regarded as the cranial portions of the sympathetic system. The sympathetic nervous system includes those portions of the nervous mechanism in which a medullated nerve fiber from the central system passes to a ganglion, sympathetic or peripheral, from which fibers, usually non-medullated, are distributed to such structures, *e. g.*, bloodvessels, as are not under voluntary control. The spinal and sympathetic ganglia differ somewhat in the size and disposition of the cells and in the number of nerve fibers entering and leaving them. In the spinal ganglia (Fig. 638) the nerve cells are much larger and for the most part collected in groups near the periphery, while the fibers, which are mostly medullated, traverse the central portion of the ganglion; whereas in the sympathetic ganglia (Fig. 639) the cells are smaller and distributed in irregular groups throughout the whole ganglion; the fibers also are irregularly scattered; some of the entering ones are medullated, while many of those leaving the ganglion are non-medullated.

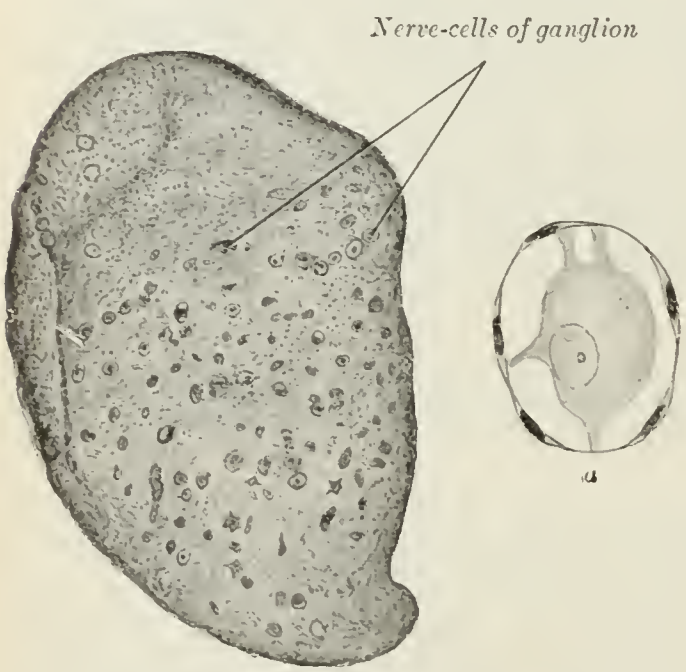

Fig. 639.—Transverse section of sympathetic ganglion of cat. *A*. Ganglion. × 50. *a*. A nerve cell. × 250.

Neuron Theory.—The nerve cell and its processes collectively constitute what is termed a **neuron**, and Waldeyer formulated the theory that the nervous system is built up of numerous neurons, "anatomically and genetically independent of one another." According to this theory (*neuron theory*) the processes of one neuron only come into contact, and are never in direct continuity, with those of other neurons; while impulses are transmitted from one nerve cell to another through these points of contact, the synapses. The **synapse** or **synaptic membrane** seems to allow nervous impulses to pass in one direction only, namely, from the terminals of the axis-cylinder to the dendrons. This theory is based on the following facts, viz.: (1) embryonic nerve cells or neuroblasts are entirely distinct from one another; (2) when nervous tissues are stained by the Golgi method no continuity is seen even between neighboring neurons; and (3) when degenerative changes occur in nervous tissue, either as the result of disease or experiment, they never spread from one neuron to another, but are limited to the individual neurons, or groups of neurons, primarily affected. It must, however, be added that within the past few years the validity of the neuron theory has been called in question by certain eminent histologists, who maintain that by the employment of more delicate histological methods, minute fibrils can be followed from one nerve cell into another. Their existence, however, in the living is open to question. Mott and Marinesco made careful examinations of living cells, using even the ultramicroscope and agree that neither Nissl bodies nor neurofibrils are present in the living state.

For the present we may look upon the neurons as the units or structural elements of the nervous system. All the neurons are present at birth which are present in the adult, their division ceases before birth; they are not all functionally active at birth, but gradually assume functional activity. There is no indication of any regeneration after the destruction of the cell-body of any individual neuron.

Fasciculi, tracts or **fiber systems** are groups of axons having homologous origin and homologous distribution (as regards their collaterals, subdivisions and terminals) and are often named in accordance with their origin and termination, the