

postulated structures which do in fact give identical diffraction effects, needs more practical consideration than it has generally received so far.

Part 2 gives an account of the results of the analysis of some organic molecular structures. This section will be particularly valuable to students both of crystallography and of chemistry. Many young workers in this field are graduate physicists whose knowledge of organic chemistry is rudimentary. Prof. Robertson's treatment, which by following the historical sequence does in fact pass from the very simplest structures to those of greatest complexity, is admirably suited to lead them gently but authoritatively to an understanding of one important side of crystallographic investigation. The young chemist, on the other hand, is made to realize, with force and clarity, how valuable are crystallographic studies in supplementing information gained by way of the standard chemical methods. Now that X-ray methods have become sufficiently refined to be able to indicate the positions of hydrogen atoms, the already large body of structural information relating to hydrogen-bonded compounds is seen to be capable of much future extension.

References are given throughout the book, and there are good name and subject indexes.

K. LONSDALE

PHYSIOLOGY OF INSECTS

Insect Physiology

Edited by Kenneth D. Roeder. Pp. xiv+1,100. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1953.) 120s. net.

THE insects as a group are distinguished from other classes of animals not only by their abundance and diversity and by their great economic importance but also by their physiology. They have a highly complex cuticular covering, a tracheal system of respiration, a characteristic endocrine system which regulates their striking metamorphoses, a capacity for flight, with flight muscles showing rates of contraction and relaxation which may exceed 1,000 per second, and elaborate sense organs and nervous system. There is therefore some justification for presenting a separate account of their physiology.

The manner in which this subject is to be treated presents a difficult problem to the author. Is he to take for granted in the reader a knowledge of general physiology and biochemistry, or is he to assume that the reader is being introduced to physiology (except at the most elementary level) for the first time? The different authors of this joint work have adopted different methods. Writing on the biochemistry of muscle, D. Gilmour gives an epitome of present knowledge on glycolysis and oxidative metabolism in muscle in general, merely fitting into this background what little is known about the special biochemistry of the muscles of insects. K. D. Roeder adopts much the same treatment for the function of nerves and ganglia—though by including the Crustacea he has more to say that applies specifically to the nerves of arthropods.

To write a really good chapter or series of chapters in a book of this kind each author must have read and appreciated the literature of his subject. That certainly applies to most of the contributors: A. G. Richards on the cuticle, D. F. Waterhouse and M. F. Day on the digestive system, W. Trager on

nutrition, V. G. Dethier on receptor organs—to mention a few names only. All these are authors well known for their researches in these fields and masters of their literature. Certain other chapters, such as those on respiration and excretion, are somewhat slighter.

Most of the authors have interpreted their task as calling for a pretty complete and balanced survey with only a modicum of critical discussion. J. B. Buck, for example, writing on the composition of the blood, has been at great pains to collect much scattered information and present it in a series of most valuable tables and charts. But others have adopted a more discursive method. L. E. Chadwick contributes three chapters on insect flight, amounting in all to nearly 100 pages. Clearly this is out of proportion to the rest—but these chapters are the best written in the whole book, and the general editor was certainly wise to permit this degree of freedom. The four chapters on growth, written by D. Bodenstein, are likewise somewhat discursive. But they are closely argued and show evidence of careful thinking. Even those readers who do not accept all the conclusions reached will find these chapters most stimulating. T. C. Schmierla contributes four chapters on insect behaviour. These are packed with information about the natural history of insects and make most interesting reading. But since the matter with which they deal is for the most part still beyond the grasp of the physiologist, they stand rather apart from the rest.

There are important topics, such as reproduction, insect pigments, light production and others, which are not included. For these reasons Prof. Roeder describes his book as a critical discussion rather than a complete review of insect physiology; but in fact most of the ground is covered fully and well.

V. B. WIGGLESWORTH

IDENTIFICATION KEYS TO THE BRITISH FAUNA AND FLORA

Bibliography of Key Works for the Identification of the British Fauna and Flora

Edited by Dr. John Smart and Dr. George Taylor. Pp. xi+126. (London: The Systematics Association, 1953.) 12s. 6d.

A SECOND edition of this very useful publication is welcome, including, as it does, many new references. The layout is clear and convenient and follows the same general plan as in the first edition, though the section on wood anatomy has been replaced by more useful ones on the anatomy of higher plants and the identification of pollen. Detailed criticism of such a work is difficult without an exceptionally wide knowledge of the literature. It must also be borne in mind that it is, after all, a list of works for assistance in the identification of the British fauna and flora, and from this point of view many important detailed works on particular groups may well be unsuitable for inclusion.

None the less, when due allowance has been made, there are some peculiar inclusions and omissions, which make this second edition a little disappointing. Space only allows a few random examples to be quoted here. It is strange that in the list of textbooks on p. 3 there are works which, excellent in their day, are now quite out of date. Why, for