finer and more thread-like, goes on to end in a piece of muscle, to which it conveys the orders of the brain. In short, it may be said that in every muscle, both voluntary and involuntary, contraction depends upon the influence of the nervous system, that is to say, upon the commands conveyed to the muscle either to contract or relax, by means of the nerves which are distributed amongst the fibres of that muscle. We, therefore, find that there are two well marked classes of nerves; the *motor* nerves or those by whose influence muscular movement takes place; and *sensory* nerves or those which convey impressions

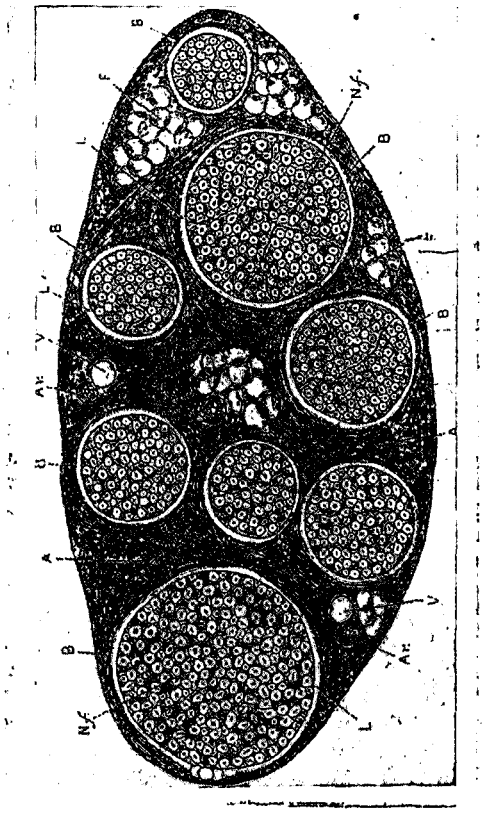

Fig. 30.—Section of the Sciatic Nerve.

from the outside to the central nervous system, that is to say, the brain and spinal cord. Every nerve in the body is connected directly with these central organs, exactly as the telegraphic wires of our streets are connected with a recording instrument at some central office. It will, probably, simplify the description and understanding of the nervous system if we somewhat enlarge the analogy between telegraphic apparatus and the nervous system of the human body; regarding, for the moment, a machine manipulated at the central post office of a town, as the brain and spinal cord, the nerve cells as county town offices, where messages are received and again transmitted on to other smaller branch offices, and finally to the individuals to whom the telegrams are addressed. Then the telegraphic wires extending to and from the branch offices will represent the nerves which branch out from the spinal cord to and from the extremity of a limb in the human body. We are not able to explain the changes which take place in the electric wire, nor in the nerve tissue; the one thing needful to remember being that in both cases impressions are conveyed through both media with practically instantaneous rapidity. We will imagine, then, for the sake of an example, that we have two wires running between two telegraph offices *a* and *b*, of which we will take the former to represent the brain, and the latter the end of the little finger of one hand; a message is handed in at *b*, telegraphed to *a*, and an immediate answer sent back to *b*. So if a pin suddenly and unexpectedly prick the little finger, the feeling is through the *sensory* nerves immediately conveyed to the brain, and instantaneously a message is sent back through the *motor* nerves to the muscles of the hand, those of the forearm, and even those of the arm, and the finger is instinctively and instantly withdrawn from the injurious contact with the pin. Simple as this instance may seem, it involves a very complicated and important series of movements. The muscles which are thrown into action in order to withdraw the finger from the pin are supplied by a number of separate nerves, each of which receives an independent message from the brain. The general movement which results from all this combined nerve-muscular-action is an excellent example of what you will hear termed, in medical wards, *Co-ordination*. In disease of the nervous system, we shall find that this co-ordinated movement amongst a number of associated muscles is impaired or altogether lost, and one can easily understand from the simple description which has been given, that this must occur in consequence of some interference with the passage of the necessary nerve messages.

To return to the nervous system, we find that this consists of two distinct sets of nerves, each of which have what have been described as "nerve centres." These two systems are as intimately associated together as one office is, by its telegraphic communication with another office, and yet are so distinct that they may be very conveniently considered apart. They are termed the *Cerebro-spinal* system and the *Sympathetic* system. The former consists of the *cerebro-spinal axis*, in other words, the brain and spinal cord, and the *cerebro-spinal nerves*, which are given off from that

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