

shading seem more complex than the others, and I suspect that many students will look at the illustrations and give up the idea of learning to correctly shade biological drawings.

The last page of the text is devoted to rules for effective lettering, but suggestions about acceptable labeling patterns are missing. This is one area in which many students need help.

It is evident from Bethke's selection of practical techniques that he has had considerable experience in helping the beginner in biological drawing. He has clearly covered essential techniques of representational drawing—techniques that can be applied by high school or college biology students with or without artistic talent. The book should meet at least some of the needs of these individuals.

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THE CHEMICAL BASIS OF PHYSIOLOGICAL REGULATION, by E. J. W. Barrington. 1968. Scott, Foresman & Co., Chicago. 274 pp. \$2.95 (softback).

This is part of the Scott, Foresman "Undergraduate Biology" series. Samuel A. Matthews states in his foreword that the series is designed for introductory courses or as supplementary material for intermediate courses. If students have had a good BSCS background in biology, this book would be excellent as a first-year college text; but for the most part I feel it is more appropriate to a second-level course.

Barrington writes interestingly. He explains the early research in each of the areas he covers, then continues with the modern, more sophisticated research and the current theories on each topic. He makes the reader aware of the very human nature of the investigators by narrating some of their feelings and excitement at each new discovery.

The book is in no way encyclopedic, but the topics chosen are covered in depth, with illustrations from the invertebrates, fish, and amphibians, as well as man. The topics are the uptake of oxygen, uptake of energy, storage and release of energy, water and ions, temperature and water, and temperature and terrestrial life. The author's liberal use of graphs and charts helps the reader follow the textual material. An excellent bibliography ends each chapter.

Margaret Watson
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ESSENTIALS OF BIOLOGY, by Willis H. Johnson, Louis E. Delaney, and Thomas A. Cole. 1969. Holt, Rinehart, & Winston, New York. 612 pp. \$9.95.

Adapted from the authors' *Biology*, this is a new undergraduate text for the one-semester course. It is an ex-

ample of what we have learned to expect from the authors and publishers: a well-organized and beautifully executed book. There are several unusual features, such as phonetics of Greek letters, an historical chart, and biologic acronyms. There is a glossary. Chapter-end materials include problems, questions, and bibliography. The illustrations are splendid.

Divisions of the book are (i) molecules, cells, and tissues; (ii) flowering plants and vertebrates; (iii) representative plants and animals; and (iv) dynamics of organisms and species. The bulk of the treatment is in the second unit; however, there is a wealth of detail in the first unit.

This is a text done with fine attention to detail, accuracy, and exposition. There is no chit-chat, and all sentences are straightforward. For the secondary school teacher, the book has fine possibilities for the upper-level course, and of course it is well worth inspection by the undergraduate teacher.

Paul Klinge
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LIFE IN THE LABORATORY, by Donald G. Humphrey, Henry van Dyke, and David L. Willis. Abridged ed., 1969. Harcourt, Brace, & World, New York. 264 pp. \$3.50.

Twenty-one laboratory exercises are included. This is too many exercises for a one-semester course in general biology and not enough for a two-semester course. This shortcoming is more apparent than real, however. The exercises are well written and well thought out, and they provide a logical and effective sequence if the manual is used in a cover-to-cover fashion. Conversely, they are so written that an instructor may adopt his own sequence or eliminate exercises without loss of meaning or continuity for the student. Thus, the instructor of a one-semester course may choose the exercises he thinks are most useful for his students or best fit his emphasis in the course. For the instructor of a two-semester course, each exercise offers suggestions for further study; therefore the instructor can use some of these suggested studies along with the formal studies in order to tailor the manual to his course.

A broad spectrum of biology is offered by the authors. They have recognized the impact of BSCS on modern biology teaching and have also recognized the fact that the "old" biology was not without some merit.

The teacher's guide for the manual is concise and complete in providing the teacher with the purpose and methods of each exercise. Thus, it educates the old professor in the "new" biology and the young teaching assistant in the "old" biology. All in all, my opinion is that this is one of the best first-

year laboratory manuals on the market.

Approximately 1,000 students have used the manual in a freshman biology course for nonmajors at the University of Missouri at Kansas City. The instructors, teaching assistants, and students are generally pleased with it. The only valid complaint is that ecology is ignored. This is regrettable, particularly in this day and age, but it is understandable. Introductory ecology exercises usually involve field work, and it is difficult to move a large class to the field during a regular two- or three-hour laboratory period. In addition to the logistics, there is also the problem of keeping a large class from destroying the environment it has been taken to study. Despite these problems, however, laboratory exercises in ecology are not impossible to develop, and it is hoped that the next edition of the book will include a few.

