the text, but a few, such as that of the Ridley turtle and of the Galápagos land iguana, could have been omitted and the space better used. Of the 19 suggested readings, only five are later than 1960; however, most of the others are pertinent.

A large amount of information is squeezed into this booklet. The subject is so vast that no work of this size could do real justice to it, but McCoy has done a commendable job of introducing a variety of concepts.

Walter Auffenberg, of the Florida State Museum, is an authority on tortoises. He begins his booklet with an introduction to tortoise systematics, using the fossil record and giving particulars of the four living species of *Gopherus*. Courtship behavior is described in *Gopherus* and compared with that of two other genera, *Testudo* and *Geochelone*. The remainder of the booklet is devoted to *Gopherus* species: their ecology, food preferences, shelters, construction of commensal organisms, behavioral relationships, and distribution. An interesting section concerns water and temperature regulation in these dryland forms. Finally, Auffenberg pleads for the conservation of tortoises.

The photographs, diagrams, and maps are well chosen. Only eight references are given: more might have been listed, including some that are easily obtainable. However, the booklet serves well to introduce an interesting but little-known genus.

Perlman's special interest is antibiotic production, action, and biosynthesis. During his 20 years in the pharmaceutical industry he has contributed much to our knowledge of clinically important antibiotics. His booklet amazingly condenses the essentials of this relatively new field of research. The use of tables and drawings is particularly good. A short history introduces the reader to some of the workers responsible for much of our current knowledge of the subject. A two-page table summarizes the microbial sources, antibiotic spectra, and uses of 46 antibiotics. Techniques for producing and isolating them are quickly but clearly described and illustrated; quite a bit more space is devoted to their commercial production. There is a section on medicinal and agricultural uses of antibiotics, along with a table of agents of infectious diseases and the antibiotics used against them. The suggested readings are basic, but there are only six of them—none later than 1965. An improvement in this regard would be the addition of up-to-date popular articles in journals.

This is an excellent overview of a field of applied biology to which most students do not get proper exposure.

Richard G. Wiegert, of the University of Georgia, is well known for his work in ecology; structure and energy flow in populations are the primary concerns of his current research. This booklet differs little from most other introductions to the subject of energy relationships, but it does a good job. In discussing aquatic and terrestrial ecosystems Wiegert compares freshwater springs (in Florida and Massachusetts) and describes pasture, old field, and salt marsh. Illustrations are kept to a minimum, which is good in a booklet of this length, and they are selected for attractiveness as well as explanation. The seven suggested readings are up-to-date but are all in one journal; again, a longer list of more readily available articles would help. This booklet adequately fulfills its function as part of a recommended series.

Robert F. Clarke
Kansas State Teachers College
Emporia

PRINCIPLES OF BIOSYSTEMATICS, by Judy Longley Lines and Thomas R. Mertens. 1970. Educational Methods, Inc., Chicago. 145 pp. $2.25 (softback).

This reviewer has long awaited a

book dealing with the concepts of biosystematics 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 aquisition 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 extention 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