

# Book Reviews

• Readers' comments on reviews should be addressed to the Editor.

## Animal Behavior

**FROM INSTINCT TO INTELLIGENCE: HOW ANIMALS LEARN**, by Gloria Kirshner. 1970. Grosset and Dunlap Publishers, New York. 127 pp. \$3.95.

Gloria Kirshner has dexterously reduced a highly complicated subject to a level at which it can be understood and appreciated by young (junior-high age or younger) readers. The casual use of controversial terms—instinct, learning, mind, intelligence—is regrettable, but it would be most difficult to convey to children the subtleties of usage by behavioral scientists. The main virtue of the book is Kirshner's illustration of concepts and principles with up-to-date examples from the research of current investigators. Biochemical aspects of learning, for example, are described in the context of the work of Krech, Rosenzweig, McGaugh, and others, and the independence of some motor behaviors from proprioceptive feedback is illustrated by the Berman studies.

The main deficit of the book is its treatment of human behavior. The commonality of many behavioral principles to man and the other animals receives little emphasis; and many of the author's statements about distinctions between human and animal behavior—for example, "man was born to be free"; "man's ideas do not depend on his environment"; "man faces the problem of free choice"—are made with an implied obviousness that is not only misleading but highly disputable.

The virtues of this book, however, are such that it would be a valuable addition to a junior high school library, especially in view of the scarcity of introductory behavior texts for young readers.

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**ANIMAL BEHAVIOR: A SYNTHESIS OF ETHOLOGY AND COMPARATIVE PSYCHOLOGY**, by Robert A. Hinde. 2nd ed., 1970. McGraw-Hill Book Co., New York. 892 pp. \$11.50.

This scholarly volume is one of the finest overviews of animal behavior or animal psychology currently available. Encyclopedic in coverage, it contains discussions of and examples from the invertebrates (principally arthropods and cephalopods) as well as the vertebrates, including man. The organization of the voluminous material is not

always clear or easy to follow—discussion of some kinds of behavior will be found in widely separated chapters on very different subjects—but extensive cross references and parenthetical allusions help to overcome this difficulty. There is much valuable material here for the biologist, physiologist, psychologist, and sociologist: ethology is one of the truly interdisciplinary subjects.

The author's writing style, coupled with his comparative-psychology orientation, gave this reviewer the impression of reading a review article in some scientific journal. Almost every paragraph contains two, three, or more citations (author and date) to the bibliography, which takes up 133 pages. The serious reader is also aided by the extensive name-index: one can quickly locate passages referring to Harlow's work on monkeys or to Pavlov's work on conditioning, for example. The subject index is helpful in finding discussions of particular animals.

For whom is this book intended? Being an erudite and detailed compendium of an interdisciplinary subject, it is certainly not for beginners. But this is a cogent reason for recommending it to advanced students of ethology; and it should prove to be a *sine qua non* for graduate students in zoology, psychology, and even endocrinology, not to mention sociology. It will probably find use as a specialized reference in the teacher's personal library or the high school library, insofar as there are student projects that could profitably draw material from this book; as a matter of fact, winning entries in several recent science fairs embodied certain of the techniques and principles presented here.

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## Botany

**NONSEED PLANTS: FORM AND FUNCTION**, by W. T. Doyle. 2nd ed., 1970. Wadsworth Publishing Co., Belmont, Calif. 240 pp. Price not given.

The recent appearance of many paperback books in the field of strictly academic science prompts one to wonder why they are, apparently, so successful. This book, now in its second edition and expanded to include nonseed vascular plants, suggests at least part of the answer. It is not just a brief synopsis lying somewhere between a syllabus

and a more extensive text. It is a well-written, well-illustrated book presenting fine discussions of the structure and function of the algae, fungi, bryophytes, and lower vascular plants. But it is more than this. Doyle includes excellent coverage of some of the more significant findings from the fields of experimental morphology and ultrastructure; his discussion of chloroplast development in *Euglena* is a fine example. It is also gratifying to see attention called to matters needing more research: no student should get the idea that morphology is static, from reading this book.