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SCIENTIFIC AMERICAN RESOURCE LIBRARY: READINGS IN THE LIFE SCIENCES. 1969. W. H. Freeman & Co., San Francisco. 7 vol., 2,832 pp. \$70.00.

The articles that make up this resource library originally appeared in issues of the *Scientific American*, dating back to 1948. If not seen in its original format, each article can, secondarily, be purchased in the "Scientific American Offprint" series. This third ecadysis consists of these offprints in the life sciences from the *Scientific American* being bound in seven hardback volumes. Not only has the quality of the type face suffered over the years, but the halftones have become more blurred with the passage of time—a situation that is not helped by the quality of paper used for the purposes of the resource library volumes. The colored illustrations also lack the clean crispness of their first journal appearance.

While I don't deprecate the publisher's ingenuity in devising ever-more-creative packaging for the same materials, it is to be deplored that, after the passage of 22 years for some of the articles, not one word has been changed nor one attempt made to update the material therein. The plain fact of the matter is that many of the articles, no matter how modern they were upon their first appearance, are now older than the students for whom they are intended and are hardly to be considered the latest word on the subject. This lack of updating has extended even to the short author accounts that originally accompanied each article. George Beadle, for example, is identified as the head of the California Institute of Technology's biology division; Fritz Went is also still there; Ralph Gerard is a professor at the University of Michigan; and Verne Grant is chief geneticist at the Rancho

Santa Anna Botanic Gardens. These men have long since left the positions with which they are identified, but their biographies indicate the lack of effort on the part of the publisher to make any effort toward updating these articles. At the end of each of the articles is a repetitious note to teachers reminding them that each article can be purchased in offprint form. Several hundred repetitions of this little commercial become as tiresome on the printed page as do its counterparts on the television screen.

It is likewise to be deplored that in the entire seven volumes no order is discernible in the organization of the materials. This obvious lack of organization cannot be explained away as an act of wisdom, as is attempted in the introduction. Each volume is a hodgepodge of miscellaneous articles that almost any grouping could have improved. Volume I contains such widely divergent articles as ones on the ear, the origin of life, ATP, collagen, cell division, and viruses. The seventh volume is just as disorganized, containing articles on how fishes swim, the ecology of fire, predatory fungi, alkaloids, and the discovery of DNA. After attempting to establish the impossibility of organization in the introduction, there is then a topic index, which does provide an organized list of the articles under reasonable subject headings, such as heredity and evolution, plant life, and physiological integration. Why the placement of the reprints couldn't match this scheme is not made clear. The disservice of the disorganization can only be explained by the publisher's desire to keep the offprints numbered in order of their original appearance.

Despite the worn plates, the fading modernity, and the absence of organization, the binding of 20-odd years of *Scientific American* reprints dealing with the life sciences into seven volumes does provide a valuable resource. Here, in this one series, a teacher or student who is patient enough can find an authoritative, illustrated paper on practically any subject relative to life science as currently taught. The authors have been impeccably commissioned and their words ground through the editorial mill of the *Scientific American* to reduce the stigma of an individual style. While many of the papers cannot be approached without some background in the subject, they are nonetheless capable of being assimilated far more readily without prior preparation than are 90% of today's journals and books. Many of the articles constitute an enrichment source for the basic elements of biology. Some are too esoteric to be applicable in any but a few situations. In these latter cases, the bound volumes will be an excellent reference source for the individual student. In the former, as we are constantly reminded, offprints can be purchased in quantities as necessary.



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The bound *Scientific American* reprints do constitute a useful, if not necessarily contemporary, assemblage. With the wide variety of enrichment materials now available for the classroom, including films, film loops, slides, and audio tapes, more effort on the part of the editorial staff of *Scientific American* could have made this a far more useful resource than it is. Failure to do so has resulted in an essentially grade A product being merchandised in a package that can be graded no higher than C-.

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HUMAN BEHAVIOR

DRUGS ON THE COLLEGE CAMPUS, by Helen H. Nowlis. 1969. Anchor Books, Doubleday & Co., New York. 144 pp. 95¢.

A recent piece of graffiti proclaimed, "This is the dawning of the age of amphetamine!" No doubt this is an exaggeration, but it is clear that our subway artist is one of a large population of drug-users, whose actions have brought forth troubled comment from virtually all sectors of the society.

Unfortunately the arguments from both sides of the drug controversy have often been questionable. With this book appears what Kenneth Keniston, in his introduction, justifiably calls "an island of clarity in the sea of controversy over drugs." Helen Nowlis, whose specialty is psychopharmacology, served as director of a study, sponsored by the U.S. Food and Drug Administration, on drug use by students. The book is derived from that project's final report. It is an excellent source of reliable information on the scope of the drug problem, effects of drug-taking, and certain legal questions. In a separate section the reader will find chapters devoted to selected drugs, including barbiturates, amphetamines, marihuana, and LSD.

