great central nervous masses forming the brain and spinal cord. These latter masses, as now becomes more and more evident, are the only structures in which occurs the work of transmuting afferent-nerve impulses into efferent-nerve impulses with all the accompanying changes in intensity, rhythm; &c., which make up reflex action. Such functions, it is now known, are not attributable to sympathetic ganglia. These last are structures in which one neurone makes communication with other neurones. To that extent, therefore, redistribution of nervous impulses does occur in them, impulses arriving by a few neurones being distributed so as to affect many. But the sympathetic ganglia are not the seat of reflex action. The sympathetic system is now known to consist entirely of conducting paths which, like the nerve-trunks of the cerebro-spinal system, merely conduct nerve impulses either toward the great nervous centres of the spinal cord and brain, or, on the other hand, away from those great centres. In the cerebro-spinal nerves the pre­ponderance of the conduction is toward the centres, in the sympathetic system the preponderance of conduction is away from the centres.

More is known of the sympathetic system from its efferent aspect than its afferent, and we shall consider the former first. One great difference between the efferent paths of the sym­pathetic and those of the ordinary cerebro-spinal system is that the former carry nervous impulses not only to muscular tissue but to secreting glands, whereas the latter convey them to muscle only, indeed only to muscle of the striated kind. Another difference is that the efferent path which the sympathetic affords from the great central nervous centres to its muscles and glands consists always of *two* nerve-cells or neurones, whereas the efferent path afforded by the cerebro-spinal motor nerves con­sists of one neurone only. The two neurones forming the sympathetic path are so arranged that one of them whose cell­body lies in the spinal cord has a long axone-process passing out from the cord in the motor spinal root, and this extends to a group of nerve-cells, a sympathetic ganglion, quite distant from the spinal cord and somewhere on the way to the distant organ which is to be innervated. In this ganglion the first sympathetic neurone ends, forming functional connexion with ganglion cells there. These ganglion cells extend each of them an axone process which attains the organ (muscular cell or gland cell), which it is the office of the sympathetic path to reach and influence. The axone-process of the first nerve cell is a myelinated nerve-fibre extending from the spinal cord to the ganglion; it constitutes the pre-ganglionic fibre of the conduction chain. The axone-process of the second nerve­cell, that is the neurone whose cell-body lies in the ganglion, is usually non-myelinate and constitutes the post-ganglionic fibre of the chain.

This construction, characteristic as it is of the sympathetic efferent path, has been found also in certain other efferent paths outside the sympathetic proper. And as these other efferent paths convey impulses to the same kind of organs and tissues as do those of the sympathetic itself, it has been proposed to embrace them and the sympathetic under one name, the *auto­nomic* system. This term includes all the efferent paths of the entire body excepting only those leading to the voluntary­muscles.

That the term “ autonomic system ” is not merely a conveni­ence of nomenclature, but really represents a physiological entity, seems indicated by the action of nicotin. This drug acts selectively on the autonomic ganglia and not on the cerebro­spinal. In the former it paralyses the nexus between pre­ganglionic and post-ganglionic fibre. It is by taking advantage of this property that many of the recent researches which have done so much to elucidate the sympathetic have been executed.

The term “ autonomic system ” must not be taken to imply that this system is independent of the cpntral nervous system. As mentioned above in regard to the sympathetic, that is not the case. The autonomic system is closely connected with the central nervous system through the ordinary channel of the nerve-roots, spinal and cranial. It may, in fact, be regarded as an appendage of the cranial and spinal roots, or rather of certain of them, for with a considerable proportion of their number it is not connected.

The sympathetic is that part of the autonomic system which is connected with the spinal roots from the second thoracic to the second lumbar inclusive (man). Its ganglia are divided by anatomists into the vertebral, those which lie as a double chain on the ventral face of the vertebral column, and those which lie scattered at various distances among the viscera, the pre-vertcbral. Langley has shown that there is no essential difference between these except that the vertebral send some of their post-ganglionic fibres into the spinal nerves, whereas the latter send all their fibres to the viscera. The sympathetic sends its post-ganglionic fibres—

1. To the muscular coats of the whole of the alimentary canal from the mouth to the rectum; to the glands opening into the canal from the salivary glands in front back to the intes­tinal glands; to the bloodvessels of the whole of the canal from mouth to anus inclusive.

2. To the generative organs, external and internal, and to the muscular coats of the urinary bladder.

3. To the skin; (*a*) to its blood vessels, (*b*) to its cutaneous glands, (*c*) to unstriated muscle in the skin, *e.g.* the erectors of the hairs.

4. To the iris muscles and blood vessels of the eyeball.

The sympathetic nervous system is sometimes called the visceral. It will be seen from the above that this term is not well suited in some respects, because the sympathetic supplies many structures which are not visceral. Another objection is that a great deal of important nerve-supply to the viscera is fur­nished by parts of the autonomic system other than sympathetic. That the sympathetic does, however, of itself constitute a more or less homogeneous entity is indicated by a curious fact. The substance adrenalin, which is the active constituent of extracts of the adrenal gland, has the property when introduced into the circulation of exciting all over the body just those actions which stimulation of the efferent fibres of the sympathetic causes, and no others. It is possible that when a nerve is stimulated some body at the nerve ending is set free, and this by combining with another chemical substance induces activity in the end organ (gland or muscle). It may be that when a sympathetic nerve is excited adrenalin is set free and combines with some substance which induces activity.

The rest of the autonomic system consists of two portions, a cranial and a sacral, so called from their proceeding from cranial and sacral nerve-roots respectively. The cranial portion is subdivided into a part belonging to the mid-brain and a part belonging to the hind-brain. The ciliary ganglion belonging to the eyeball is the ganglion of the former part, and its post­ganglionic fibres innervate the iris and the ciliary muscles. The hind-brain portion gives pre-ganglionic fibres to the facial (intermedius) glossopharyngeal and vagus nerves; its post­ganglionic distribution is to the blood vessels of the mucous membrane of the mouth and throat, to the musculature of the digestive tube from the oesophagus to the colon, to the heart, and to the musculature of the windpipe and lungs.

The sacral part of the autonomic system issues from the spinal cord with the three foremost sacral nerves. Its ganglia are scattered in the neighbourhood of the pelvic organs, which they innervate. The distribution of its post-ganglionic fibres is to the arteries of rectum, anus and external genitalia, to the· musculature of colon, rectum, anus and the urinary bladder, and to that of the external genitalia.

The part played by the sympathetic and the rest of the autonomic system in the economy of the body is best con­sidered by following broad divisions of organic functions.

*Movements of the Digestive Tube.—*It is those movements of alimentation not usually within range of our consciousness which the autonomic system regulates and controls. Nor is its control over them apparently essential or very complete. For instance, the pendular and peristaltic movements of the intestine still go forward when all nerves reaching the viscus