Not everyone is going to agree with some of Doyle's interpretations or points of emphasis. Certainly, the inclusion of the green algae, the bryophytes, the fern and fern allies, and the seed plants in a single division, the Chlorophyta, is different. Nor will many biologists agree that the major taxonomic categories of "phylum" and "division" are not comparable. And the extensive discussion of the viruses seems unnecessary.

There is only one aspect of this book that is, to me, unfortunate: the tendency of the author to be teleologic. Statements like "*Rhizopus stolonifera* is specialized for life on land" (p. 50) and "The sporangiophore is a remarkable example of cell specialization for function" (p. 51) and "The form of the mature sporophyte is well adapted for its function, which is the production and discharge of spores" (p. 184) are frequent and distract from otherwise good writing. This book appears to be remarkably free of technical errors; only one came to my attention: in fig. 3-11, a Woronin body is labeled but is not explained in the text.

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## Cell Biology

**CELL BIOLOGY**, by Jack D. Burke. 1970. Williams & Wilkins Co., Baltimore. 357 pp. \$9.75.

Burke divides his text into three sections: cell anatomy and physiology, cell metabolism, and nucleocytoplasmic relations. The book is written for advanced undergraduates and for students in the first phase of graduate or professional training. If these students have a good background of several courses in biology, they will find the first section interesting and informative: it is clear and concise and does not expect too much prior knowledge of the details of the subject. The same is true of the section on metabolism if the student has a strong background in chemistry to supplement his biology.

Unfortunately the final section does not come up to the standards set by the first two. The chapter on the theory of the gene is condensed, and the smoothness of the author's style suffers. The

final chapter, on cell radiation biology, is somewhat better.

The text is not footnoted, but each chapter has an extensive list of suggested readings from a wide variety of sources.

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## Education

**BIOLOGY TEACHER'S HANDBOOK**, ed by Evelyn Klinckmann. 2nd ed., 1970. John Wiley & Sons, Inc., New York. 692 pp. \$8.95.

The first edition (1963) of this excellent book was prepared by a team actively involved in BSCS programs. The second edition lists 12 new contributors whose expertise in the teaching of biology complements that of the contributors to the first edition.

The book has five sections. Section 1 discusses the origin, development, and organization of the BSCS program. Extensive consideration is given to behavioral objectives in applying the inquiry process to the teaching of biology. The inclusion of material developed in 1969 by the McREL-BSCS group enhances the effectiveness of the book. Chapter 3 of section 1 contains updated, succinct descriptions of instructional materials produced by BSCS.

Section 2 is entitled "Invitations to Enquiry." [The spelling "enquiry" has come to denote the editor's point of view.—Ed.] This material is essentially the same as that of chapter 4 of the first edition; however, the Invitations have been indexed, which will facilitate their use. According to the contributors the Invitations are "teaching units that bring before the student small samples of the operation of enquiry." They directly involve the student in the operation of the process. The teaching methodology for use of "Invitations to Enquiry" is described in detail. Students and teachers who use the Invitations will share a unique experience.

The teaching of biology is the focus of section 3. The chapter on teaching strategies and styles has been vastly changed from the first edition. Models for structuring learning activities are proposed. Considerable attention is given to strategies of questioning and discussing. Useful checklists to help teachers develop more productive teacher-student interaction are included in chapter 6. Chapter 8, on evaluation, has been improved by the addition of material on students' perception of tests and the purpose of tests. Since evaluation is a difficult task for many teachers, this chapter could have been strengthened by including more information on assessing progress through means other than tests, and more references pertaining to evaluation could have been provided.

