

Part 1 covers investigation and its role in undergraduate curricula. In a discussion of the time for laboratory reform the critical point is made that a superior investigative program is not possible without specific identification of the function of the laboratory in a changing biology curriculum. Several common functions are enumerated; engaging the student in the process of investigation is at the top of the list. The information explosion and rapid rate of change of biologic information dictates that much greater stress be placed on the laboratory process, by which the content of biology is generated and changed. Unfortunately the change-over from a curriculum centered on core content to one centered on the laboratory process will not take place until instructors somehow dispel the common myth that students cannot engage in research before assimilating hordes of facts. Additional topics include special considerations in designing laboratory programs for nonmajors, appropriate experiences for biology majors, and an ideational treatment of teaching and learning through investigation. A summary chapter (5) deals with the origin and present status of the investigative laboratory.

Part 2 deals with the practice of investigative laboratories in introductory courses at two- and four-year colleges, in advanced courses, and at field stations. Part 3 includes detailed descriptions of laboratory curricula at Marquette University and at the Massachusetts Institute of Technology—two institutions that have given serious consideration to the role of laboratory instruction. Part 4 has as its subject "Helping students learn to investigate: advice from those who have experience." Here, biologists who have developed and observed investigative laboratories share a variety of usable information.

It is refreshing to review the wealth of ideas and experiences of those who are most knowledgeable about investigative laboratories. If one accepts the premise that all other considerations in laboratory instruction are secondary to the investigative role, then a thorough reading of this book is an essential preliminary to the designing of a sound program.

Inasmuch as "investigative laboratory" means different things to different people, no specific plan or design is offered. This is because each program is unique to the instructor, institution, and course. Still, the reader learns a number of investigative-laboratory practices that produce good results, and he can adapt them to his own program.

Investigative-laboratory programs are ultimately judged by students' rejection or acceptance of activities that fit their needs and interests. The successful programs appear to be those that are individualized.

This book is a must for those who

wish to teach biology as a dynamic science.

John T. Windell  
University of Colorado  
Boulder

**THE AUDIO-TUTORIAL APPROACH TO LEARNING**, by S. N. Postlethwait, J. Novak, and H. T. Murray, Jr. 3rd ed., 1972. Burgess Publishing Co., Minneapolis. 149 p. \$5.50.

The third edition of this well-known book contains only minor modifications and corrections, in chapters 1 through 5, but a new chapter deals with the concepts of mastery and minicourses. The minicourse concept is thoroughly explained as to its application, advantages, and disadvantages, and there are interpretations of minicourse pilot programs in botany, zoology, and comparative veterinary anatomy recently conducted at Purdue University.

The section on audiotutorial methods in elementary-school instruction has been expanded. An interesting section, "How Children Learn," lends support to the audiotutorial method. Some biology teachers would benefit by an extension of this section to the upper grades.

Although some biologists believe the mechanistic nature of the audiotutorial system does not normally permit much freedom to pursue the process of science or to learn biology experimentally, it does provide a more intense or broader background preparation.

The authors discuss audiotutorials that may be applied to learning at all levels. They include sample lessons, offer methods of organization and evaluation, and recount the history and development of the audiotutorial system. The text is concise, readable, and free of errors. Although the text is primarily applicable to first- and second-year college courses, teachers in secondary schools with basic audiotutorial facilities may learn much that is applicable to a high-school biology program.

Ivo E. Lindauer  
University of Northern Colorado  
Greeley

**TESTS FOR "INTERACTION OF MAN AND BIOSPHERE,"** by Donald Chaney and Hulda Grobman. 1971. Rand McNally & Co., Chicago.

These tests are to accompany the biology textbook *Interaction of Man and Biosphere*, by Norman Abraham et al. for the Interaction Science Curriculum Project. There are four quarterly tests and two final tests. Each exam consists of 45 four-response multiple-choice items, the first 15 dealing primarily with information and definitions and the last 30 dealing primarily with science skills. This balance between skills and content seems valid, because the preface to the textbook states that science

is a creative activity. The coverage is good, and the items are well written and creative. The items make good use of illustrations. My categorization of items according to Bloom's *Taxonomy of Educational Objectives* and based on the textual content reveals about 25% items requiring recall of knowledge, 20% comprehension, 27% application, 26% analysis, and 2% synthesis. This is a high percentage of items calling on skills other than recall, compared with the tests that accompany most textbooks.

It was not possible for me to analyze discrimination or difficulty levels without looking at the test-analysis data, which were not provided; however, based on my own experience and the opinion of my 12-year-old daughter, I feel that the difficulty level is generally appropriate and that only a few of the items are too difficult. The tests are not perfect, however: a few items are scientifically incorrect or inaccurate, and some are ambiguous or unanswerable because of improper wording or labeling of graphs. No doubt these minor flaws will be corrected in the next edition.

James L. Koevenig  
Florida Technological University  
Orlando

**SEX, SCHOOLS, AND SOCIETY: INTERNATIONAL PERSPECTIVES**, ed. by Steward E. Fraser. 1972. George Peabody College for Teachers and Aurora Publishers, Inc., Nashville, Tenn. 521 p. \$15.00 (hardback).

