BOOK REVIEW

INSECT PHYSIOLOGY. V. B. Wigglesworth. 7th Edition 1974. Chapman and Hall, London. John Wiley and Sons, New York, 166 p. This small book is very readable and can be finished in a couple of evenings. It appears to be a much condensed version of Professor Wigglesworth's *Principles of Insect Physiology*. Eleven chapters deal with integument, respiration, circulation, digestion, excretion, nutrition and metabolism, growth, reproduction, muscles, nervous system and behavior, and the endocrine system. There is an adequate index. About half of the chapters have from 2-4 line drawings, but some have none.

The chapter on respiration is one of the best. Wigglesworth discusses structure of trachea and spiracles, mechanisms of gas exchange, and regulation of breathing. He devotes the last 4 pages in the chapter to specialized respiration of aquatic and parasitic forms. The chapters on integument and excretion also were well written and contained several illustrations.

The book does have some shortcomings. Undoubtedly one of the most difficult decisions in writing a book of this size is choosing what to leave out. In this case some of the most exciting work in insect physiology was omitted or so severely curtailed that the reader may not realize that many scientists are using insects as model systems to study questions related to the whole of biology. For example, the chapter on the endocrine system fails to convey the importance of contributions from insect physiology being made toward understanding hormonal regulation. This is surprising since Professor Wigglesworth has contributed so much to this very understanding through his own research.

The chapter on muscles includes little of the mechanism of muscle contraction. Some deficiences are likely due to the highly condensed material. For example, the explanation of the click mechanism operating in flight muscles of Diptera and Hymenoptera stops short of explaining how an oscillation is maintained. "This sudden release [of tension] deactivates the contracting muscle and causes it instantly to relax,. . . ." It should be explained that muscle remains in a physiological state called the "active state" for a few milliseconds following a nerve stimulus. The muscle does indeed cease contracting if the tension is suddenly released, but it can contract again if the tension is reintroduced while the active state exists. Release of tension occurs in one set of thoracic muscles when the wing clicks into the up position, and tension is reintroduced to the opposite set of muscles. Contraction of these muscles clicks the wings into the down position and reintroduces tension to the first set of muscles. Several oscillations of wing movements can be achieved in a few milliseconds after only 1 nerve stimulus to each set of opposing muscles. Vertebrate muscle can be made to give several oscillatory contractions for each nerve stimulus, so the uniqueness achieved by insects lies in the elasticity of the wing hinges and the instability of intermediate wing positions.

There are a few printing and/or careless errors. On p. 91 queen substance of honey bees is incorrectly named 9-oxodecanoïc acid rather than 9-oxo-trans-2-decenoic acid; on p. 103 there is a slight error in the structural formula of cholesterol; on p. 118, the sex pheromone of *Periplaneta* as reported in the original literature was incorrect; on p. 149 the retinal pigment involved in the light reaction mediating vision is said to be retinene, rather than rhodopsin.

In spite of these limitations, the book is still a valuable addition to an entomologist's library. For working entomologists, not especially trained in physiology, it is a fast way to get an overview of some of the basic foundations of physiology. For graduate students nearing a Ph.D. qualifying exam, it can serve as a memory jogger for earlier physiology courses, and very likely as a source of information with which he can stump all his professors.

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