Section 4, devoted to the background of biology—physics, chemistry, and

statistics—is essentially the same as that of the first edition except for a severe reduction in the chapter on biochemistry. Although it is true that knowledge in this field is growing rapidly, it does not seem reasonable to reduce this chapter to a mere listing of references to be searched out by the teacher: basic concepts and conceptual schemes providing a foundation of information on which the teacher could build through further reading should have been included. The chapter on statistics would have been strengthened by including a consideration of research design.

Section 5 is composed of six appendices: a list of republished research papers in biology, a selected bibliography for teachers, a description of laboratory facilities for BSCS biology, itemization of techniques and materials for the biology laboratory, and lists of sources of films and of information on career opportunities in biology. All appendices, except for the last-mentioned, have undergone complete revision and updating. The appendix on techniques and materials will be especially useful in the preparation of solutions, reagents, and stains. Material on the maintenance and handling of laboratory organisms will be an aid to the teacher who establishes and maintains his own cultures.

Although this book was developed by individuals associated with the BSCS program, it can be used successfully in any high school biology program. It should become a standard tool of biology teachers in stimulating interest in the study of biology. The book should also be considered for use in pre-service biology methods courses.

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**TEACHING AS A SUBVERSIVE ACTIVITY**, by Neil Postman and Charles Weingartner. 1969. Delacorte Press, New York. 234 pp. \$5.95.

The relatively high price of this slim book is more than justified. It is especially relevant for science teachers, since part of science teaching is helping children learn how to learn. The point of view held by the authors and conveyed repeatedly in a variety of contexts is that the primary concerns of educators (the educational establishment) are not the primary concerns of students. Educators are primarily concerned with producing people who will become bureaucratic functionaries and fit well into today's society. The roles envisioned by students are seldom, if ever, the content of education.

Postman and Weingartner favor a new education that would create people who could "be part of their own culture and at the same time be out of it." They envision a person "not completely captivated by the arbitrary abstractions" of his own society. Such a person would be freed from dependency on arbitrary

authority, have greater respect for himself as "anti-entropic" agent, and so would be ready to question the entrenched attitudes and beliefs of his society.

In the reviewer's opinion the crucial chapter is "What's Worth Knowing?" It provides a mirror in which the teacher will see reflected the priorities behind his present teaching practices. Here the definition of inquiry used by the authors acquires a new and exciting perspective. For them, inquiry means inquiring into issues of concern to the learner. And, as most of us know, that is not common practice in most schools. Carl Rogers' belief that "anything that can be taught to another is relatively inconsequential, and has little or no significant influence on behavior" is fundamental to the Postman-Weingartner philosophy.

The authors offer proposals for producing a better learning environment. Some have to do with the training of teachers, others with modifying the school's procedures. The proposals are radical ones—remember the title of the book!—but the authors would ask the teacher to examine his premises for rejecting them. Here are some of the proposals:

1. Prohibit teachers from asking any questions they already know the answers to. (This proposal would not only force teachers to perceive learning from the learner's perspective but would help them to learn how to ask questions to produce knowledge.)

2. Make every class an elective and withhold the teacher's monthly check if the students do not show any interest in going to next month's classes.

3. Require that graffiti in the schools' toilets be reproduced on large sheets of paper and hung in the halls. Graffiti that concerns teachers and administrators should be chiseled in stone at the main entrance of the school.

4. Prohibit the use of the following expressions: teach, syllabus, covering ground, I.Q., disadvantaged, gifted, accelerated, enhancement, human nature, dumb, college material, administrated necessity.

I recommend this book to any teacher who is interested in making his school more humane. The book is especially suited to the teacher who worries about why so many students stare out of windows, cut classes, or see school as separate from "living." For these teachers this book could be the start of a new way of life.

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## General Biology

**PROGRAMMED BIOLOGY SERIES** [booklets], ed. by James Bond. 1967-70. Educational Methods, Inc., Chicago. "Hereditry," by Gary Parker, W. Ann Reynolds, and Rex Reynolds (1970);