

more change in man's outlook on the world, and his power over nature, than any other advance in natural knowledge that can be clearly foreseen"—there is no explicit treatment of man's responsibilities in using our current genetic knowledge. The authors' piety before the god of scientific knowledge is hollow and deserving of the scathing criticism that critics of irresponsible technology are also addressing to science today.

At most, this well-made book can be a supplementary text for advanced undergraduates or a useful reference for teachers wanting a solid, brief review of microbial and biochemical genetics.

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History

SIR CHRISTOPHER WREN, by Heywood Gould. 1970. Franklin Watts, Inc., New York. 226 pp. \$3.95.

This is essentially a short history of 17th-century England as reflected in Wren's life. The style is low-keyed, and the author avoids much of the bias often found in books about the period. This muted approach may make the book less interesting to children (grade 7 and up).

In the introduction, Gould points out the 17th-century criteria of an educated man and shows how scholars were concerned with many kinds of learning. He then traces Wren's early interests: in geometry, astronomy, sun-dial mechanics, and anatomy. Wren was one of the first practitioners of the "new philosophy," which called for experimentation. Early in life he became highly skilled in developing models for testing hypotheses and for use in explaining ideas to nonscientists. At age 29 Wren was appointed Savilian professor of astronomy in Oxford—just when he was losing interest in the subject.

With the restoration of the monarchy (1660) many new public and university buildings were being erected. Wren—not a professional architect but England's foremost geometrician—was commissioned to design several new buildings at Cambridge and Oxford. So, at about age 30, this former child prodigy, skilled model-builder, associate of scientists, and charter member of the Royal Society began a new career. His designs and finished buildings gained him permanent recognition as one of England's greatest architects. His mastery of geometry and astronomy contributed to the spatial relationships found in his designs. His scientific training and skill in model-building enabled him to serve as construction engineer as well as designer on many of his buildings, including the best-known—St. Paul's Cathedral.

Wren lived, and prospered, under six monarchs and the military dictatorship of Oliver Cromwell; yet there was never a hint of court intrigue connected with him. Artful in apparent compromise, he was able to live outside the turmoil of the time.

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Immunology

BIOLOGY OF THE IMMUNE RESPONSE, ed. by Peter Abramoff and Mariano La Via. 1970. McGraw-Hill Book Co., New York. 508 pp. \$12.95.

The authors, with the help of eleven other contributors, have assembled a comprehensive textbook of fundamental and applied immunology. Their attempt to produce an integrated book has met with reasonable success, although there is some overlapping of content among the 15 chapters. Major chapters deal with the physical and chemical properties of antigens and antibodies; the nature of immunity and the development of the immune response; the induction, regulation, and sites of antibody biosynthesis at the cellular and subcellular level; immunologic memory (for example, the fact that positive response to booster injections is faster and greater than to initial injections); external factors affecting the immune response; the nature of the antigen-antibody reaction; immunologic protection and injury, including the nature of autoimmune diseases; and transplantation immunity.

When differing theories are presented to explain observed phenomena a fair allocation of space is provided for them. Most of the current problems in immunology are touched upon and discussed. The authors make good use of figures and tables, and these prove to be very helpful. This textbook is recommended for biologists whose work involves aspects of immunology, to graduate students, and to physicians.

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Marine Biology

OCEANOGRAPHY: AN ENVIRONMENTAL APPROACH TO MARINE SCIENCE, by Alan Rabinowitz, Toby Bates Sutton, and Edward M. Taylor. 1970. Oceanography Unlimited, Inc., Lodi, N.J. 216 pp. \$7.00 (softback).

Basically, this manual is an introductory curriculum guide for teachers who wish to design a course centered on local marine life and oceanography

in general. It is a compilation of activities that have been used with Florida and California secondary students. It has material for both the teacher and the student.

The introduction describes some elementary techniques and provides the general background needed for collecting or maintaining organisms for study. The next 15 chapters center on the taxonomy and anatomy of common organisms found in the sea. The final 10 chapters treat of a variety of topics, including the tides, instrumentation, physiography, and chemical oceanography.

Most of the activities involve laboratory observation, identification, measurement, drawing, and the preparation of specimens. Each chapter presents the rationale of its topic, explains student objectives, describes materials and procedures, and contains a vocabulary, questions for discussion, and a bibliography. Thus the book resembles many classical textbooks, but it presents far more information and in less space. The teacher doesn't need to be a specialist in marine biology to get along.

The book may have been put together rather hurriedly: frequent grammatical errors and inconsistencies distract the reader from the content by drawing attention to syntax. And the authors seem to address the teacher and then the student, off and on, without a specific pattern. Some of the references are rather old; in particular, the most recent editions are not always cited.

Appendices include a sample examination, a master word-list, tables, lists of films and periodicals, instructions for writing a term paper, and procedures for diagramming biologic specimens. The manual is suitably illustrated with diagrams, charts, maps, and photographs of oceanographic instruments.

Marine biology and oceanography are being taught increasingly throughout the United States. This is one of the first commercially published outlines a teacher could use without having to do a lot of personal spadework or having to start from scratch in designing his own course.

