

Book Reviews

Botany

BOTANY: A BRIEF INTRODUCTION TO PLANT BIOLOGY

by Thomas L. Rost, Michael G. Barbour, Robert M. Thornton, T. Elliot Weier and C. Ralph Stocking. 1979. John Wiley and Sons, Inc. (One Wiley Drive, Somerset, New Jersey 08873). 344 p. and Appendices, Index and Preface. \$15.95.

The authors state that the objective of this new text is to provide an abridged and shortened version of *Botany: An Introduction to Plant Biology* and that the book is intended for introductory courses at the university, college, or community college level. The book is attractively assembled and the various topics are well labelled. To broaden its appeal, the focus of the book is largely organismal, and the topics that have the least whole organism slant (genetics and chemistry) are discussed in a series of appendices. In some respects, the condensation is effective. This book is shorter than the parent book (by nearly 300 pages), and the reduction in size is not achieved through smaller print and larger pages. In fact, the briefer book makes more extensive (but sometimes inappropriate) use of white space than did the parent book. Life cycle diagrams, for example, are spread over two pages; and, although well illustrated, they are difficult to follow as a cycle from stage to stage. At first inspection, the topics that are important in understanding the essential aspects of plant biology appear to be adequately presented. A closer examination, reveals that careful presentation and clear description of some concepts are sacrificed to save space. The section on metabolic processes, for example, covers a basic introduction to organic chemistry terminology, the functioning of enzymes, the categorization of metabolic reactions, respiration, control of metabolism and protein synthesis in only 14 pages.

In summary, the authors of this book attempted the difficult task of condensing a book that is already only an introduction. The condensation is achieved by limiting the depth of coverage of most

topics and condensing some discussions to such a bare-bones level that the explanations are difficult to follow. This is not to say that this annotated-outline approach is without merit; it just seems that perhaps a more effective way to teach a shortened or less-detailed course in botany is to select readings from a larger textbook or choose a book that covers fewer topics than the larger, more complete books. In such a case, the less-abbreviated explanation can more adequately introduce the selected topics.

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PRACTICAL FUNGAL PHYSIOLOGY

by Peter M. Robinson. 1978. John Wiley and Sons, Inc. (One Wiley Drive, Somerset, New Jersey 08873) 123 p. \$9.50.

This book describes the use of specific fungi as tool organisms for physiological experiments. The experiments are described in detail with practical information for handling the organism and conducting the experiments presented clearly and concisely.

The experiments are selected to demonstrate the major events of the fungus life cycle: spore germination, development of mature hyphae in a typical colony, and spore production. This is reflected in the chapter titles: (1) Spore germination, (2) Hyphal growth, (3) The developing colony, (4) Reproduction in fungi, (5) Nutrition of fungi, (6) Morphogenetic substances produced by fungi, (7) Staling and colony morphology, (8) Mycostasis, and (9) Continuous culture. There is a current reference section and an appendix with information on the specific organisms used in the experiments, on laboratory technique, and on interpretation of results.

The book is well organized and is illustrated with table and line-drawings. It is clearly written and could serve as a manual for laboratory experimentation without requiring excessive special equipment.

The fungi used as experimental organisms are described clearly, but should not be interpreted as "typical" of the major groups of fungi because of the

wide diversity present in the fungi. They are a selected group of organisms that have been commonly used by research workers and are easily maintained in culture.

This is not a textbook for a course dealing with fungi or even with fungal physiology. It could be very useful as a laboratory guide for a section of a course dealing with microorganisms and their activities.

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Cell and Molecular Biology

INSIDE THE CELL—THE NEW FRONTIER OF MEDICAL SCIENCE

by Maya Pines (no date of copyright) Office of Research Reports, National Institute of General Medical Sciences, National Institutes of Health (Bethesda, Maryland 20014) 96 p. Free.

It would appear that *Inside the Cell* was written to serve two purposes. First, this booklet provides the reader up-to-date knowledge of cell biology that has potential value in the understanding of diseases. The secondary function of this National Institute of General Medical Sciences (NIGMS) publication is public relations. Both purposes seem well served by Pine's excellent writing style and the high-quality photographs and illustrations.

The reader is provided a short introduction in which an abbreviated account of the evolution of cell biology illustrates the close working relationship of instrument technology and science. The current state of knowledge is shown to be the result of interrelated work by electron microscopists, biochemists, physical chemists, physiologists, geneticists and x-ray crystallographers. Subsequent sections further develop the premise that contemporary biology will progress most effectively through cooperative and integrated efforts of persons with specialized training using specialized equipment.

The first few descriptions of cell components are very basic; the information provided is equivalent to that found in

any introductory high school textbook. As I read through the sections on the general characteristics of the cell, the nucleus, the endoplasmic reticulum and other descriptions of cell components, they seemed to be merely a different, although refreshing discussion of the cell. About half-way through the booklet, the proposition begins to emerge that the key to a significant number of biomedical problems may lie in further study of the cell. A case for basic research is also delineated. Hence, I began to see that what was originally believed to be merely an updated enrichment supplement to an introductory biology textbook is really a carefully developed argument for a systems approach to basic research. The case is subtle but well made.

