

*Function Together; Artistry in the Classroom; Personalized Teaching; and the Biologist in His Community.*

Part 2 of the book concerns the environment which promotes creative biology teaching. There are cogent chapters on *Planning a Science Center*; and *Planning a Science Laboratory*. Both are superb!

Part 3 outlines how to go about *Selecting Useful Tools*. There are successive chapters on *Ways to Use Basic Materials; Planning Field Trips; and Shaping Biology Units*.

Part 4 is a series of Appendices, giving a wealth of useful information on *Teaching Aids; Working with Protists; Techniques Using Animals; Books, Magazines and Journals; Sources of Materials* (very useful and practical); and *Projects and Class Studies*. There is also a modest index.

Generally the authors have scrupulously avoided one of the pitfalls—being encyclopaedic—which they warn against in their suggestions on selecting (or writing) a textbook. If anything, they appear to be too brief—and the reader is left with the feeling of “tell me more, teacher!”

The book is wise, witty, informed, and informative, pithy, and encouraging (but discouraging where pertinent!). It makes use of many effective quotations from the wisdom of others to accentuate its points.

The book is simply, but attractively bound, with its title effectively and boldly displayed on the front cover and the spine, with otherwise little decoration—proclaiming it to be (as it is) a utilitarian book. The printing is in two easily read columns per page, newspaper-like, on high quality gloss paper. Chapter and section headings are in crisp bold-face print. There are numerous excellent sketches and photographs which add many thousands of exective unwritten words to the volume. You can't miss the page numbers at the upper outer corner, very bold, in 18 point type. The type face of the text is clear, readable, and large enough that even the tri-focalled may read it easily.

The book is written for the young teacher—especially for the teacher who wants to stay energetically young in his biology teaching. Hence it is a book for the modern age, for a teacher of any age.

I have only a few minor quarrels with the book. Whereas the chapters of Sections 1 through 4 in the main body of the text have good references at the end of each chapter for its amplification, The Appendices have reference lists which are all too brief. In Appendix A the list of “Leaders and Scientists Who Contributed to the Biological Sciences” overemphasizes contributions to the treatment of human ailments, and thereby denigrates the biologist *per se* while elevating unduly

the contributors from the area of medical research. There isn't an ecologist in the list, and modern taxonomy and systematics are virtually absent, as if they don't exist. Most of the scientists who have ever lived are alive and productive today, yet only a very few of them—mainly Nobel prize winners—are mentioned. Gravest of all, in a handbook for teachers, is the omission in the listing of any mention of the great teachers of biology, past or present. Some great writers of biology, who teach through their writings as well as in the classroom ought to be there; Julian Huxley, or Rachel Carson, or Loren Eisely are some who come to mind. The list seems to have been abstracted rather hastily from a few science history texts.

Another area in the book which needs prompt revision is the Appendix on *Using Protists in the Laboratory*. While generally good, the techniques for culturing protists are largely an out-of-date assemblage. Some modern, simple, and effective culture methods have been overlooked, as well as have some staining and preserving techniques, and some effective laboratory experiments.

These complaints are easily adjustable for the second edition—which the authors are (or should be) diligently preparing. This is a book which should and will grow through a series of editions—with the danger of becoming encyclopaedic.

I hope the authors continue to avoid that pitfall. They will better enjoy and profit from polishing the many facets of the diamond they have so expertly prepared and set.

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SCIENCE EDUCATION INFORMATION REPORT, GENERAL BIBLIOGRAPHY SERIES, No. 15, ACHIEVEMENT, 21 pp.; No. 17, SCIENCE AND SOCIETY, HISTORY OF SCIENCE EDUCATION, SCIENCE HISTORY, GENERAL STUDIES AND SURVEYS, 20 pp.; No. 18, LEGISLATIVE ACTS AND REPORTS, ADMINISTRATION AND SUPERVISION, SCIENCE FACILITIES, 10 pp.; No. 19, EVALUATION AND EDUCATIONAL OBJECTIVES, LEARNING THEORIES AND PROCESSES, RESEARCH AND METHODOLOGY, 43 pp.; December 1968; No. 20, TEACHER CHARACTERISTICS, STUDENT CHARACTERISTICS, 19 pp., January 1969, ERIC Information Analysis Center for Science Education, Columbus, Ohio.