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EXPLORING THE OCEAN WORLD: A HISTORY OF OCEANOGRAPHY, ed. by C. P. Idyll. 1970. Thomas Y. Crowell Co., New York. 288 pp. \$14.95.

Oceanography is a young and extremely diversified science consisting of branches of many disciplines, including marine geology, physics, chemistry, and biology. This book covers the history, modern developments, and interrelationships of these branches in 10 chapters, each written by a well-known

specialist in his field. Of particular interest to students of biology are the chapters "Biology of the Sea," "Food from the Sea," and "Farming the Sea." Other chapters include information on some of the earlier oceanographic expeditions, such as the voyages of the *Challenger* and the *Albatross*; methods of mapping the ocean floor; the study of tides, waves, and currents; chemical constituents of the sea; mineral resources and mining of the sea; history of diving techniques and their use in underwater archeology; and an account of the increasing sophistication in design of submarines and submersible research vessels. The text is complemented by a large number of black-and-white photographs, drawings, and diagrams. Color paintings and photographs—unfortunately, poorly reproduced and one printed upside down in my copy (p. 192)—are grouped into four sections of the book and labeled "Color Essay."

The appendix includes a list of important dates in the history of oceanography and an excellent list of further references for each chapter topic.

Only a small part of this book can be considered strictly biologic in subject matter. However, the book does give an excellent review of the total scope of modern oceanography and should be considered for use as reference or textbook in the growing number of high school and college introductory-oceanography courses.

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Microbiology

THE MICROBIAL WORLD, by Roger Y. Stanier, Michael Doudoroff, and Edward A. Adelberg. 3rd ed., 1970. Prentice-Hall, Inc., Englewood Cliffs, N.J. 873 pp. \$15.95.

The long-awaited new edition is so thoroughly revised that it almost constitutes a new book. Not only are the authors among the foremost researchers in the fields of microbial taxonomy, physiology, and genetics, respectively, but theirs is also one of the best comprehensive microbiology textbooks available—perhaps the best. College students and high school teachers who have a good grasp of genetics, cell physiology, and elementary biochemistry, along with a desire to become thoroughly acquainted with the fantastic world of modern microbiology, will surely enjoy *The Microbial World*. It is certainly an excellent textbook for a high-powered upper-division undergraduate course in microbiology.

The primary aim of the book is the description of microorganisms, including their behavior. This aim has been stretched a bit: there are detailed

presentations of biosynthetic and degradative pathways and of molecular genetic mechanisms, and there is a chapter on environmental cycles of various critical elements. A full treatment of the distinctive features of procaryotic cells, in contrast with those of eucaryotic cells, includes good brief descriptions of most kinds of eucaryotic protists. Approximately three-fifths of the text is devoted to three major subjects: procaryotic metabolism, including energy production and transfer, biosynthesis, and regulation; the major types of bacteria; and bacteria-virus relationships, with attention to current theories of molecular and population genetics. There are chapters on microbial growth and population dynamics and on economic microbiology. A short history of microbiology and a discussion of pertinent techniques are included.

By far the most innovative and exciting sections are those dealing with the relationships of microorganisms with each other, with plants and animals, and with the environment. The ecology of microorganisms is treated in detail, from the evolution of symbioses to mechanisms of pathogenicity and from the effects of bacterial toxins to theories of antibody formation.

Two criticisms may be made. The absence of specific references to original literature becomes critical in the sections on molecular biology and on metabolism. Also, certain ideas about these complex matters have been generalized to the point that important exceptions are sometimes omitted.

The wide margins and the great number of fine illustrations, diagrams, and tables, as well as the lucid exposition of many difficult topics, make the book very useful as a general reference work. It is pleasant to find that excellent organization can make a comprehensive textbook such as this completely unburdensome.

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Molecular Biology

THE MOLECULES OF LIFE, by Gisela Nass. 1970. World University Library, McGraw-Hill Book Co., New York. 256 pp. \$2.45.

As a book intended for newcomers to the study of molecules present in organisms, this book has obvious merit. While emphasis is placed upon simplicity in the presentation, clarity and validity are retained. Among the themes developed are the structure, function, and regulation of the synthesis of macromolecules; structure and organization of multicellular organisms; and the types of molecules produced that serve as communication between organisms

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and within organisms. Much effort has been spent to include diagrams and photographs to assist in developing the ideas of the text. Notably, the diagrams used to show how regulation occurs in a biologic control system and how proteins are formed have real value for the beginning student. There is little emphasis on chemical terminology, but rather an emphasis on stating what happens and then illustrating it pictorially. However, there are two glossaries: one of scientific terms and another illustrating some of the methods used in research in molecular biology. An appendix details the molecular structures for many of the compounds discussed in the book. These features afford a more developed or interested student the opportunity to learn in more detail if he so desires.

If a high school biology teacher or a college biology instructor intends to teach his class something about molecular biology, this book could assist him in establishing a simplified approach to the subject. Because of its restrictive nature it would not be a book to require each student to purchase unless the course is such that there is no one large text but instead a series of smaller, more restrictive and inexpensive books, like this one.

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