major issues of developmental neurobiology and has grouped them according to several rather large subcategories of problems: morphogenesis, histogenesis, neuronal and glial differentiation, and the establishment of interneuronal connections. The success or failure of his efforts will vary depending upon the knowledge the reader brings to this book. It is not easy to read. The author's habit of defining specialized terms only after he has used them two or three times may frustrate novices, and the habit of describing the same experiments several times in different chapters could well create in the reader a "déjà vu" feeling and the erroneous impression that he has gained some familiarity with the literature of a very involved subject. Despite the obviously erudite and scholarly approach, the internal organization of the chapters and subsections often seems to be randomly determined and may well confuse those readers who expect their introductory reading to present material as an organized procession of hard data and softer interpretations. The chapters could probably be read in almost any order, as with Cortazar's Hopscotch. I found the last chapter, which contains Jacobson's own theory of neuronal specificity and a subtle statement of his motivations for studying development, to be a stimulating introduction to the analysis of this book.

These are stylistic points, however, and they will thwart the reader only momentarily. Perhaps more troublesome in potential damage to inexperienced neuroscientists are the author's assertions that the controversies over neurofilament-microtubule interconversions or the reality of axonal protein synthesis are now settled issues. They are not.

Nevertheless, anyone interested in the general problems of cellular differentiation and recognition will find both source material and theory relevant to the nervous system in this very useful book. Read with a dictionary close at hand, this book can be a rewarding and educational reading experience. One minor but noteworthy example (a possible warning for unwary reviewers?) is Jacobson's correct use of the name *Ambystoma* rather than the commonly used and erroneous "*Amblystoma*"; the latter term translates from its Greek roots as "stupid-mouth."

F. E. BLOOM
Laboratory of Neuropharmacology, National Institute of Mental Health, Washington, D.C.

Translocation

Phloem Transport in Plants. ALDEN S. CRAFTS and CARL E. CRISP. Freeman, San Francisco, 1971. xxii, 482 pp., illus. $12.50. A Series of Books in Biology.

The subject of translocation in plants is an old and difficult one. Both the tissues through which it occurs and the forces responsible for movement have been contested. The controversies have been lively.

Crafts's early conviction of the merits of the mass or pressure flow mechanism has shaped his scientific career. This book is best viewed as a monograph of his and his associates' work.

In justification, one should point out that the pressure flow mechanism is the only one for which a reasonably sound scheme of operation is readily evident. Its simplicity is beguiling, however, in view of the difficulties and uncertainties others have found in fitting it to all of the accumulated data.

The subject of phloem exudation, a phenomenon that could not be handled critically prior to the aphid-stylet technique, is belabored by the authors, in this reviewer's opinion. Also the importance to physiology of previous evidence for closed pores in the sieve plate is overemphasized. Physiological data have always indicated free movement through sieve tubes, and most physiologists have placed the burden of proof as to the open or closed status of the pores on the anatomists, who, although they originally believed the pores to be closed, now, on reexamination with the electron microscope, find them to be open. The consequences of this development are fully incorporated into the book.

If one approaches the book with these things in mind, together with a consciousness that the authors' aim was "to collect *and interpret* [italics mine] the experimental information available," one will find a useful compilation of literature and opinions dealing with each of the subtopics of translocation.

The strength of the book rests in the zest with which the authors have searched for and compiled most of the literature even remotely oriented toward a discussion of mechanisms. Some papers whose intent was data gathering, or merely a careful description of the phenomenon of translocation per se, are omitted; there is some carelessness in citing of authors.

A weakness of the book resides in the apparent urge to reinterpret data in a way foreign to the intent of the original author. Reinterpretation is perhaps justified in some cases in the light of recent findings on sieve plate pores and is generally acknowledged by the authors, but it nevertheless does present a problem as to whose interpretation is best.

The authors have managed to encompass, judge, and classify most of the available data bearing on translocation mechanisms. The study of translocation benefits from such a book. Prior knowledge of the literature is necessary for the reader, since frequently the arguments require familiarity with papers and often even figures and plates of specific papers. As to its place among books about translocation, this one has no competitors in breadth and depth of coverage.

ORLIN BIDDULPH
Department of Botany, Washington State University, Pullman

Nematode Worms

Plant Parasitic Nematodes. B. M. ZUCKERMAN, W. F. MAI, and R. A. ROHDE, Eds. Vol. 1, Morphology, Anatomy, Taxonomy, and Ecology. xiv, 346 pp., illus. Vol. 2, Cytogenetics, Host-Parasite Interactions, and Physiology. xviii, 348 pp., illus. Academic Press, New York, 1971. $22 each volume; $38 the set.

The Structure of Nematodes. ALAN F. BIRD. Academic Press, New York, 1971. xiv, 318 pp., illus. $16.50.

Some of the most fundamental biological principles were established by the study of nematodes, but on the whole these animals are rather neglected by zoologists. With so much emphasis in zoological teaching on evolutionary theory and phylogenetic relationships, the fact that nobody really has much idea as to where they fit in has not exactly helped nematodes to get the attention they deserve. As parasites of man and domesticated animals they have, of course, been treated in courses on parasitology; and the growing realization of their importance as agricultural pests has led to their recognition in courses in plant pathology and, to underline the point, "entomology." But they continue to be neglected as animals in their own right; in my view, the development of the more applied fields of biology will be greatly impeded until this is remedied.

The recent demonstration that some nematodes are vectors of plant viruses has increased interest in them. The zo-