

book dealing with the concepts of bio-systematics that could be understood by high school students as well as college freshmen. Fortunately *Principles of Biosystematics* is simplified, informative, and comprehensive. This book should clarify many misunderstandings of the biosystematics discipline.

The text is written in a programmed form; therefore the reader must progress through it from the beginning to the end if he is going to comprehend the meaningful structure that this book exemplifies. The authors have programmed the material in a fashion that instills confidence in the user; consequently, he is encouraged to delve into each succeeding chapter with enthusiasm.

The diversity of written and diagrammed examples that is used to alleviate misconceptions of such terms as taxonomy, classification, cytogenetics, karyotype, ethnology, biophysics, and electrophoresis is arranged in ideal form and sequence.

Any teacher or student who desires a well-written, elementary book on biosystematics should have this one in his library.

Hayward Ball
Princeton High School
Cincinnati

PROGRAMMED SKILLS FOR BIOLOGY LABORATORIES [pamphlet series], by James C. Giglio. No. 1, "The microscope" (19 pp.; \$1.20), with test (3 pp.; 40¢). No. 2, "Metric linear measurements" (20 pp.; \$1.20), with test (3 pp.; 40¢). No. 3, "Measuring with the microscope" (18 pp.; \$1.20), with test (3 pp.; 40¢). Teacher's guide (5 pp.; 80¢). 1970. Houghton Mifflin Co., Boston. \$5.60 complete series.

Programmed instruction, wisely constructed and used, provides a teacher with the means to achieve flexibility in the classroom. It provides students with the opportunity to work at their own rate and to receive immediate feedback. And it enables students within the same classroom to work simultaneously on topics that are suited to their individual backgrounds, abilities, and interests.

This series of self-instructional programs is designed to provide flexibility in the biology laboratory. It is composed of three linear programs, three tests, and a teacher's guide. The purposes of the programs are to equip students with fundamental skills in the effective handling and use of the microscope, recognition and use of metric linear measurements, and measurement with a microscope. A test accompanies each program, to measure the accomplishment of stated objectives. The teacher's guide provides a rationale for using programmed materials, description of content and use of programs, brief discussion of behavioral objectives,

and a list of supplies and equipment.

The materials are an improvement over many self-instructional programs in that students, rather than being restricted to pencil and paper, actually manipulate laboratory equipment. Behavioral objectives are stated for the students to read, and frames relating to the objectives are identified by number. As a result, students can review or skip various skills. A "prover" frame is provided for each behavioral objective: an evaluation of students' progress can be made by observing responses to these frames. The "lead-up" frames develop adequately the content leading up to the correct responses in the prover frames. Frames are arranged so that a sheet is not needed to cover succeeding frames, and directions for following the frames are clear and concise.

The tests are the weakest part of the materials. Test 1, for example, measures certain mental skills involved in using a microscope and ability to interpret images, but it does not measure students' ability to actually operate a microscope. The items in each test are designed so that the average score is about 50%, but this seems inconsistent with the programs' purposes and the basic theory of programmed instruction. Assuming the tests measure acquisition of fundamental skills, a student should be able, after completing the program, to answer the items correctly or be able to practice the skills until he is able to demonstrate them.

After considering both the strengths and weaknesses of these materials, the reviewer recommends their examination and use by secondary-school biology teachers. With a modification and extension of the tests, *Programmed Skills for Biology Laboratories* should provide teachers with a useful instructional tool for the teaching of biology.

Thomas P. Evans
Oregon State University
Corvallis

BASIC CONCEPTS IN ANATOMY AND PHYSIOLOGY: A PROGRAMMED PRESENTATION, by Catherine Parker Anthony. 2nd ed., 1970. C. V. Mosby Co., St. Louis. 166 pp. \$4.95 (softback).

Catherine Parker Anthony has prepared an interesting programmed textbook covering several of the topics in anatomy and physiology that lend themselves to this sort of presentation. Topics such as the nervous system, control and integration, and fluid and electrolyte balance, about which students have many questions, are included. The drill and learning reinforcement of a programmed method of instruction are appropriate for introduction of the concepts of osmosis, acid-base balance, and nerve pathways.

The prospective user would do well

to heed the author's explicit caution that her programmed book should be used as a supplement to a conventional textbook. Many details are presented in *Basic Concepts in Anatomy and Physiology*, and their relationship to each other is often not at all clear. Without an accompanying textbook the knowledge gained would be most incomplete.

