The book opens with three chapters that describe locusts and the physical layout of the locust nervous system, including its cellular elements. These are followed by one chapter on the development of the nervous system and three chapters that describe the physiological properties of neurons and how they are organized to control behavior. The book concludes with five chapters, nearly 50% of the text, which discusses the neural basis of specific actions—walking, jumping, escape, flying, and breathing. This organization allows Burrows to consider in detail the neural circuits that underlie the expression of each behavior without having to make digressions to describe the characteristics of the neurons that make up the circuits.

What makes the book especially valuable is that rather than merely summarizing the literature, Burrows evaluates it. He is not shy in pointing out which current opinions are actually not well supported by experimental evidence. Established researchers will certainly be challenged by some of his views, and students will come away with a better appreciation of the inevitable controversies that surround cutting-edge research.

The book is attractively laid out and remarkably free of errors (except that locusts are hemimetabolous, flies are holometabolous), but I found the index quite disappointing. Many a mention or discussion of concepts, phenomena, or animals are not referenced in the index. This, and because of its unnecessarily restrictive title, may prevent neurobiologists who work on vertebrates from picking up a copy. This would be unfortunate, because the ideas about motor function and behavior that Burrows discusses would actually interest anyone who wants to understand the neural basis of behavior.

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ANNUAL REVIEW OF NEUROSCIENCE. *Volume 20: 1997. Edited by W Maxwell Cowan, Eric M Shooter, Charles F Stevens, and Richard F Thompson. Palo Alto (California): Annual Reviews.* $60.00. xii + 654 p; ill.; subject index and cumulative indexes (contributing authors and chapter titles, Volumes 11–20). ISBN: 0-8243-2420-X. 1997.

NERVOUS SYSTEM REGENERATION IN THE INVERTEBRATES. *Zoophysiology, Volume 34.*

By Stacia B Moffett. Berlin and New York: Springer-Verlag. $158.00. xi + 208 p; ill.; index. ISBN: 3-540-59454-X. 1996.

Here Moffett has taken on the challenge of reviewing nervous system regeneration in the invertebrates. Her short and concise treatise provides readers with a decent overview of this diverse field, presents models for specific problems, and makes reasonable comparisons with vertebrate systems where appropriate. The literature review will be particularly valuable. The second chapter is a high point, reminding one of the extraordinary regenerative capacities of organisms in various phyla. Some examples leave a sense of wonder and puzzlement, such as a nematode worm that can grow a new tail and head part-way down the body when the nerve cord is cut, or an insect that can accept and reinnervate transplanted legs and ganglia. Necessarily, this chapter highlights how apparently different these phyla are from each other and from the vertebrates.

In much of the following material, however, we begin to see the opposite. Chapters on early responses to injury, pathfinding in growth cones, and synapse formation bring out many common features of both development and regeneration. In early responses to injury, the author covers many of the pivotal studies in our understanding of axonal sealing and sprouting. Oddities are also brought to a reader's attention—as in the long-term survival of the distal nerve section in crustacea by the incorporation of glial nuclei. Early metabolic and possible signaling responses are considered. I was pleased to see some consideration of the nonneuronal components of the nervous system whose role in neural regeneration and neurodegenerative disease is now apparent. The following two chapters, on the growth cone and synapse, place the emphasis on the single cell and developmental capabilities. This is a valid approach where basic mechanisms are common and more easily revealed in single cell observations but, as pointed out, temporal and spatial presentation of cues can be dramatically different in regeneration when compared with development. These two chapters present a solid synthesis of present knowledge through selected studies, and certainly provide the reader with many avenues by which to follow their individual interests.

Overall, this book brings together a scattered literature on invertebrate neural repair. There are areas where more details could have been included, particularly in the treatment of the nonneuronal components in regeneration, where useful additional comparisons with vertebrate systems are possible. What comes home is that, despite the regenerative differences between phyla, so many of the basic mechanisms, either in guidance or signaling, remain common. Therefore, we must consider not just the character of the external cues and the molecular responses, but the interface linking the two. The invertebrates continue to offer exciting model systems for studying this interface, and as the author states, the spiders and insects "are far more complex than the wind-up toys their behavior sometimes suggests" (p 139).

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