

glory; in the chapter on volatile substances, eight are listed ranging from modeling glue to non-stick cooking oil spray; and the chapter on amphetamines lists seven that are commonly abused. Each chapter, with the exception of the one on volatile substances, also includes a brief historical sketch of the substance. These histories are of varying depth and extent, with the best being those of heroin and tobacco. Here the reader learns that the opium poppy was cultivated as early as 4000 B.C. by the Sumerians, that the Roman emperor Tiberius moved his court to Capri to be near the poppy, that heroin was isolated in 1898 and originally believed to be a non-addicting substitute for morphine, and that research on the harmful effects of tobacco can be traced back at least as far as the French physician Bouisson who in 1859 noted the correlation between cancer of the oral cavity and pipe-smoking.

This book is intended for the secondary student and the preface states that its purpose is to provide answers about the biology of drug abuse. The chapters on amphetamines, alcohol, and tobacco do the most complete job of this. For the intended reader, the information presented through discussions and diagrams in these chapters as to how amphetamines affect nerve transmissions and how alcohol and tobacco cause physiological change and damage is quite adequate with but two exceptions: it is mentioned that nicotine and tars immobilize respiratory cilia, but this statement stands alone and is not elaborated upon or tied in with resulting effects; the very questionable statement that cirrhosis of the liver is "... a cancer condition..." is made on page 72. Furthermore, the discussion on what alcohol is (p. 66-67) may leave the reader with erroneous impressions. "Alcohol is a compound with the chemical formula C_2H_5OH " implies that all alcohols have this formula, and the statement "When alcohol is made from grain, it is called ethyl alcohol ..." is only partially correct.

As with the historical survey, the treatment given to the known or suspected biological effects in the other chapters is considerably less (for example, "The sniffing of volatile substances damages the liver, the lungs, the blood cells, and the brain" and "... opiate drugs depress respiration. This means that the rate at which the individual obtains and uses oxygen is slowed down"), but throughout the book much emphasis is given to the symptoms of drug abuse, its harmful social and psychological results, and warnings against drug use. As a result, the more advanced reader may be left with the nagging feeling of *deja vu* and wish for more physiological data and less exhortation. While there is a paucity of materials that gather together information on the many drugs subject to the abuse as this book has done, I feel that the more advanced or sophisticated

reader would probably not gain too much new information other than a fairly extensive bibliographical reference for further reading.

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Microbiology

MANUAL OF CLINICAL MICROBIOLOGY, ed. by Edwin H. Lennette, Earl H. Spaulding, and Joseph P. Truant. 2nd ed., 1974. American Society for Microbiology, Washington, D.C. 970 p. \$15.00 softback, \$20.00 hardback.

This book will be one of the most widely used manuals in the laboratory or classroom of the microbiologist. 125 authors, each writing in his area of expertise, have contributed to this manual. The second edition has completely updated the materials presented and includes 20 new chapters.

The emphasis of this manual is on the organisms commonly found in human infections. Each organism is considered in terms of characteristics and clinical significance along with specific methods and procedures for examination, isolation, and identification. The nomenclature of bacteria has been revised, and the literature citations updated. The book is divided into 11 sections containing 96 chapters. There are 246 illustrations; among these are excellent tables, photographs, and diagrams.

The section on "Infection Prevention—Quality Control" contains some very useful general information for laboratory management such as a quality control program, methods of maintenance of microbial cultures, and suggestions on the selection of disinfectants and antiseptics. The final two chapters, on media, tests, reagents, and stains are of particular importance to the teacher. The preparations are written in detail with notations to guide the most inexperienced laboratory person. This manual should be found on the desk of every microbiologist.

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HANDBOOK OF MICROBIOLOGY, ed. by A. L. Laskin and H. Lechevalier. Cond. ed., 1974. CRC Press, Cleveland. 944 p. \$14.95 (softback).

