Book Reviews

• **Readers' comments on reviews should be addressed to the Editor.**

Behavior

CONTROL AND DEVELOPMENT OF BEHAVIOR: AN HISTORICAL SAMPLE FROM THE PENS OF ETHOLOGISTS, ed. by Peter H. Klopfer and Jack P. Hailman. 1972. Addison-Wesley Publishing Co., Reading, Mass. 281 p. Softback; price not given.

This is the editors' second volume of papers of historical interest to the student of ethology. Four topics—"innate release mechanisms," displacement activities, imprinting, and learning—are discussed. Descriptive papers, arranged chronologically, communicate the complexity of one behavioral sequence and the laborious series of experiments leading to our present understanding of it; other papers, which describe attempts to elicit certain kinds of behavior by stimulating neurons or by injecting hormones, are less conclusive. But the conclusion of the book is optimistic. Papers by W. H. Thorpe, N. Tinbergen, and C. G. Beer challenge experimenters to incorporate new advances in neurophysiology, genetics, and developmental biology into their work. This volume is recommended to undergraduates who are contemplating research in ethology.

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Biochemistry

MACROMOLECULES: STRUCTURE AND FUNCTION, by Finn Wold. 1971. Prentice-Hall, Inc., Englewood Cliffs, N.J. 318 p. $3.50 softback, $8.75 hardback.

This textbook is another in the "Foundations of Modern Biochemistry" series. Wold says, in the preface: "In this book we discuss the status of the structure–function analysis of biological macromolecules and macromolecular complexes. The ultimate goal of the analysis must be to explain all the functional properties of the molecules in question in terms of their completely defined three-dimensional structure, and the analysis thus contains three separate components: the determination of structure, the determination and quantitation of function, and final correlation of this information into the structure–function model." This is an apt description of what the book is about. Both protein and nucleic acid systems are discussed. A key point is made early: all biologically active proteins must be able to recognize and bind other substances. This concept is applied to enzymes and to immune, carrier, regulatory, and constructile proteins. The author discusses binding as studied in enzyme kinetics and, by analogy, applies this analysis to other protein systems. Next, structures of several enzymes, as models, are discussed in a way that is strongly supported by the experimental methodology and data from which the structures were deduced. The author skillfully interweaves the information derived from structure studies, activity measurements, and the effect of structure modification on activity in the various enzyme examples. The latter part of the book is devoted to nucleic acid systems in terms of structure studies, transcription of genetic information into ribonucleic acid and translation in protein biosynthesis, replication of deoxyribonucleic acid, and the assembly of all this into an integrated model.

This well-organized, well-written book is really a review of the state of the art as it pertains to structure–function relationships. Each chapter ends with citations of textbooks and reviews relevant to the chapter material; but many other references are included as footnotes. The book has an abundance of clear, useful figures and illustrations. It is fairly priced and is an especially good buy in the paperback version. It is highly recommended for instructors of biochemistry and molecular biology and their graduate students.

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LIFE IN ACTION, by Peter Farago and John Lagnado. 1972. Alfred A. Knopf, Inc., New York. 264 p. $6.95.

This book is an attempt to explain fundamental concepts of biochemistry with minimal use of such conventional paraphernalia as formulas and equations. Designed primarily for the layman and for scientists who are not biologists, the book makes extensive use of simplified statements, analogies, and diagrammatic illustrations. Experimental evidence and items from the history of biochemistry are used in the development by authors who are professional biochemists. Clearly, they are seriously concerned with the awesome task of sharing biochemical ideas with the general public. The book briefly treats of the scope and methods of biochemistry; cellular organization; proteins, enzymes, and metabolic systems; genetics; and cellular controls. It ends with a brief perspective on directions of development and the potential contributions of biochemistry.

Because the task is so difficult, it is understandable that the book is only partly successful in achieving its goals. Some major topics are omitted or are so compressed as to be of doubtful comprehensibility. The treatment stresses animal biochemistry; microorganisms and higher plants are neglected. For instance, the central role of photosynthesis is barely hinted at, and the process itself is touched on sketchily in less than two pages. Oversimplification often tempts the authors to teleologic phrasing of biologic functions; for example, the urinary loss of sugar in diabetes is described thus: "If insulin is not present in sufficient quantities, the kidney attempts to take out of the system as much glucose as possible . . . ." Despite their sincerity in trying to simplify the exposition, the authors frequently lapse into biochemical terminology or apologize for the lack of scientific rigor of their statements. This could jar the ear of the layman, who is straining to understand material. The illustrations are not entirely satisfactory in their explicatory role and sometimes are so simplified as to be misleading.

Despite such difficulties, the book has major assets. It is written in a bright, attractive style. The authors are competent in their field, and the treatment is generally interesting and up-to-date. The biology teacher may well find this book useful and provocative. A good grounding in biology would negate the difficulties that make the book of questionable value to laymen. In any case, the attempt of biochemists to describe aspects of their science for serious consideration by others is praiseworthy.

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Botany

PLANTS, CHEMICALS AND GROWTH, by F. C. Steward and A. D. Krikorian. 1971. Academic Press, New York. 244 p. $4.50 (softback).

F. C. Steward probably is best known for his success in developing complete plants from cultured cells. More recently he has directed some of his energy toward the writing of short books for nonspecialists. In this one he and a co-worker have attempted to introduce plant-growth regulators to a wide audience of students, teachers, research workers, and agriculturalists. Although the book is not meant to be an extensive review of the topic, there are good summaries on the kinds of growth regulators, on bioassay systems, on the interactions of regulators, and on the possible roles of plant hormones in the cell. The book

is well illustrated, and it includes numerous structural formulas. There are 30 pages of references.

