

a plea to the mammalian physiologists. He expresses the hope that they may find in the invertebrates some answers to questions which to now have not been amenable to study in the mammals.

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International review of neurobiology. Vol. 9. — C. C. Pfeiffer and J. R. Smythies (Editors). (Academic Press, New York, 1966, 420 p., \$16.50).

The Editors should be congratulated on their selection of topics and contributors to this volume. As pointed out in the preface, "... the aim of this review is to provide a forum in which the latest progress in the many and different sciences that make up neurobiology can be presented...". I believe that this has been achieved in this publication. S. M. Crain reviews the development of organotypic bioelectric activities in central nervous tissues during maturation in culture. He points out that neurons in embryonic spinal explants can form organized synaptic networks *in vitro*. Similarly, the growth of neonatal mouse cerebral cortex in culture reveals a process of self-differentiation. Of interest to the electroencephalographer is the fact that considerable bioelectric activity can be recorded from these remarkable structures. Thus, they provide a model system for studying central nervous system function. Furthermore, the absence of a blood-brain barrier permits the study of neuropharmacological agents which do not penetrate into the intact central nervous system. This technique seems to offer a great deal to the experimental electrophysiologist interested in chemicals. The chapter by P. Krupp and M. Monnier on the unspecific intralaminar modulating system of the thalamus is of special interest to the neurophysiologist and electroencephalographer. The diffuse thalamic system is involved in different neuronal mechanisms such as sleep, arousal, learning and pain perception. The authors point out that this system, however, is not essential for these functions entirely. Thus, they conclude that the diffuse thalamic system is an important modulating mechanism as a result of its polysensory input.

The chapter by L. Gyermek on the pharmacology of imipramine and related antidepressants is presented in a scholarly manner. It is recommended for all those interested in tricyclic antidepressants. Both the structure-activity relationships of the tricyclic antidepressants as well as their known mechanisms of action are covered. In general, peripheral neuropharmacologic and cardiovascular effects are described. Electrophysiological evidence of their central mechanisms of actions is extremely limited. The author rightfully points out that although the majority of observations have been made on peripheral tissues it would appear that the pharmacological actions of these compounds relate to an action on the brain monoamines. The effects of brain monoamines appear to be potentiated by these drugs. The central cholinergic blocking properties of these agents do not appear to be primary. The recent

data by Votawa to the contrary have not been included since they appeared after publication of this book.

The chapter by P. M. Seeman, membrane stabilization by drugs including tranquilizers, steroids, and anesthetics, is again of interest to the neuropharmacologist. Seeman points out that many centrally acting drugs produce stabilization of nerve membranes. He has assembled a great deal of evidence to extend the idea of membrane stabilization beyond the neuron; it occurs with a large variety of cellular and subcellular membranes. Although such drugs have widely different pharmacological effects (for example, anesthetics, antipsychotic agents and the corticosteroids), Seeman suggests that their different *in vivo* actions are presumably due to a variety of biological and physical factors. This review brings together further evidence to suggest that antipsychotic drugs are acting through their membrane stabilizing properties, a view now widely accepted.

The chapter by L. G. Abood on the interrelationships between phosphates and calcium in bioelectric phenomena attempts to support the hypothesis that depolarization of nerve and muscle membranes is associated with decreased transfer and utilization of inorganic phosphate. Abood proposes a simple model for depolarization and ion exchange which involves a lipoprotein complex linked to ATP by calcium. The contribution by J. Sutin on the periventricular stratum of the hypothalamus summarizes many anatomical and neurophysiological studies. Sutin's review is especially refreshing in view of the need for correlated morphological functional analyses.

The paper by I. Darian-Smith on neural mechanisms of facial sensation is scholarly. By reviewing both anatomical as well as electrophysiological methods he presents a functional scheme of individual nuclear regions within the ascending pathways mediating facial sensation. Of special importance is the demonstration that considerable feedback operates at all levels within the ascending somatic system. As is true for spinal projections subserving somatic sensation, a similar double ascending system for facial sensation is also present.

The excellent reviews contained in this volume are highly recommended especially to the neuropharmacologist and neurophysiologist. Other workers in the neural and behavioral sciences will find it an excellent reference source. Both the editors and contributors are to be congratulated. The *International Review of Neurobiology* is on the road to becoming a reference standard in this important interdisciplinary area.

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A stereotaxic atlas of the brain of the pigeon. — H. J. Karten and W. Hodós. (Johns Hopkins Press, Baltimore, 1967, 195 p., \$20.00).

This excellently illustrated atlas shows Nissl stained transverse and sagittal sections at 0.5 mm intervals from A14.5 to P4.5 and from lateral 0.5 to 7.25. The photo-

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