

arborization (or synapse) upon the cell-body of the second neurone of the path, situated in some sympathetic ganglion. The axis cylinder of this second neurone is non-medullated and is known as a post-ganglionic fibre; it extends from the ganglion to the smooth muscle fibres, or to the secreting gland, which it innervates. Between the nerve terminal and the muscle or gland there seems to be an intervening substance (myoneural, or adenoneural); and in this medium the ions of calcium, sodium, etc., seem to exercise important functions.

It has long been known that many of the viscera receive nerve-impulses not only from the sympathetic system, but also through other nerve paths. Thus, though the heart receives impulses through the sympathetic which increase the rate of its beat, it also receives impulses through the N. vagus by which the rate of its beat is decreased. Similarly, the smooth-muscle of the gastrointestinal tract has long been known to be doubly innervated, contraction being stimulated through the N. vagus, and inhibited through the N. sympathicus. The smooth muscle which controls the size of the pupil is also doubly supplied; the pupil dilates when the cervical sympathetic is stimulated, and it contracts when the N. oculomotorius is excited. It remained, however, for later studies to demonstrate: (1) that such a double and reciprocally antagonistic innervation holds throughout the whole body as regards smooth muscle and secreting glands, (2) that each of the two innervating systems has a similar architecture, the centrifugal path in each system between the cerebrospinal axis and the periphery consisting of at least two sets of superimposed neurones. The two antagonistic systems taken together have been called by Langley the "autonomic nervous system." What was formerly called the sympathetic system is that part of the autonomic system which is connected chiefly with the cervical, thoracic, and lumbar portions of the spinal cord; while those parts of the autonomic system connected chiefly with the mid-brain (fibres running in the N. vagus in the N. oculomotorius), with the medulla oblongata (fibres running in the N. and N. glossopharyngeus) and with the sacral portion of the spinal cord (fibres running in the N. pelvius) are known as the "autonomic proper," or, better, as the "craniosacral autonomic system."*

In addition to these two sets of nerve fibres going to each viscus, some organs have an intrinsic nervous mechanism, partly subor-

*The anatomy and physiology are still further complicated by the fact that each of these two systems contains two sets of fibres—one "favoring" the main function subserved, the other "inhibiting" it. For simplicity of presentation, this point is not extensively elaborated in my paper.