

Non-medullated Fibers.—Most of the fibers of the sympathetic system, and some of the cerebrospinal, consist of the **gray** or **gelatinous nerve fibers** (*fibers of Remak*) (Fig. 635). Each of these consists of an axis-cylinder to which nuclei are applied at intervals. These nuclei are believed to be in connection with a delicate sheath corresponding with the neurolemma of the medullated nerve fiber. In external appearance the non-medullated nerve fibers are semitransparent and gray or yellowish gray. The individual fibers vary in size, generally averaging about half the size of the medullated fibers.

Structure of the Peripheral Nerves and Ganglia.—The **cerebrospinal nerves** consist of numerous nerve fibers collected together and enclosed in membranous sheaths (Fig. 636). A small bundle of fibers, enclosed in a tubular sheath, is called a **funiculus**; if the nerve is of small size, it may consist only of a single funiculus; but if large, the funiculi are collected together into larger bundles or **fasciculi**, which are bound together in a common membranous investment. In structure the common membranous investment, or sheath of the whole nerve (**epineurium**), as well as the septa given off from it to separate the fasciculi, consist of connective tissue, composed of white and yellow elastic fibers, the latter existing in great abundance. The tubular sheath of the funiculi (**perineurium**) is a fine, smooth, transparent membrane, which may be easily separated, in the form of a tube, from the fibers it encloses; in structure it is made up of connective tissue, which has a distinctly lamellar arrangement. The nerve fibers are held together and supported within the funiculus by delicate connective tissue, called the **endoneurium**. It is continuous with septa which pass inward from the innermost layer of the perineurium, and shows a ground substance in which are imbedded fine bundles of fibrous connective tissue running for the most part longitudinally. It serves to support capillary vessels, arranged so as to form a net-work with elongated meshes. The cerebrospinal nerves consist almost exclusively of medullated nerve fibers, only a very small proportion of non-medullated being present.

The bloodvessels supplying a nerve end in a minute capillary plexus, the vessels composing which pierce the perineurium, and run, for the most part, parallel with the fibers; they are connected together by short, transverse vessels, forming narrow, oblong meshes, similar to the capillary system of muscle. Fine non-medullated nerve fibers, **vasomotor fibers**, accompany these capillary vessels, and break up into elementary fibrils, which form a network around the vessels. Horsley has demonstrated certain medullated fibers running in the epineurium and terminating in small **spheroidal tactile corpuscles** or **end bulbs of Krause**. These nerve fibers, which Marshall believes to be sensory, and which he has termed **nervi nervorum**, are considered by him to have an important bearing upon certain neuralgic pains.

The nerve fibers, so far as is at present known, do not coalesce, but pursue an uninterrupted course from the center to the periphery. In separating a nerve, however, into its component funiculi, it may be seen that these do not pursue a perfectly insulated course, but occasionally join at a very acute angle with other funiculi proceeding in the same direction; from this, branches are given off, to joint again in like manner with other funiculi. It must be distinctly understood, however, that in these communications the individual nerve fibers do not coalesce, but merely pass into the sheath of the adjacent nerve, become intermixed with its nerve fibers, and again pass on to intermingle with the nerve fibers in some adjoining funiculus.

Nerves, in their course, subdivide into branches, and these frequently communicate with branches of a neighboring nerve. The communications which thus take place form what is called a **plexus**. Sometimes a plexus is formed by the primary branches of the trunks of the nerves—as the cervical, brachial, lumbar, and sacral plexuses—and occasionally by the terminal funiculi, as in the plexuses formed at the periphery of the body. In the formation of a plexus, the component nerves