Aside from its informational value, the principle virtue of this book is the author's willingness to deal intelligently and compassionately with the drug problem. She states, "It is increasingly evident that people with problems—personal, social, intellectual—use drugs, and it is the individual with his reasons for using drugs that is the key to understanding drug use." She concludes that there are many reasons why students use drugs—"and, for the most part, they are the same reasons why adults use drugs such as alcohol, tranquilizers, amphetamines, barbiturates, aspirin, nicotine, and caffeine." For the biology teacher, who is often called upon to answer students' questions about drugs, this book is highly recommended.

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"FOR UNTO US A CHILD IS BORN," by SPR Charter. 1968. Applegate Books, San Francisco. 53 pp. \$1.65. (Available on tape also)

The subject is beginning to suffer from overexposure, but Charter injects a fresh philosophical approach into the question of man's continued existence on a planet facing the crises of overpopulation and world hunger. He eloquently delves into the need for an "individual suprabiological morality" to transcend the technological solutions man already has at his disposal to meet the population problem. He relies on an emerging generation that is not entrapped by a philosophy of expediency as a way of life. Instead, he believes that a profound movement towards seeking a kind of humanness among individuals must be substituted for the use of power as a guide to the solution to these problems.

In effect, Charter feels that a growing awareness of goodness and love can lead to solutions where the present use of expediency and power have not and can not. Exactly how this new humanness will be applied to solve these problems remains unclear. Nonetheless, he forcefully drives home the point that this new era must come about if mankind is to survive.

The book is short and easy to read, and the philosophical argument is well presented. The title may be unfortunate, for the casual reader may pass it by without suspecting that it is a little treatise on human ecology.

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MAN ON EARTH, by S. P. R. Charter. 1962.

Angel Island Publications, Inc., Sausalito, Calif. 272 pp. \$2.95.

It seemed incomprehensible to me, as I started reading *Man on Earth*, that a book bearing a 1962 copyright should be considered seriously for review in 1970. It was with considerable surprise that I found I was mistaken. In 1962, the book raised important questions concerning man's relationship to his environment and was prophetic of the alienation and disaffection of man from himself and his institutions—symptoms that were commonplace by the close of the decade. And it seems worth noting that Charter's book took substance during a ground-swell of public support, optimism and belief in the scientific enterprise.

The theme of this book is that the unity of man with man and of man with his planet are fundamental philosophical concepts of science, and that the physical and psychological survival of mankind is inextricably tied to understanding and protecting this unity. Charter feels that a design-theory for science has been bypassed by the scientific community—men of good intentions and high ideals, but men who have

often selected problems that were either unimportant or that actually negated the unity of man with man and man with his planet. Charter suggests that many men who pursue science have lost their love of wisdom and sense of values; that though the edifice of science may still be sound, its utility has certainly been tarnished. He suggests that Science and Politicus have been inbreeding now for 15 years and that the mating has produced irresponsible and sometimes obscene progeny. He says that scientists have frequently hunted headlines rather than knowledge, stalked funds for pet projects rather than for ideas, and cashed in on destructive weaponry with the potential of total annihilation for all mankind, while calling their work scientific achievement and the waste-products of this weaponry human enrichment. Charter's indictment is sound and his analysis is correct: that a design-theory for science must be sufficiently comprehensive to incorporate problems of food and water resources, nuclear and moral fall-out, pollution of our planet, automation, personal dignity, population control, the knowledge explosion, weapons research and international order.

The content of the book was formulated as a series of 35 lectures for radio broadcast in 1961-62. The lecture format is retained in the essays of the book, enabling a reader to profit from reading only a few pages, since each essay is essentially autonomous. This format, however, causes later essays to be less interesting than earlier ones, since the same ideas are often recast repetitiously, though in different frames. The essays are readable and straightforward, asking important questions rather than suggesting ready answers. His examples are credible but lack documentation of any kind, and this significantly limits their follow-up use. He does not make alarmist or spectacular overstatements, deal in half-truths, or suggest guilt of the scientific enterprise through innuendo.

Charters' book breathes a firm grasp of science, a critical honesty, and a dedication to man's welfare. The book emanates urgency for the development of a design-theory which will enable mankind to continue to inhabit his host planet. It is a book I consider relevant to courses in social biology, social problems, and human ecology. Little of the content can be termed out-of-date though some of it is dated; and other, more recent books carry several of Charter's themes to greater depths (e.g., Taylor's *Biological Time Bomb* and McHarg's *Design With Nature*.) I remain awed at the 1962 copyright. Today the book is thoughtful, iconoclastic, and a synthesis of an immense understanding of the scientific enterprise; in 1962 it was also courageous and a decade ahead of prevailing opinion.

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