Long a favorite among microbiologists, the comprehensive four-volume *Handbook of Microbiology* is now available in a condensed edition. The handbook is organized into seven sections: bacteria; fungi; algae; protozoa; viruses; and miscellaneous. The section on bacteria is reproduced entirely from volume 1 of previous editions and pre-

sents a thorough discussion of the various groups of bacteria, including information on genetics and cell wall structure. A general survey of the fungi is presented in the second section, followed by sections on the algae and protozoa. These sections are not as thorough and complete as the other sections but they are adequate. Viral systematics and bacteriophage linkage maps are presented in the viral section. The last section provides primarily information of a biochemical nature, genetic information, and material on immunocompetent cells. These seven main sections are followed by a glossary and general reference sections that provide several useful tables ranging from the periodic table of the elements to foreign alphabets. A foldout 1974 metabolic pathway chart is also included.

There is no doubt in my mind that the editors have succeeded in their goal of producing a highly useful and inexpensive desktop data center. The price and the breadth of the material make it a useful reference for the intermediate or advanced microbiology student, high school biology teachers, or anyone in need of a current concise microbiology reference.

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Physiology

FUNCTION OF THE HUMAN BODY, by Arthur C. Guyton. 4th ed., 1974. W. B. Saunders Co., Philadelphia. 481 p. \$10.50.

A LABORATORY MANUAL FOR GUYTON'S *FUNCTION OF THE HUMAN BODY*, by George G. Armstrong. 3rd ed., 1974. W. B. Saunders Co., Philadelphia. 284 p. \$6.50 softback.

Significant to any evaluation of this textbook by Guyton is the observation that this is actually the third book of a group of three. The other two are *Textbook of Medical Physiology* (1971) and *Basic Human Physiology* (1971). It appears that the basic, original work is the medical physiology, technical and comprehensive in scope, which has been skillfully abridged and simplified to serve different readerships. *Basic Human Physiology* is shortened for a college physiology offering while *Function of the Human Body* is still more elementary and abbreviated.

Specifically, the book under review is a fine example of Guyton's clarity of thought and gift for exposition and communication. There have been selected the salient areas of physiology—beginning with cells and tissues and proceeding through the systems—that most instructors would want to be included. Illustrations are simple and appropriate; there is one color plate on blood cells. The index is adequate. Overall, this book should con-

tinue to earn its popular acceptance because of a straightforward and reasonable approach, and because its small size and modest format should make it quite serviceable to those who do not desire some of the more encyclopedic and technical physiologies. It is one college level publication that could find realistic application to the high school situation.

The second publication, by Armstrong, was intended as a companion for Guyton's textbook. As far as laboratory manuals are concerned, it is one of the best I have seen. The contents parallel—section by section—the contents of *Function of the Human Body*, beginning with the cellular level and proceeding through the major organ systems. Each exercise has an introductory "principles" discussion, then an experimental procedures section, and finally a data sheet to fill in and several questions to answer. Careful consideration discloses accurate, basic, and well-thought-out "experiments," select activities that have obviously been tried and perfected. The latter assessment can be appreciated only by those who have been frustrated many times by poorly explained and unworkable exercises found in all too many lab manuals. Some of the equipment and supplies required are rather sophisticated; therefore, this workbook is probably useful only in a well-equipped college physiology laboratory.

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Related Fields

MATHEMATICS IN BIOLOGY: CALCULUS AND RELATED TOPICS, by Duane J. Clow and N. S. Urquhart. 1974. W. W. Norton and Co., Inc., New York. 708 p. \$8.50 soft-back.

This fascinating book presents a wealth of pertinent theory and methods to biologists. It is basically a calculus textbook, with biological applications cited, and seems much stronger in math than biology. Very few undergraduates would be able to absorb such a bonanza in less than two years' hard study, so its use may be limited to graduate classes. However, all mathematically oriented biologists could benefit from a thorough reading of this book.

The book is very readable. Good examples are given of each concept, followed by problems allowing the reader to try his skill. Even answers are given for selected problems—so rewarding for tentative students. The authors begin with a good presentation of set theory and Venn diagrams, continue through a complex section on probability, and arrive at the main content of the book, differential and integral calculus. The

calculus is well handled, and many higher forms not usually seen in beginning courses are found.