Products of the ERIC operation at Ohio State University which specializes in information retrieval of science education materials. In each of these there is a clear exposition of the retrieval science's expertise and methodology. The objectives of such an operation are quite important indeed, and the benefits of it can be great.

However, this reviewer was frankly

disappointed in these publications. Most of the citations are from theses catalogued by University Microfilms of Ann Arbor and from *Science Education*. Some include citations from books and pamphlets. Of course, other periodicals are also included. This reviewer's disappointment was primarily because of what is not included and a deep suspicion of some of what is included. On the latter point, a career pamphlet is included under “Student Characteristics.” An inspection of it does not clear up the mystery of why it is included and not a host of other available pamphlets. On the first point, there are significant articles not included which are in journals such as *Science* and this one, and there are books omitted, especially under “Science and Society.” This leaves a nagging suspicion that a lot of editing out of articles was accomplished which inevitably must reflect the biases of the selectors or at best, the criteria of selections, whatever they may be.

This review is being written with great regret and perhaps out of ignorance; but these publications are simply not adequate for the titles they use.

PROJECTS: ZOOLOGY, Doreen Tampion, 294 pp., \$ .75, Washington Square Press, New York, 1969.

A companion paperback to an earlier one on botany. It is extensive and includes a great variety of ideas for the teacher and student interested in this approach to learning. There is not much which is unfamiliar to most biology teachers. However, its strength is in the clear directions and the fact that it is all brought together under this heading. There are many dissection type projects and on animal behavior. Some caution should be noted which is not described in the book, and that is the requirement of sterility in those which involve living organisms, including man. For example, the blood sample experiment does not provide this caution.

For its price, this book can be purchased in multiple copies to good advantage for pre-college biology classes.

HEALTH RESEARCH LABORATORY DESIGN, U. S. Department of Health, Education and Welfare, National Institutes of Health, 83 pp., \$1.25, Superintendent of Documents, U. S. Government Printing Office, Washington, D.C., 1968.

A valuable booklet for all those in the business of designing biological laboratories. Although designed specifically for research installations, its value is also apparent for those interested in teaching. It is detailed yet succinct. Fully illustrated.

SCIENCE FOR BETTER LIVING, U.S. Department of Agriculture, 386 pp., \$3.00,

Superintendent of Documents, Washington, D.C. 20402, 1968.

This is a collage of articles directed toward agriculture. Unfortunately, most of the information presented is far from the frontiers of science, having been presented in popular magazines and the Sunday supplements. Some articles are descriptive technology, which make for interesting reading but are not what are expected from the volume's title; some are bits of memorabilia. As a reference, this book may have limited student use in the classroom.

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### ELEMENTARY SCIENCE

GOALS FOR THE CORRELATION OF ELEMENTARY SCIENCE AND MATHEMATICS, Cambridge Conference on the Correlation of Science and Mathematics in the Schools, 208 pp., \$2.20, Houghton-Mifflin Company, Boston, 1969.

This is a summary report, written anonymously, of a conference which surely had an important and valid objective, viz., to come up with concrete methods of correlating the disciplines of science and mathematics in the elementary curriculum. While the conference participants' titles indicate good representation, it is evident that the base of discussion was mathematics. Thus, mathematical concepts are discussed with reference to what kind of science units or exercises they might best be correlated. One is struck, therefore, that mathematics is conceived as the framework for the correlated curriculum and not vice versa. The writers admit a minority view that nothing must interrupt the regular progression of the mathematics curriculum, and let science instruction go where it will. But in rejecting this point of view, the minority seems to have won for the progression proposed is still that of the mathematician. There are some biological "correlates" but not many.

This is not to say that this is not a valuable publication; it is. But a real correlation remains to be proposed.

### GENERAL BIOLOGY

AN INTRODUCTION TO MODERN BIOLOGY, Paul C. Bailey, 414 pp., \$8.95, International Textbook Company, Scranton, Pennsylvania, 1969.

A new elementary undergraduate text by a biologist at Birmingham-Southern College, Birmingham, Alabama. It may be presumed that the text is written for the junior or four-year college course as the text, while at the collegiate level, is nevertheless quite simpler than some of the more ponderous tomes or the shorter but amazingly advanced texts. The organization is traditional. While the writing is smooth enough, it is didactic and without much embellishment. The illustrations are

mostly line drawings, but there are quite a few full color pictures, particularly for taxonomic purposes. Chapter-end materials include review questions and bibliographies.