A word should be said about the author's approach to anatomy and physiology. She has a traditional point of view; therefore her book would best accompany a traditional textbook. Much anatomy can be learned without knowing the names of all anatomic planes through a body, and an appreciation of general principles of nervous-system integration does not require knowing the distinction between somatic and visceral reflexes. The book would be helpful in learning quite detailed facts of anatomy and physiology.

A better title for the book might be *Some Basic Facts . . .*, because it is hard to imagine gaining a clear understanding of the function of the body in the absence of information about the respiratory and digestive systems. And it is facts that are taught here, rather than general principles.

Lorna P. Straus
University of Chicago

INTEGRATED BASIC SCIENCE, by Stewart M. Brooks. 3rd ed., 1970. C. V. Mosby Co., St. Louis. 520 pp. \$10.00.

The author and publisher tout this tome as one in which the essence of physics, chemistry, microbiology, anatomy, and physiology are integrated. In reality, the book consists of highly fragmented and isolated bits and pieces of science information. It is essentially a survey of traditional human anatomy and physiology wherein each system is treated in a separate chapter.

"Integration" is evident only in the title. Rarely does the author relate important ideas in one chapter to the other related and important ideas in another chapter, so as to assist the student in doing his own conceptual integration. The book may be useful to beginning nurses in elementary anatomy and physiology, but in my opinion it will be of little value to biology teachers at any grade level.

Ted F. Andrews
Governors State University
Park Forest, Ill.

Zoology

THE BIOLOGY OF THE PORIFERA, ed. by W. G. Fry. 1970. Academic Press, New York. 540 pp. \$22.50.

Anyone who has felt perplexed about the role sponges play in the scheme of life will welcome this international

symposium conducted by the Zoological Society of London. This is the first comprehensive review of the biology of sponges since Libbie Hyman's work of 1940. Particularly interesting are Claude Levi's comparisons of the constant cell transformations of sponge cell ultra-structure with differentiation in animal cells. The capacity of sponge cells to differentiate and "undifferentiate" repeatedly suggests that they are indeed a unique form of life. What emerges from this text is a picture of sponges as populations of cells that interact in morphogenesis and homeostasis much as do mixed populations of organisms. William Fry uses this concept to develop new taxonomic procedures, which may be of great value in this taxonomically very difficult group. Indeed, a number of the contributors to this symposium have been very successful in describing sponge morphogenesis and homeostasis in the terminology that ecologists use to describe the dynamics of mixed populations of organisms.

There are also exceedingly interesting contributions on the fossil history, distribution, autecology, and synecology of sponges. All French and German papers have English summaries, and the work is very well indexed. Anyone interested in cytology, developmental biology, ecology, paleontology, or systematics will find something of value in this collection. I would recommend this text for every secondary and college library: it is an invaluable reference to anyone seeking current information about sponges.

Jon R. Fortman

Mississippi State College for Women
Columbus

THE WASPS, by Howard E. Evans and Mary Jane West Eberhard. 1970. University of Michigan Press, Ann Arbor. 271 pp. \$3.45 softback, \$7.95 hardback.

The Wasps is a valuable contribution to the field of behavioral taxonomy, an area of biology that until recently has been largely neglected. The authors begin with descriptions of behavior of the more primitive, solitary wasps. Evolutionary behavior, such as prey carriage, adult feeding and maintenance behavior, and nesting behavior, and the preadaptations necessary for sociality, are discussed at length. The point is emphasized throughout the book that species of wasps that have similar behavior patterns are closely related taxonomically.

The *Polistes* wasps are used to exemplify the behavior of typical social wasps. The means of queen determination, method of building nests, behavior of adult females, and other aspects of *Polistes* behavior are thoroughly treated. The behavior of other social wasps is discussed in less detail.

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The final chapter is devoted to the biotic relationships of wasps. Many types of parasitism displayed by wasps are discussed, as well as the organisms that prey upon or parasitize wasps. Various types of mimicry are treated in detail.

Because it is written on a fairly technical level, this book would not be appropriate for a reader who does not possess a fundamental knowledge of the Hymenoptera. The chapter on biotic relationships, however, could be used effectively in a high school biology class to supplement a unit on general biotic relationships. Except for this section, the plethora of generic names and the adult vocabulary make this fine book

difficult reading for all but the most advanced high school student.

Alan von Ahlefeldt
Wasson High School
Colorado Springs

BIONICS: MAN COPIES NATURE'S MACHINES, by Alvin and Virginia Silverstein. 1970. McCall Publishing Co., New York.. 74 pp. \$4.50 (hardback).

Bionics is the study of the mechanisms of living creatures, with the findings applied toward the improvement of man-made systems. The authors bring us up to date in this new science. They present the full range of animal endowments, including sight, sound,