

Nerve Fasciculi.—The longitudinal fibers are grouped into more or less definite bundles or fasciculi. These are not recognizable from each other in the normal state, and their existence has been determined by the following methods: (1) A. Waller discovered that if a bundle of nerve fibers be cut, the portions of the fibers which are separated from their cells rapidly degenerate and become atrophied, while the cells and the parts of the fibers connected with them undergo little alteration.¹ This is known as **Wallerian degeneration**. Similarly, if a group of nerve cells be destroyed, the fibers arising from them undergo degeneration. Thus, if the motor cells of the cerebral cortex be destroyed, or if the fibers arising from these cells be severed, a **descending degeneration** from the seat of injury takes place in the fibers. In the same manner, if a spinal ganglion be destroyed, or the fibers which pass from it into the medulla spinalis be cut, an **ascending degeneration** will extend along these fibers. (2) Pathological changes, especially in man, have given important information by causing ascending and descending degenera-

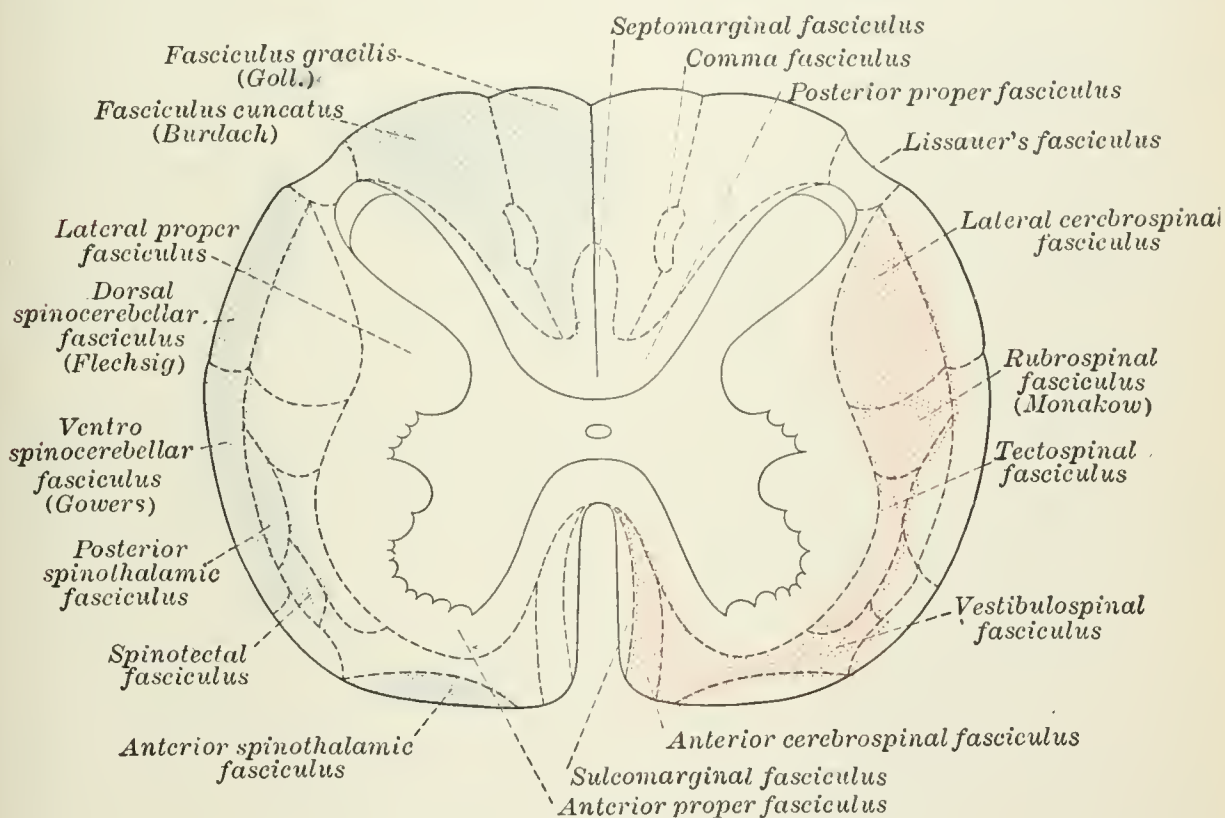


FIG. 672.—Diagram of the principal fasciculi of the spinal cord.

tions. (3) By tracing the development of the nervous system, it has been observed that at first the nerve fibers are merely naked axis-cylinders, and that they do not all acquire their medullary sheaths at the same time; hence the fibers can be grouped into different bundles according to the dates at which they receive their medullary sheaths. (4) Various methods of staining nervous tissue are of great value in tracing the course and mode of termination of the axis-cylinder processes.

Fasciculi in the Anterior Funiculus.—*Descending Fasciculi.*—The **anterior cerebrospinal** (*fasciculus cerebrospinalis anterior*; *direct pyramidal tract*), which is usually small, but varies inversely in size with the lateral cerebrospinal fasciculus. It lies close to the anterior median fissure, and is present only in the upper part of the medulla spinalis; gradually diminishing in size as it descends, it ends about the middle of the thoracic region. It consists of descending fibers which arise

¹ Somewhat later a change, termed *chromatolysis*, takes place in the nerve cells, and consists of a breaking down and an ultimate disappearance of the Nissl bodies. Further, the body of the cell is swollen, the nucleus displaced toward the periphery, and the part of the axon still attached to the altered cell is diminished in size and somewhat atrophied. Under favorable conditions the cell is capable of reassuming its normal appearance, and its axon may grow again.