they supply. The former are sometimes called their **origins** or **central terminations**; the latter their **peripheral terminations.**

Origins of Nerves.—The origin in some cases is single—that is to say, the whole nerve emerges from the nervous center by a single root; in other instances the nerve arises by two or more roots which come off from different parts of the nerve center, sometimes widely apart from each other, and it often happens, when a nerve arises in this way by two roots, that the functions of these two roots are different; as, for example, in the spinal nerves, each of which arises by two roots, the anterior of which is motor, and the posterior sensory. The point where the nerve root or roots emerge from the surface of the nervous center is named the **superficial** or **apparent origin**, but the fibers of the nerve can be traced for a certain distance into the substance of the nervous center to some portion of the gray matter, which constitutes the **deep** or **real origin** of the nerve. The centrifugal or efferent nerve fibers originate in the nerve cells of the gray substance, the axis-cylinder processes of these cells being prolonged to form the fibers. In the case of the centripetal or afferent nerves the fibers grow inward either from nerve cells in the organs of special sense, *e. g.*, the retina, or from nerve cells in the ganglia. Having entered the nerve center they branch and send their ultimate twigs among the cells, without, however, uniting with them.

Peripheral Terminations of Nerves.—Nerve fibers terminate peripherally in various ways, and these may be conveniently studied in the sensory and motor nerves respectively. The terminations of the sensory nerves are dealt with in the section on Sense Organs.

Motor nerves can be traced into either unstriped or striped muscular fibers. In the *unstriped* or *involuntary muscles* the nerves are derived from the sympathetic, and are composed mainly of non-medullated fibers. Near their terminations they divide into numerous branches, which communicate and form intimate plexuses. At the junction of the branches small triangular nuclear bodies (ganglion cells) are situated. From these plexuses minute branches are given off which divide and break up into the ultimate fibrillæ of which the nerves are composed. These fibrillæ course between the involuntary muscle cells, and, according to Elischer, terminate on the surfaces of the cells, opposite the nuclei, in minute swellings.

In the *striped* or *voluntary muscle* the nerves supplying the muscular fibers are derived from the cerebrospinal nerves, and are composed mainly of medullated fibers. The nerve, after entering the sheath of the muscle, breaks up into fibers or bundles of fibers, which form plexuses, and gradually divide until, as a rule, a single nerve fiber enters a single muscular fiber. Sometimes, however, if the muscular fiber be long, more than one nerve fiber enters it. Within the muscular fiber the nerve terminates in a special expansion, called by Kühne, who first accurately described it, a **motor end-plate** (Fig. 637). The nerve fiber, on approaching the muscular fiber, suddenly loses its medullary sheath, the neurolemma becomes continuous with the sarcolemma of the muscle, and only the axis-cylinder enters the muscular fiber. There it at once spreads out, ramifying like the roots of a tree, immediately beneath the sarcolemma, and becomes imbedded in a layer of granular matter, containing a number of clear, oblong nuclei, the whole constituting an end-plate from which the contractile wave of the muscular fiber is said to start.

Ganglia are small aggregations of nerve cells. They are found on the posterior roots of the spinal nerves; on the sensory roots of the trigeminal, facial, glossopharyngeal, and vagus nerves, and on the acoustic nerves. They are also found in connection with the sympathetic nerves. On section they are seen to consist of a reddish-gray substance, traversed by numerous white nerve fibers; they vary considerably in form and size; the largest are found in the cavity of the abdomen; the smallest, not visible to the naked eye, exist in considerable numbers upon the nerves distributed to the different viscera. Each ganglion is invested by a smooth