

Book Reviews

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

Botany

THE VASCULAR CAMBIUM: ITS DEVELOPMENT AND ACTIVITY, by William W. Phillipson, Josephine M. Ward, and Brian G. Butterfield. 1971. Barnes & Noble, New York. 188 p. \$4.50.

Any biologist interested in developmental plant anatomy will want this book. The authors assume the reader has some knowledge of general plant anatomy and that the basic terminology of cell types in cambium, wood, and phloem is familiar to him. The book leads the reader to an understanding of terms by illustrating usage rather than by constructing formal definitions. For example, in the discussion of the origin of vascular cambium the authors say, "There are two opposing and extreme viewpoints, though most morphologists have taken some intermediate, usually undefined, position." The remainder of the discussion describes the development of vascular cambium from procambium, as reported by several botanists. As a result of this method of presentation, the student develops an understanding of the term "vascular cambium" as it is used.

The nature of changing spatial relationships in growth as the diameter of a plant axis increases is stated very concisely. Geometric requirements and aspects of growth are outlined, and the interrelationships are clearly indicated. The chapter on cambial activity summarizes information on effects of plant hormones on the vascular cambium. The final chapter is on experimental control of cambial development.

By way of comparison: the chapters on vascular cambium in two plant-anatomy textbooks are 13 and 16 pages long, respectively, although additional references to cambium occur in other pages of these books. Because *The Vascular Cambium* extensively summarizes information in one place, it will be valued by anyone interested in plant anatomy, dendrology or dendrochronology, tree growth, or plant development.

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EXPERIMENTS IN PLANT PHYSIOLOGY, by Francis H. Witham, David F. Blaydes, and Robert M. Devlin. 1971. Van Nostrand Reinhold Co., New York. 245 p. \$6.50 (softback).

This laboratory manual, which consists of 56 exercises, is obviously writ-

ten by people who have had considerable experience teaching plant physiology. Each exercise has a list of materials needed, a clear and concise procedure section, and instructions for reporting results. At the end of each experiment is a list of references, which will be of considerable value to the highly motivated students. However, those who prefer to have a brief introduction dealing with the theory on which the experiment is based will be disappointed.

The manual contains many more experiments than could ordinarily be completed in a two-semester course. There is such wide variation in degree of complexity of the experiments that challenging ones can be found for beginning as well as advanced students of plant physiology.

The authors have based many of their experiments on the published works of such well-known plant physiologists as F. Skoog, C. A. Miller, F. W. Went, and F. B. Salisbury. Furthermore, many of the other exercises are taken from time-tested experiments designed in the teaching laboratories of noted plant physiologists; for example, several exercises were taken from experiments written by B. S. Meyer, D. B. Anderson, and C. A. Swanson.

An appendix provides aids for scheduling; these will prove invaluable to the instructor who attempts the exercises for the first time. There is a section on preparation of materials and reagents.

I look forward to using this well-designed, carefully written, rather comprehensive laboratory manual in my own classes. I feel it will be widely used by plant physiologists throughout the nation.

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TREES OF THE NORTHERN UNITED STATES AND CANADA, by F. H. Montgomery. 1970. Frederick Warne & Co., New York. 144 p. \$4.95.

This is a hard-backed, pocket-sized identification handbook for 163 tree species. Montgomery has developed keys that use line drawings and non-technical language. In addition there are 136 figures and 24 photographs. The distribution of each species is noted. This book should be on the shelf or in the pocket of naturalists and botany students.

William T. Barker
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Fargo

Cell Biology

CELL BIOLOGY, by E. J. Ambrose and Dorothy M. Easty. 1970. Addison-Wesley Publishing Co., Reading, Mass. 510 p. \$12.50.

This book was written either for a separate course in cell biology or as a component in a course combining cell biology with organismic and population biology. Though it presupposes previous instruction in chemistry and biology, it does give a review of fundamentals in these fields. A student without at least a year of college chemistry will find difficulty in understanding the sections on biosynthesis and other molecular phenomena. The book avoids mathematics.

The first section treats in detail the structure, function, and synthesis of cellular components while considering the molecular and organelle levels of organization. The properties of the cell's surface are given special attention. Next, a short section has to do with mitosis, life cycles, and heredity of cells. Although heredity of microorganisms is emphasized, gene-mapping in *Drosophila* is considered in some detail. The other lengthy section considers cellular movement, along with the biology of development. The mechanisms of whole-animal development are correlated with cellular activity. A short section dealing with simple life and the origin of life concludes the book.

Cell Biology is well illustrated with photographs and line drawings. Each chapter is concluded with a bibliography of pertinent secondary literature, which should be available in all college and many high school libraries.

The treatment of enzyme kinetics and of bioenergetics is low-key. The physiology of neurons is ignored except in a general treatment of membrane potentials, where many of the current concepts are explained.

The authors are to be commended for writing a book that can be used in an introductory-biology course: they present complex material in an easily understood manner. This book joins several others that have been published within the year to fill the need for textbooks in cell biology.

Donald L. Wise
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CELL BIOLOGY, by Robert M. Dowben. 1971. Harper & Row, Inc., New York. 584 p. \$12.95.

Because it is difficult to know what is cell biology and what is molecular biology, biochemistry, and genetics, it is difficult to know what a textbook about cell biology should be like. Text-

books differ in their choice of subject matter, and to my knowledge a revelation clearing the question has not been received. Dowben's book certainly is as good as any other as judged by content, but it does not reflect the choice I would have made.