Several fields of great importance to modern biology—statistics in general and nonparametric statistics in particular and matrix theory—are only mentioned in passing, because as the authors state, they would add considerably to the length of an already long book. Since it is intended to be an introductory book for apprentice biologists, I believe a little less depth in calculus and a little more breadth in the above fields would have been indicated. Still the authors have done a beautiful job of teaching the reader, and their book is recommended for calculus courses with large numbers of brave biology majors.

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Zoology

THE LIFE OF BIRDS, by Jean Dorst. 2 vol. 1974. Columbia University Press, New York. 718 p. \$35.00 hardback. Translated from French by I. C. J. Galbraith.

The Life of Birds, which was originally published in French (1971), has now been translated into English. This comprehensive, two-volume work discusses birds from an ecological standpoint by first elaborating the general anatomical, physiological, and behavioral characteristics of the organism and then its adaptations to a variety of habitats. The information is expressed in nontechnical language and is supplemented by more than 100 figures and photographs. A bibliography, found at the end of each volume, is divided into chapters and gives only the principle works cited in each of the specific chapters.

Although volume 1 examines such topics as coloration, feeding, thermoregulation, and evolution, the majority of the discussion centers on the topics of locomotion and reproduction and its consequences.

The chapters dealing with locomotion are illustrative of the clear, concise style found throughout both volumes. It is the author's ability to make a complex subject, such as aerial flight, understandable that makes this essay enjoyable. For example, the importance of flight is stressed immediately by the statement that "every aspect of their [bird's] biology and especially their ways of obtaining food and raising their young, is profoundly affected by their ability to move rapidly in all three planes of space." A logical, stepwise discussion of flight mechanisms is begun with the general modification of the vertebrate body plan which leads into specific anatomical adaptations and finally to the varied types of flight. Comparative examples, in tabular form,

aid in the clarity of the presentation. This developmental sequence is found throughout the chapters in volume 1.

Ten of the 16 chapters of volume 2 are concerned with adjustments that are necessary for birds to survive in varied environments (for example, marine, polar, desert, high mountains, and so on). The discussion again follows a logical development. For example, the chapter on polar environments first looks at the extremes of the Antarctic climate which the avifauna must combat. Several of the methods used by the birds for survival are discussed (microclimates, thermoregulation). Finally, the life cycles of the Adelie and emperor penguins and the Antarctic petrels are used to show specific adaptations to the environments. This is followed by a similar discussion of the Arctic environment and its avifauna.

Two chapters are devoted to aspects of migration and one to the place birds occupy in various ecosystems, with emphasis on their place in energy transfer.

Man's relationship with birds, be it through domestication, hunting, science, habitat destruction, or pesticides, is the final consideration of volume 2. Man's disruption of the equilibrium between birds and the environment, as well as the consequences, is well documented. A plea is made for rational management to allow for the survival of all species.

The author has done a superb job in presenting the biology of birds from an ecological standpoint. The sequencing of topics is logical, and the well documented writing is clear and concise. *The Life of Birds* is "an essay on the ecology of birds, written not so much for the specialist as for the well informed public." These volumes deserve the attention of both groups.

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TURTLES: EXTINCTION OR SURVIVAL, by Sarah R. Riedman and Ross Witham. 1974. Abelard-Schuman, New York. 156 p. \$6.95 (hard-back).

The title of this book is somewhat misleading because the question of extinction or survival is not raised until the very end. Instead of being a dirge for another vanishing animal, this highly readable book is actually packed full of information about turtles, ranging from their prominence as ancient religious figures through their importance as food for early explorers and colonizers to their anatomy, physiology, and behavior. The vocabulary is simple; the chapters are short (on the average five pages). Almost every other page has a photograph or drawing directly related to the text. (A photograph of copulating turtles adds conviction to the text's answer to a classic