The authors' aim is to present a "philosophy" of the subject. One must therefore remember that some of the notions they present may simply reflect their biases: the "large differences," as they see them, between plants and animals; the use, in the study of chemical control of organogenesis, of mature cells rather than unorganized tissues; the belief that all aspects of molecular biology must be demonstrated for plants before they can be assumed to occur there. And the reader may get the idea that no other researchers have been successful in growing mature plants from single-cell isolates.

Although some sections (chapter 1, for example) are a bit confusing because of the massive amount of information jammed into a relatively small space, this book is a concise statement of our progress in understanding the chemical control of plant growth and development. It is a technical essay; therefore some background in biology is needed. However, it is an excellent reference for anyone trying to obtain an overview of the subject.

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FUNDAMENTALS OF THE FUNGI, by Elizabeth Moore-Landecker. 1972. Prentice-Hall, Inc., Englewood Cliffs, N.J. 493 p. $16.00 (hardback).

This is the third new textbook in a field long dominated by a single text, Alexopoulos' *Introductory Mycology*. Fortunately the three authors approach their subject differently: Burnett *(Fundamentals of Mycology)* is concerned with function and behavior; Webster *(Introduction to Fungi)* concentrates on the organisms; and Moore-Landecker, in the present book, uses both these approaches, in separate sections, and also provides a unit on ecology. As with most compromises, this causes some problems. The separation and condensation of morphology and taxonomy into one section have produced a barely adequate treatment; for example, the slime molds (traditionally studied by mycologists) are not even mentioned in order to exclude them. The section on physiology and reproduction, apart from some uneven treatment and small omissions, is much more successful. Although the chapter on metabolism is beyond that necessary in an introductory course and the fairly extensive treatment of hormones does not mention Barksdale's recent contributions, a good overview of the subject is provided. The real strength of the book lies in the section on ecology and the use of fungi by man. This section, which highlights the involvement of fungi in the decomposition and recycling of organic material and in plant diseases, brings home the important role they play in our environment and everyday life.

The text is generally free of errors and misspellings, and it has numerous and adequate illustrations. With this addition to the available general-mycology textbooks, an instructor should be able to find one that matches his own approach to the subject.

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THE BIOLOGY OF FLOWERING, by Frank B. Salisbury. 1971. Natural History Press, New York. 182 p. $5.95.

This diminutive but important book is so carefully put together that it admits of no serious criticisms. The sequence of sections is as follows: methods of study; temperature dependence of flowering; the light-absorbing pigment, phytochrome; biologic timing; the biochemistry of flowering; the postulated flowering hormone, florigen; and flowering in natural environments. Salisbury's treatment is a lucid exposition of what, in other hands, might be simply an extremely confusing body of data. He uses many helpful diagrams and figures, with explanations both in legend form and in the text. Each topic is carefully summarized and related to preceding topics. Strongly motivated high-school or college students or interested laymen may easily be inspired to pursue the subject through the excellent selection of references and the intriguing suggestions for experiment.

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VASCULAR PLANTS: FORM AND FUNCTION, by F. B. Salisbury and R. V. Parke. 2nd ed., 1970. Wadsworth Publishing Co., Belmont, Calif. Softback; price not given.

As expected, this is a well-written contribution to plant science. This edition contains a great deal of new information and some updating of earlier material. Also, the publisher has improved the binding. My favorite feature of this basic textbook is that major problems (for example, transpiration) are presented as problems that are being worked on today.

The book can be used by teachers for review and by advanced students for comprehensive-exam preparation; and it can be used in rigorous introductory botany and biology courses in college if it is supplemented with other material. In other words, this book is intended for the serious biology student.

There are a few minor faults. The proper forms of plant families should be capitalized: Lycopodiaceae, not "lycopodiaceae family." The treatment of life cycles could be improved. The description of alternation of generations is somewhat confusing. In some cases the information, particularly on plant form, is so tersely stated as to be obscure; for example, all that is said of cells of vascular cambium (no figures) is, "Fusiform initials are elongated cells with pointed ends, whereas a ray initial is essentially isodiametric with a somewhat flattened radial axis." I regret the brevity of the discussion of the Hatch and Slack pathway of carbon fixation. Also, the authors (or the editor) make annoyingly frequent references to other books in this series. Other weaknesses in the text are equally minor.

This book is a valuable addition to the literature. It contains a truly amazing amount of accurate and exciting information. It deserves to be read by all students of modern plant science.

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Earth Science

OUR BLUE PLANET, by Heinz Haber. 1972. Charles Scribner's Sons, New York. 86 p. $1.95.

Eight radio lectures by the author provided the material for this book, which was originally published in Germany in 1965. There is an unbelievable amount of information about our earth in these short chapters. Haber is concerned with the earth's origin, how it evolved, how life developed, what forces gave the earth its present shape, and what its future may be.

An earth-science teacher would probably find most of the information old hat, but to the biology teacher the book should be valuable. I doubt if any question raised by students about the earth could not be answered here. The answer might be in the form of a hypothesis: much of the information is conveyed in this form. This in itself has value, because if we can get students to become more aware of the fact that much of what we know and do in science is hypothetic, we have gone a long way toward developing scientific literacy in our students.

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THE NATURE OF THE UNIVERSE, by Clive Kilmister. 1971. E. P. Dutton Co., New York. 197 p. $6.95 (hardback).

To be able to treat of cosmology without reference to the intricate mathematics behind it is in itself a difficult feat. This the author has accomplished incredibly well. The book covers the development and evolution of thought on the nature and origin of the universe, from the contributions of the early Greeks to the hypotheses of the present day.