

NEUROPHYSIOLOGY OF BEHAVIOUR

Ciba Foundation Symposium on the Neurological Basis of Behaviour

Edited by G. E. W. Wolstenholme and Cecilia M. O'Connor. (In commemoration of Sir Charles Sherrington, O.M., G.B.E., F.R.S., 1857-1952.) Pp. xii+400. (London: J. and A. Churchill, Ltd., 1958.) 52s. 6d. net.

THIS volume contains a collection of some nineteen papers presented at a Ciba symposium commemorating the birth of Sir Charles Sherrington in 1857. As is usual with Ciba symposia, the meeting was attended by only a small international group, and the book is intended to present the proceedings to a much wider circle. The papers covered many fields related to neurology, but the main emphasis was, as might be expected, on neurophysiology and experimental neurology.

The latest data on the activity of single neurones of the spinal cord are reviewed by Eccles, while the behavioural effects of lesions (Bard, Brierley, Kluver) and electrical stimulation, both in animals (Olds, Andersson, Monnier) and in man (Penfield) are very adequately covered. Other fields discussed are: sexual behaviour (Harris), the effects of stress (C. P. Richter), the rhinencephalon (Green), brain enzymes (Rosenzweig) and drug action (Elkes). Many of the papers are reviews containing material much of which has already been published; nevertheless they serve to bring this together for discussion, which follows each paper. On the other hand certain papers contain a proportion of new information, and these, while they illustrate trends in research, also focus attention on the fact that new developments in this field must depend upon advances in technique. For example, Olds outlines the new results which are coming from experiments on electrical self-stimulation in animals; Jasper reviews the responses of single cortical neurones in unanaesthetized animals during conditioning; and Malcolm discusses the activity of cortical neurones in freely moving animals. All these developments and many others which are providing information linking electrophysiological and behavioural studies depend upon new technical skills.

The only criticism which one might make is that the contributions made by psychology and biochemistry to this symposium are small, yet both these fields of study are becoming increasingly important to work on neurological mechanisms. However, no symposium can ever be truly comprehensive if it is to be confined to a single volume at a reasonable price, and this book provides an excellent review of our present state of knowledge in this subject. It is well illustrated and contains an adequate index.

P. B. BRADLEY

PHYSIOLOGY OF THE CEREBELLUM

The Physiology and Pathology of the Cerebellum
By Prof. Robert Stone Dow and Prof. Giuseppe Moruzzi. Pp. xv+675. (Minneapolis, Minn.: University of Minnesota Press; London: Oxford University Press, 1958.) 100s. net.

STUDENTS of cerebellar physiology have been well served by a sequence of splendid critical writings, each marking a distinct advance in knowledge, and in some degree defining the direction of

later research. Foremost among them stand those of Sherrington (1900), Luciani (1915), Bremer (1935) and Holmes (1939). Dow and Moruzzi's new book will take its place with these. A physiological and pathological study of the cerebellum, it is planned as companion to a forthcoming morphological treatise by Larsell.

In their general nature, and in the technical approach to them, cerebellar problems resemble those presented by other parts of the central nervous system, but without preoccupation with the relation between nervous and mental events. The oldest approach tries to analyse the disorder of function—in this case, of posture and movement—resulting from destruction of the cerebellum or of some part or parts of it. Following the injury, the pattern of disability undergoes progressive change until a final steady state is reached. It is difficult to determine how far the disability at each stage is 'negative', due to lack of cerebellum, and how far 'positive', due to new activity of surviving nervous tissue. The general conclusion, however, is that the cerebellum tends to subdue postural reflexes on one hand, and on the other, to reinforce and steady the motor outflow from the brain. Electrical stimulation, although its effect is mixed, confirms the reality of these two streams of action.

The large and richly folded cerebellar cortex (with an area only a small fraction of which is exposed on the surface of the organ) receives impulses from all the receptors, and not only from the proprioceptors, as would have been expected from pioneer work. These impulses arrive at areas the surface localization of which is sharpest in deep anaesthesia. The cortical Purkinje cells send impulses to the cerebellar nuclei and thence to brain and cord. How far is this cortical output directly driven by the afferent input, and how far by intrinsic neuronal activity of the cortex? This cortex has the same apparently homogeneous, but very complex, microscopical structure throughout its extent. In the past there has been some loose usage of the term 'functional localization'. Anatomical localization of areas of arrival and departure of impulses has been abundantly shown. Is the active response of the cerebellar cortex to incoming impulses also localized, or is there, rather, spread and mass action, converging ultimately upon the different corticofugal systems?

On these and many other questions, this book assembles a wealth of experimental and clinical fact. The bibliography has about 2,000 references, old as well as new, and in many languages. These are not merely quoted, but critically appraised: the authors have taken great trouble to extract from them the facts needed for reasoning, and to reject poor observations (for example, those with inadequate anatomical control). The arrangement is methodological: ablation experiments; stimulation experiments; electrophysiological experiments; the cerebellum and other central structures; clinical symptoms; pathology. The analysis of clinical symptoms reveals the full stature of Gordon Holmes's contribution to cerebellar physiology. The pathological processes affecting the cerebellum are admirably described from the physician's point of view. Some of the sections end with interesting general essays, and these, and the essay "General Considerations on the Function of the Cerebellum", might well be read consecutively. The book as a whole would probably not be read consecutively by anyone other than a reviewer; but it is all very readable, well indexed