BURROWS, M. 1996. The Neurobiology of an Insect Brain. Oxford Univ. Press, Oxford. xv + 682 p. ISBN 0-19-852344-0. Hardcover. $100.00.

The author's stated objectives are "to define and analyze our current knowledge of the functioning of the brain of one animal, the locust, and to show how this contributes to our understanding of brains in general." In accomplishing these objectives Burrows emphasizes how the brain and other central nervous system components function to produce and control behavior, rather than giving descriptions of how the sensory system functions. The author has a long career in insect neurobiology research and writes with the authority of that experience.

It should be said at the outset that there is a great deal of comparative insect neurophysiology in the book. It seems to me that the title is misleading, because the book covers far more than the brain, and more than neurobiology of locusts.

The book is divided into 12 chapters. Chapter 1 gives a brief introduction to locust anatomy and biology, and Chapter 2 has a thorough description of the anatomy of the locust brain, ventral ganglia, and major nerves. Chapter 3 is a very comprehensive (about 70 pages) description of the cellular components of the nervous system. Beginning in this chapter and for much of the remaining chapters the book contains much that is comparative insect neurophysiology and it is sometimes difficult to determine from the text if the author is describing something known to occur in locusts or in

some other insect. Fortunately many citations to the literature have been given, and by looking at the titles of these citations included at the back of the book one can sometimes see the name of the insect for the cited work.

Chapter 4 is an excellent discussion of the embryological development of the nervous system. Chapters 5 and 6 (about 85 pages in the two chapters) contain a thorough description of neurotransmitters, neuromodulators, neurohormones, and their physiological actions. Research in this particular arena of neurobiology, in both vertebrates and invertebrates, is perhaps the most rapidly expanding area of neurobiology. One of the fascinating aspects of the emerging research is the often high degree of similarity between vertebrate and insect neuropeptide structures, suggesting ancient molecules that have been adapted many times to perform different functions.

About 60% of the book is given to Chapters 7 (control of the legs), chapter 8 (walking), chapter 9 (jumping), chapter 10 (escape), chapter 11 (flying), and chapter 12 (breathing) which fulfill the author's promise to relate the nervous system to behavior. Of necessity these discussions require some reference to peripheral sensory structures, but as the author admits in the preface, the book is not about sensory physiology, and few details are given.

An outstanding feature of the book is a very thorough and excellent glossary (about 20 pages) at the end. Although every discipline has to have its own language to some extent, neurobiology, perhaps more than most areas of physiology, is loaded with jargon. The glossary will be especially helpful to nonspecialists and noninsect biologists who may use the book. The book is well illustrated with line drawings and printed on high quality paper.

This book will be useful to vertebrate neurobiologists, especially in a comparative sense, but they need to be cautioned that insects are a very diverse group of animals and there is considerable variability from one group to another. Thus, to assume that everything described in the book is characteristic of a locust, or of any other insect, is a grave error.

The book will be valuable to anyone teaching a course in insect physiology, insect behavior, or comparative neurobiology.

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