The final chapter, "The Challenge," takes up important biological problems: genetics, ecology, and immunology. To this reviewer, such a chapter, sans detail, might be chapter one, and then the text might put the points in context.

A new text, traditional as it is, which deserves examination.

UNEXPLORED MODEL SYSTEM IN MODERN BIOLOGY, Robert M. Friedenber, 98 pp. \$7.50, Hafner Publishing Company, New York, 1968.

An attempt to explain a portion of biophysics dealing primarily with exobiology. It is a curious book, short yet chock-full of details and broad-ranging concepts in biological systems. The first section takes up the idea of models and some chemical and physics background. The second section is on exobiology from thermodynamics to quantum mechanics. The final section is on "Long Range Forces in Biology," and an intricate summary of biophysical concepts. There is an index.

The book is one of a series, *Pioneering Concepts in Modern Science*, and offers rough reading for all except those with a good background in the physical sciences.

### PLANT BIOLOGY

PLANT DIVERSITY, Robert M. Harris, 96 pp., \$1.95, Wm. C. Brown Company, Dubuque, Iowa, 1969.

A concise introduction to the plant kingdom, this paperback is one of the *Concepts in Biology Series* designed for an introductory college biology course. The scope of the book is limited primarily to one aspect of plant diversity, that of life cycles typical of the major plant groups. Following brief discussions of the origin of life and the general scheme of plant classification, major plant groups are presented in sequence from primitive to advanced with emphasis on ontogeny and evolutionary relationships of select examples. Scientific vocabulary is kept to a minimum; however a basic knowledge of such processes as mitosis and meiosis is prerequisite. Numerous photographs and illustrations, primarily of reproductive structures or cycles, supplement to the text. I consider the use of "highly magnified," "greatly enlarged," etc., rather than the actual magnifications of the photomicrographs, to be a serious omission in a college text.

The most serious shortcoming of the book is the failure of the author to raise questions. For example, it is stated that a reduction in flower parts is considered to be a feature of more advanced angiosperms, but no considera-

tion is made of why this is so. The adaptive significance of diversity is only briefly mentioned in the summary, and the question "why are there so many species?" is never asked. I would not recommend this book as supplemental reading for the high school course because the scope of diversity is more restricted than that in most high school texts, and I would suggest that the beginning college student who has experienced an investigative approach to biology in the high school would find this book dull and unchallenging.

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INTRODUCTION TO PLANT PHYSIOLOGY, Jacob Levitt, 304 pp., \$9.85, The C.V. Mosby Company, St. Louis, Missouri 63103, 1969.

A new text incorporating much of the newer research yet keeping it within the confines of a single semester course. Of course, there is much that is not here, e.g., anatomy, much of the work on pigments, relevance of genetics, etc. Yet the book is remarkably complete and comprehensive. The writing is to the point with little effort to go beyond the bare facts. The organization is logical and includes chapter-long treatments of subjects important in the general biology course, e.g., absorption, osmosis, colloidal structure, etc. A good book.

COMMON AQUATIC WEEDS, Agriculture Handbook No. 352, L. W. Weldon, R. D. Blackburn, and D. S. Harrison, 43 pp. \$ .50, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 1969.

A good example of a U.S. Government publication which is of great usefulness to the biology teacher. Although the emphasis is on water weeds which infest and clog waterways of the South, there are many familiar plants for those in more Northern areas. A fine reference for any biology classroom.

### ANIMAL BIOLOGY

ANIMAL DIVERSITY, Milton Fingerman, 184 pp., \$2.95, Holt, Rinehart and Winston, New York 10017, 1969.

Another splendid paperback addition to the publisher's *Modern Biology Series*. It describes the Animal Kingdom from Protozoa to Primates with a final chapter on miscellaneous and minor invertebrate phyla. The author has presented a succinct and up-to-date review of the diversity of the animal world. The first chapter presents a good and lively discussion of the systematics involved and its evolutionary significance. This reviewer was struck by the simplicity of approach and the new facts incorporated into each phylum treatment.

Highly recommended as a resource or as part of a multiple reading course.