The later sections of the booklet focus on membranes and membrane models. These sections should be of interest to biology teacher and students alike. A significant amount of relatively new knowledge is packed within a few short pages. Here, too, the reader will find interwoven amongst the biologic content statements such as: "One advantage of working in an interdisciplinary center such as...is that it is large enough to maintain experts who can devise such techniques" (p. 82). Clearly this type of information is valuable to the biology teacher and student. The case for major basic research efforts is not usually made available to the introductory student. The argument for large research centers can be made in economic terms; it is more efficient to centralize expensive equipment that could not be purchased or maintained by smaller laboratories. Although there is something romantic about a lone scientist doing his/her research in an isolated laboratory, arguments such as these need to be brought to the public.

The level of reading and abstractness in the booklet is equivalent to any introductory high school or non-major college biology textbook and should be of interest to the science oriented or socially concerned student. Similarly this publication should provide the instructor of such courses additional insight into the content and issues described above. A glossary is provided for the uninformed reader (which might include lawmakers, readers in a doctor's waiting room, and/or the public at large).

There are two major shortcomings of the publication that will limit its use. First, there are no references; neither general references nor references to research papers are provided for the more interested reader. Second, details of interesting research approaches and designs are left out. The notion of "inquiry" is ignored. Both of these "shortcomings" were no doubt designed into the booklet to keep it at a non-technical level.

As NABT members received copies of this publication as part of their membership, it will merely take some dedication on their part to sit down and read through the 91 pages. It is likely that the professionals who do go through this booklet will find some use for it beyond putting it back on the shelf—even if there is disagreement with centralized research efforts.

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PRINCIPLES AND TECHNIQUES OF ELECTRON MICROSCOPY: BIOLOGICAL IMPLICATIONS

by M.A. Hayat, ed. 1978. Van Nostrand Reinhold Company (135 West 50th Street, New York 10020). 301 p. \$27.50.

This is volume nine in a series designed to provide a complete understanding of the theory and methods of electron microscopy to the biological sciences.

Eight techniques employed in the study of the structure of cellular components and their composition and the recommended procedures or preparation of biological materials are included.

The areas covered and their distinguished authors are: Electron Microscopy of Atoms, John P. Langmore; Electron Microscopy of DNA, John O. Thomas, Techniques for Visualization of Genetic Material, Aimee H. Bakken and Barbara A. Hamkalo; Localization of Acetylcholine Receptors, Mathew P. Daniels and Zvi Vogel; Electron Microscopy of Glycoproteins by High Resolution Metal Replication, Henry S. Slater; Examination of Thyroglobulin Molecules in the Electron Microscope, Gertrud Berg; Electron Optical Measurement of Surface Charges, Imre Veres.

The authors are of an international nature and reputation. Their methods have been used by a large number of competent scientists and represent a comprehensive compilation of methods. Advantages and disadvantages of each method are described.

Each chapter ends with an exhaustive list of references and complete titles. Many micrographs are included along with appendices for solution preparation and staining procedures. The book contains an Author Index and Subject Index.

The techniques are done with the basic tenet that the interpretation of information gained from electron micrographs is dependent upon an understanding of the principles underlying methodology and instrumentation.

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Physiology and Anatomy

PHYSIOLOGY OF THE HUMAN BODY

by Arthur C. Guyton. 1979. W. B. Saunders Company (West Washington Square, Philadelphia 19106). 520 p. \$13.95.

Physiology of the Human Body is a textbook that is exactly what its title implies. It is very strong on function and weak on form of the human body. It is not at all descriptive of human anatomy. This suggests that the student is expected to have more than a cursory knowledge of human anatomy before encountering this textbook and the course it is designed to complement.

This book is thorough and precise in its presentation of the facts of physiology. It will be a fine textbook for undergraduate students preparing for careers in medicine or other health professions. It is probably too rigorous for a straight biology major or at least a biology major with a more ecologically oriented interest and inclination. It is too much for a physiology course in a junior college or technical school that prepares students for paramedical careers requiring two years or less of preparation.

It is well written in a clear, concise style and is pleasantly presented. The type is easy to read, and the illustrations are profuse and appropriate. Many illustrations of the principles discussed in the text are included. The book is authoritative and up-to-date. It contains many references to disease and abnormal physiology that should be of interest to the student.

Because this is the fifth edition (formerly titled *Function of the Human Body*) this textbook obviously has wide appeal. However, an instructor should be cautioned to consider the ability, interests, and needs of the students before adopting this book for a semester course. For the professional physiologist, this is an excellent reference. It is comprehensive and detailed.

Each chapter concludes with a list of useful references that reflect the advanced, technical nature of this book. There are also questions for the student to consider, but they are general and not thought provoking. They are mostly reviews of the general ideas of the chapter.

The textbook was accompanied by a laboratory manual. *Human Function* by Egan and McMillan, that has fourteen laboratory exercises in general physiology. They are mostly the standard exercises the beginning student of physiology usually experiences in a physiology laboratory session. There is also a study