The first two chapters introduce the macro- and ultra-structure of cells. The illustrations are good. But the next seven chapters are about aspects of biology covered in detail and well in textbooks of biochemistry, molecular biology, and genetics. Energetics, cellular biophysics, amino acids and proteins, enzyme systems and metabolic pathways, DNA and its replication, ribosomes and protein synthesis, and regulation of metabolic processes are the subjects of these chapters. It is not entirely clear why the author tried to cover such a wide range, especially with so many excellent books (such as Stent and Watson) available as supplements to students of cell biology. He states in his introduction that his book "follows closely the recommendations of the Panel on Undergraduate Major Curricula of the Commission on Undergraduate Education in the Biological Sciences"; having served on the commission I can say with some confidence that the intention was not to include the full scope of biology in one book.

Chapters 10 through 16 are more to the point of cell biology: they cover lysosomes and protein regulation in eukaryotic cells, organization of biological structures, mitochondria and chloroplasts, cell permeability, excitation and nerve impulse, contraction in skeletal muscle, and primitive motile systems. In my teaching of these aspects of cell biology I have found it both easy and informative to introduce the more biochemical processes (of the previous seven chapters) as they become intellectually relevant to the grosser cell processes. My reasoning is based on the empiric observation that beginners seem to grasp the grosser processes more readily—which, if true, makes it somewhat easier to rationalize at a later time the more chemical processes. This reasoning is invalid for classes from which have been excluded those students whose analytic abilities are underdeveloped.

Dowben's book is very well illustrated, and it is written in a style acceptable to most professionals. It is not a book for the beginner or for the student who is not strongly motivated. If it is used in classes with students who are not afraid of molecular processes and are not repelled by jargon and a condescending style, it is as good as any book on the market.

Val W. Woodward
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Ecology

UNDERSTANDING ENVIRONMENTAL POLLUTION, ed. by Maurice A. Strobbe. 1971. C. V. Mosby Co., St. Louis. 357 p. \$5.95.

The editor, in compiling the selected readings and adding the appendices, says he had two major objectives: to provide a "text reference" to support biology courses and "to provide a source of information on the current status of the science and technology of environmental quality for students of the sciences and humanities." To this end, Strobbe divides the book into two parts.

The first set of articles is most readable. The lay readers as well as the science students will have a greater appreciation of specific environmental problems and will see how important it is that problem-solving should be interdisciplinary. Strobbe provides a good balance of view points on pesticide and water-pollution problems; this helps students to understand that not all scientists agree.

The selection of articles in the second section is more variable in both readability and significance. In this sense it is a true reflection of the scientific journals. The assignment of specific articles from this set, however, can be very useful.

The appendices vary in value from a most useful set of "standard" environmental tests to a rather useless, because nonevaluative, list of environmental films.

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ENVIRON/MENTAL: ESSAYS ON THE PLANET AS A HOME, ed. by Paul Shepard and Daniel McKinley. 1971. Houghton Mifflin Co., Boston. 317 p. \$4.50 (softback).

Environ/mental is a collection of articles, many of which are drawn from sources the typical biologist would not normally read. There is a good deal of emphasis on the social and psychologic effects of overpopulation and of the destruction of the natural environment on humanity. By dealing with these matters—often overlooked or ignored by biologists—the book can certainly broaden the reader's perspective of the dilemma we are facing. There are also a number of excellent articles from *Science* and the book ends with a 22-page bibliography of additional reading. Each article is prefaced with comments by the editors; these are often more interesting than the articles.

In general, the articles are not well integrated sequentially: the book seems

somewhat disjointed. However, I found it interesting and thought-provoking. Some of it would be difficult for the typical student, but there is much good supplemental reading here for courses in biology, sociology, and psychology.

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THE CHEMICALS WE EAT, by Dr. Melvin A. Bernarde. 1971. American Heritage Press, New York. 208 p. \$6.95.

Much has been written about chemical additives to food; but *The Chemicals We Eat* is not just another book on the subject. It is a well-written, fresh, realistic view of the ever-expanding, often frightening chemicals-in-food industry.

The technical chapter on chemicals found in natural foods and food additives may be difficult for the layman; the other six chapters are not. Bernarde explains that many natural foods contain chemicals toxic to man but in amounts insufficient to damage one's health. Perhaps he is a bit optimistic when he views chemical additives in the same way. He points out that it is the consumer who has demanded convenience foods. Furthermore, the only hope of feeding an expanded population is by increased yields, which necessitate chemical aids and additives.

Even after the dramatic cranberry and cyclamate announcements, little has been done to educate the consumer. *The Chemicals We Eat* is an attempt in this direction. It explains why food additives are necessary, provides information about strengths and weaknesses of the U.S. Food and Drug Administration, and explains what FDA does in the interest of the consumer. Furthermore, the book deals with the food of the future, including preservation of natural foods and the manufacture of foods from nonfood materials.

This book does well what it intends to do: allay fears about many food additives. It is easily read, is factual, and should be of interest to every consumer.

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GLOBAL ECOLOGY: READINGS TOWARD A RATIONAL STRATEGY FOR MAN, ed. by John P. Holdren and Paul R. Ehrlich. 1971. Harcourt Brace Jovanovich, Inc., New York. 303 p. \$4.50 (softback).

This selection of papers does not deal with global ecology as these words are usually defined but, rather, is concerned with the future of mankind and the quality of the planetary ecosystem. For the editors, there "are no panaceas