the difference in size and the more superficial position of the smaller cells, they resemble each other. The average length of the small cells is from 10 to 15μ; that of the large cells from 20 to 30μ. The body of each cell is pyramidal in shape, its base being directed to the deeper parts and its apex toward the surface. It contains granular pigment, and stains deeply with ordinary reagents. The nucleus is of large size, and round or oval in shape. The base of the cell gives off the axis cylinder, and this runs into the central white substance, giving off collaterals in its course, and is distributed as a projection, commissural, or association fiber. The apical and basal parts of the cell give off dendrites; the apical dendrite is directed toward the surface, and ends in the molecular layer by dividing into numerous branches, all of which may be seen, when prepared by the silver or methylene-blue method, to be studded with projecting bristle-like processes. The largest pyramidal cells are found in the upper part of the anterior central gyrus and in the paracentral lobule; they are often arranged in groups or nests of from three to five, and are named the *giant cells of Betz*. In the former situation they may exceed 50μ in length and 40μ in breadth, while in the paracentral lobule they may attain a length of 65μ.

Layer of Polymorphous Cells.—The cells in this layer, as their name implies, are very irregular in contour; they may be fusiform, oval, triangular, or star-shaped. Their dendrites are directed outward, but do not reach so far as the molecular layer; their axons pass into the subjacent white matter.

There are two other kinds of cells in the cerebral cortex. They are: (*a*) the *cells of Golgi*, the axons of which divide immediately after their origins into a large number of branches, which are directed toward the surface of the cortex; (*b*) the *cells of Martinotti*, which are chiefly found in the polymorphous layer; their dendrites are short, and may have an ascending or descending course, while their axons pass out into the molecular layer and form an extensive horizontal arborization.