An issue facing people throughout the world is whether or not sex education should be an integral part of the school curriculum. This anthology examines the issue and associated problems from a balanced point of view. It is a collection of 30 articles by opponents and advocates of sex education, and it represents a wide range of educational, psychological, religious, political, and social beliefs.

In the first of four sections, Art Buchwald, the humorist, contributes two articles in support of sex education in schools. His arguments focus on sex misinformation that young people receive by watching television commercials and from peers at the local candy store. This is followed by an overview of sex education in the schools of Sweden, North Korea, China, the Soviet Union, and the United States.

The second section deals with pedagogy and sex education. Ashley Montagu, the anthropologist and sociologist, advocates teaching sexual responsibility in the schools and the establishment of state tests to determine a person's readiness for marriage and ability to bring up children. Michael Scriven, a Mormon teenager, suggests that the sexual interests and energy of young people should not be encouraged; instead, they should be diverted into more

# WACO is *The Source*

**for high school laboratory supplies and chemicals**

From Aquariums to Zirconium Crucibles... from Bunsen Burners to Wheatstone Bridges... you'll find all your needs at WACO, leading "one stop" source for high school lab equipment... chemicals, too. Hundreds of schools (and districts) rely on WACO. Ordering a package of filter paper or outfitting a complete new laboratory, you get the same fast, efficient, courteous service... the consistent "care about" performance we've been rendering for over half a century. Try us and see for yourself!



# WACO

**WILKENS-ANDERSON COMPANY**  
4525 W. DIVISION STREET  
CHICAGO, ILLINOIS 60651

## CONNECTICUT VALLEY BIOLOGICAL SUPPLY CO., INC.



*Living Material*      *Preserved Material*  
*Visual Teaching*      *Blood Typing Kits*  
*Dissecting Equipment*  
*Lab Supplies*

**Fast service on all living cultures**  
**All material unreservedly guaranteed**

**FOR OUR FREE CATALOG WRITE TO**  
**SOUTHAMPTON, MASS. 01073**  
**OR PHONE**  
**1-413-527-4030**

constructive channels, such as church-organized activities. James Elias and Paul Gebhard, of the Institute for Sex Research, Indiana University, reveal that lower-class children have less accurate knowledge of sex than do upper-class children. They attribute the differences to the source and quality of information available to the children and suggest that educators have the opportunity to reduce such discrimination because of social class. Other articles discuss the impact of the pill on society, point out some inadequacies of existing sex-education programs, and offer practical suggestions for promoting premarital contraception.

Articles in the third section move right into the heart of the controversy by providing arguments for and against sex-education programs. They include an attack on the Sex Information and Education Council of the United States (SIECUS) and the private lives of its members. Opponents such as Gary Allen and Gordon Drake generally insist that sex education is a plot by Communists, atheists, and pornographers to destroy the moral and political philosophy underlying American society. Advocates such as W. H. Masters and V. E. Johnson point out the failure of the home, family physician, and church in providing young people with adequate information about sex. They further argue that society's taboos on sexuality are psychologically unhealthy.

The fourth section is devoted to sex education (or the lack of it) in Sweden, China, Australia, Singapore, Russia, and Britain. The Catholic position on the role of the family in bringing up children and information on health, sex, and family education offered by the UNESCO Institute for Education are presented. The articles reveal that sex education is considered a family matter throughout most of the world, even though the family has not been particularly effective in providing its members with adequate knowledge about their sexuality.

This is an interesting collection of articles. There is some repetition, but it is not excessive. The articles are a must for teachers, administrators, and parents who have initiated or plan to initiate sex-education programs in their schools. The articles would be worth reading by high-school and college students as well. I also recommend the book to those persons who oppose sex education. If they read it with an open mind, they may become aware of the illogical and often ridiculous arguments leveled against sex education in the schools. Then perhaps they will begin to see that a cooperative effort must be made by home, church, school, and society-at-large if young people are ever to have an adequate sex education.

*Thomas P. Evans*  
Oregon State University  
Corvallis

### Environmental Biology

ECOLOGY ACTIVITY CARDS, SERIES I, ed. by George Wilson. 1972. BFA Educational Media, Santa Monica, Calif. Price not given.

These activity cards are meant to give individual students experiences in ecology. The cards are in seven different colors, which are keyed to the subjects of investigations (a misnomer, because all cards do not contain investigations). The keyed categories are (i) general information about ecology; (ii) studies of niches, populations, and succession; (iii) studies of the flow of energy and materials in our lives; (iv) problems of urban ecology; (v) ecologic study of natural areas; (vi) conservation; and (vii) techniques for studying or testing the environment. Although many of the activities could very well be done by upper-elementary and junior-high-school students, they are more appropriate for use by senior-high-school students.

Variety is one of the strengths of the series: it provides models of experiences for diverse locales and student interests. Selected activities could be arranged as either an independent unit or as a segment of an ecology unit. However, they could be used most effectively to adjust the study of ecology