

BOOK REVIEWS

UNITY OF ACTION

Nervous and Hormonal Mechanisms in Integration

Edited by George M. Hughes. (Symposia of the Society for Experimental Biology, No. 20.) Pp. viii+565. (London: Cambridge University Press, 1966. Published for the Company of Biologists on behalf of the Society for Experimental Biology.) 75s. net.

INCLUDING an introduction described as a prologue, this book contains twenty-one original papers which were delivered at a symposium held in St Andrews in September 1965 under the auspices of the Society for Experimental Biology. It may impress the reader, however, more as a book of essays than as the usual proceedings of a conference, partly because of the way in which the papers are presented and partly because the discussion that would normally follow each paper has been omitted. The style is generally easy and clear, and it is an added recommendation, for a book in which invertebrate systems form the main topic of discussion, that most of the papers are introduced with enough background information to make previous knowledge of the topic not essential for an understanding of what follows. Another advantage, possibly the result of good editing, is that unusual technical terms are in most cases clearly defined.

Although only three papers deal solely with vertebrates and one only with mammals, there is much to interest all physiologists. The theme which runs throughout (except in one paper on plants) is how animals of varying degrees of complexity achieve in themselves the "oneness" of behaviour which is described as integration; on this, each paper has some contribution to make either in the experimental analysis of some mechanism essential to integration or in drawing attention to some new aspect of the problem. In some papers the comparative aspects of the questions discussed are of considerable interest, as in those on the control of cilia, the chemical senses of insects, the chemical transmission of nerve impulses and neurosecretion. The paper on this last topic as well as contributing new information provides an excellent critical review of some of the most important unresolved questions about neurosecretion.

The same topic is discussed in the paper on the brain of the worm by R. B. Clark, who points out its significance in the context of Sherrington's concept of the different levels of integration as a connecting link between the nervous and chemical systems. The scope of this paper is much wider, however, and in addition to the relative importance and functions of the neurosecretory cells of the supra-oesophageal ganglion (possibly, in the author's view, constituting only half the brain) he discusses the brain as a sensory centre, the integration of innate behaviour and, at considerable length, various aspects of learning.

One paper which in many ways best fulfils the promise of the title deals with the nervous and endocrine control of sexual behaviour in the grasshopper. Interactions of hormonal (specifically from the corpora allata) and nervous influences as they operate in each sex are clearly presented, and by a model series of experiments a whole chain of activities in the endocrine and nervous

systems underlying the sexual behaviour both of male and female is revealed. In comparison the analogous investigation of reproduction in canaries is less satisfying. Here more emphasis is on the analysis of observed behaviour and less is placed on the underlying mechanisms. The behaviour under consideration, however, although stereotyped to some degree, is more complex and its thorough documentation may be necessary before experimental analysis of the controlling mechanisms can proceed very far.

Neural mechanisms receive a large share of attention in other papers on coelenterates, crustacea and insects. The analysis of crustacean reflexes provides some interesting parallels and contrasts with the mammalian system. A paper of a very different kind and one of the most attractive in the book is that presented by Roeder and Payne on acoustic orientation in moths and how this faculty may be used by the moth to escape from predatory bats to whose ultrasonic cries it is sensitive.

The achievement of this book is that it presents twenty-one papers which are of a generally high standard and provide useful and stimulating accounts of the behaviour and functional make-up of many different species of animals. On the other hand, what many of the papers lack, which readers might expect to find, is historical perspective. Few if any of the ideas which they explore are really new, and it would not have been out of place in the introductory paper to make more explicit the debt which all contributors to some degree owe to Sherrington. The omission is perhaps a reflexion of the regrettably wide gap which seems to separate zoology from physiology; more communication between the two parties would be of benefit all round.

CATHERINE HEBB

BIOCHEMISTRY AND SCHIZOPHRENIA

Amines and Schizophrenia

Edited by Harold E. Himwich, Seymour S. Kety and John R. Smythies. Pp. ix+290. (Oxford, London and New York: Pergamon Press, Ltd., 1967.) 75s. net.

THIS most interesting and important book records the proceedings of a symposium held in Atlantic City in 1965, and basically explores three themes, which can be summarized briefly as the catecholamine hypothesis, the tryptamine hypothesis and the transmethylated hypothesis.

In the early chapters, the now famous pink spot is discussed, although much of this work has been superseded by more recent publications. Friedhoff and van Winkle list their evidence supporting an identification of this spot as β -3,4-dimethoxyphenylethylamine along with further comments on its likely origin. Their findings are questioned by Perry *et al.* and largely confirmed by Kuehl and Bourdillon and Ridges. The latter authors also claim a correlation between pink spot excretion and the "non-paranoid" group of schizophrenics.

Evidence implicating a disordered tryptophan metabolism and the importance of indoleamines in relation to the mental state is presented by Brune, Sprince, Richter and Berlet *et al.* In the discussion (these were particularly informative, as is so often the case in this type of publication) following Richter's paper Schildkraut produced some evidence also involving catecholamines.

Comments on psychoactive substances range from Holmstedt's description of the separation and identification of the active principles contained in extracts of the snuff used by South American Indians through Himwich's electroencephalogram alerting studies; Szara's metabolic studies including his theoretical model of brain function; Synder and Merrill's fascinating relationship between electronic configuration and the hallucinogenic potency to Smythies and Syke's structure-activity relationships of