

## BOOK REVIEWS

**The Physiology of Nerve Cells.** By John Carew Eccles. (Pp. ix + 270, 30s.; \$5.75) London: Oxford University Press; Baltimore: The Johns Hopkins Press. 1957.

One of Sherrington's notions was that every neurone in the central nervous system functions as a convergence point and "common path" for impulses from many sources. Its output is graded, over a wide range, by the shifting balance of excitation and inhibition generated by those impulses. The early experiments used muscular contraction to measure the output of the "final common path", that is, of the ventral horn cells. Professor Eccles was a collaborator of Sherrington's in the latter phases of that work, and is now an acknowledged leader in the direct microphysiological investigation of neurone and synapse which is its modern outcome. In his book *The Neurophysiological Basis of Mind* he reviewed progress up to 1953. For his new book, whose title is not, like its predecessor's, misleading, there has been much to add. So rapid is the advance that in the interval between the delivery of the Herter Lectures at Johns Hopkins in 1955, and the writing of this book which is based upon them, fresh discoveries have had to be assimilated.

Eccles' own research has centred on the ventral horn cells and on the synapses formed upon them by the simplest reflex pathways of the spinal cord. Simplified assumptions treat the cell as a globule invested by a plasma membrane and immersed in an infinite volume of tissue fluid. Experimental alteration of the ionic composition of the cell interior has been used to analyse the effects produced by excitatory and inhibitory synapses on the membrane potential. Experimental results from other central neurones and from neurones of invertebrates are collected together to fill out the picture.

Dale's principle, that all the synaptic endings of a single neurone should liberate the same chemical transmitter, has been shown to be true in the case of the ventral horn cells, whose peripheral terminals and intraspinal axon collaterals are all cholinergic. The discovery that there is an interneurone in the simplest inhibitory pathway in the spinal cord is taken to mean that the dorsal root fibres liberate excitatory transmitters only; inhibitory action necessitates the interposition of one or more interneurones to produce inhibitory transmitter substances. Acetylcholine is the excitatory transmitter of the recurrent collaterals of the ventral horn cells, but in spite of rigorous testing, the other central transmitters are still unidentified.

The book, although clearly written, is strenuous reading, and is for the specialist in biophysics and neurophysiology. Those who have long admired the author's achievements will envy once again the intellectual energy that has brought forth such a wealth of detailed hypotheses. They will not fall into the error of supposing

that these are intended as final explanations, and will recognize their power to stimulate new research.

C. G. PHILLIPS

**Brain Mechanism and Drug Action.** A Symposium: Fourth Annual Scientific Meeting of the Houston Neurological Society, Texas Medical Center, Houston, Texas. Compiled and edited by William S. Field. (Pp. ix + 147; illustrated. 32s. 6d.) Springfield, Illinois: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1957.

This small book will be of interest to workers in many branches of the neurological sciences for although its subject has not been tackled at the fundamental cellular level it has a wide field of application. The first two chapters are devoted to the reticular formation on which drug activity is presumed if they evoke an arousal response in the E.E.G. of curarized unanaesthetized animals and not in "cerveau isolé" preparations. In a chapter that is a model of clarity of illustration, Marrazzi describes the effects of certain drugs on synaptic transmission in autonomic ganglia, as a result of which he postulates a cholinergic excitation and adrenergic inhibition for synapses at all levels within the central nervous system. This is shown to be true for a disynaptic association pathway connecting the optic cortices of the cat across the corpus callosum. The action of some tranquillizing drugs on the central afferent pathway in the curarized animal is reported by Eva and Keith Killam who also studied the effect on rhinencephalic seizures induced by electrical stimulation of the fornix. In a short chapter, Roger Guillemin presents experiments on A.C.T.H. release in response to stress and the effect of chlorpromazine, reserpine, and serotonin on this reaction. Finally, Joseph Brady describes methods for evaluating the effects of drugs on behaviour. This he prefaces by a short historical review, among the words of which are scattered 157 references. The book is completed by David McK. Rioch whose summary of the proceedings is both clear and sensible.

This is a well illustrated and nicely produced book in the Thomas tradition.

**Fundamentals of Clinical Neurophysiology.** By Paul O. Chatfield. (Pp. xiv + 392; 151 figures. 63s.) Springfield, Illinois: Charles C. Thomas. 1957.

This is a valuable book for students of neurology who require an up-to-date summary of the physiology of the nervous system and the special senses. The contribution of clinical studies in man to physiological knowledge does not, however, receive the attention it deserves.