

observations of living specimens in the field. A secondary objective is to coordinate data from different sources, utilizing a brief excursion into paleobotany as an approach to a better understanding of geographical distribution and phylogenetical development of American species. At the same time, practical applications of taxonomic data to forestry or other phases of applied ecology is emphasized. The author lists 66 herbaria in which specimens studied in this investigation are preserved. In addition he cites voluminous, pertinent literature, and comprehensive lists of synonyms. Using the centripetal method of C. R. Ball, Professor Jones works from the outside inward to establish unity of materials within four basic species. He considers and evaluates differences due to local environments, effects of sprout growth, and seasons of the year collected. The synthetic approach followed includes sections on morphology, hybrids, propagation, distribution, fossil forms, possible origin and evolution, and descriptions and keys to species. While the introductory material dealing with names will be of interest to biologists generally, the scholarly monograph as a whole will be especially welcomed by plant taxonomists and foresters.

Jonathan J. Westfall
University of Georgia
Athens, Georgia

PLANTS: ADAPTATION THROUGH EVOLUTION
Joan Eiger Gottlieb, 114 pp., \$2.25,
Reinhold Book Corporation, New
York, 1968.

A paperback on the systematics of plants, with a subtitle of "Diversity of Life." There is no attempt to use the newer classification schemes, and the phyla treated are Bryophyta, Pteridophyta, and Spermatophyta. Protista is not covered. The Plant Kingdom is distinguished as having photosynthesis, photosynthetic products, response to stimuli through tropisms, meristems, and life cycles.

There are illustrations and an index.

ANIMAL BIOLOGY

ELEMENTS OF ZOOLOGY, 3rd Ed., Tracy Storer, Robert L. Usinger, and James W. Nybakken, 493 pp., \$8.50, McGraw-Hill Book Co., New York, 1968.

Another edition of a well known elementary zoology text with some revisions in the material on DNA and metabolism. The organization remains the same and the frog is the "type" animal close to the beginning of the text. Most of the illustrations are line drawings, but some should have been left as photographs. Terms are in bold face and other features of the previous editions are retained.

ANIMAL FUNCTION: PRINCIPLES AND ADAPTATIONS, Gordon, Bartholomew, Grinnell, Jorgensen, and White, 560 pp., \$12.95, The Macmillan Co., New York, 1968.

This work presents a truly functional view of whole vertebrate organisms. It emphasizes mainly comparative adaptative physiology of nonhuman vertebrates. This orientation provides a refreshing change from the numerous human oriented anatomy and physiology texts that glut today's market. The emphasis on what might be called ecological physiology may disappoint those who worship solely at the shrine of molecular biology but the volume provides sound coverage of physiological principles and concepts, including the experimental basis for demonstrated conclusions that gives some feel for biological inquiry.

The 11-page introduction is far too brief for its announced purpose of providing the necessary theoretical, philosophical, evolutionary, and taxonomic background for what follows, but what follows is very good indeed. Animal energy is the theme of the first chapters on nutrition, metabolism, and movement. The internal environment is covered in chapters on respiration, circulation, water and solute metabolism, and temperature adaptation and regulation. The concluding four chapters concern themselves with sensory physiology, coordination, and control. This thematic organization makes unnecessary separate chapters, for example, on excretion, which is not even listed in the index as a topic, but is covered in the chapter on water and solute metabolism. Similarly, reproduction is treated as part of the problem of chemical correlation and control.

Dr. Gordon and his co-authors have produced a truly process-oriented volume that is a marked change from the systems approach of the bulk of contemporary physiology books. The work is authoritative, modern, and well documented. Collegiate undergraduates should find this an exciting presentation of function in whole vertebrate organisms. I predict that the organizational pattern of this volume will be widely copied in the future.

William V. Mayer
University of Colorado
Boulder

PRINCIPLES OF SYSTEMATIC ZOOLOGY, Ernst Mayr, 428 pp., \$12.50, McGraw-Hill Book Company, New York, 1969.

The book, a revision of the 1953 edition of "Methods and Principles of Systematic Zoology," is an excellent source of reference for the individual interested in systematics. Great care has been taken to define the more technical terms, which makes the book valuable to the beginner as well as

the more technically trained taxonomist. It is well indexed and contains a comprehensive glossary which increases its value as a source of reference.

The author has not only brought the book up to date, as a reference and teaching text, by incorporating new information and deleting the out-dated, but he has also done an excellent job of defining the disciplines of taxonomy and systematics. He has interpreted their role in modern biological process and demonstrated the importance of a balance between the reductionist tendency of cellular and molecular biology and the study of the whole organism and its systems. He clearly defines the role of systematics as a science and not a technology.

The book is definitely geared to the reading level of the teacher, college student, or technician in the field of systematics.

Charles H. Clay
Fraser High School
Fraser, Michigan

VERTEBRATE ADAPTATIONS, Norman K. Wessells, Ed., 368 pp., \$10.00, W. H. Freeman and Company, San Francisco, 1968.

Readings from *Scientific American* and grouped under the headings of structural adaptations, vascular systems, gas exchange and lungs, water balance, temperature adaptations, orientation and navigation, hormones, and communication. The editor has supplied extensive and detailed introductory essays to each section. While interesting and informative, the introductions are longer than most of the reprinted articles.

A useful book and one well worth having as a handy reading reference.

EXPERIMENTAL ANIMAL PHYSIOLOGY, Arnold Dunn and Joseph Arditti, 312 pp., \$5.95, Holt, Rinehart, and Winston, Inc., New York, 1969.

EXPERIMENTAL PLANT PHYSIOLOGY, Joseph Arditti and Arnold Dunn, 312 pp., \$5.95, Holt, Rinehart and Winston, Inc., New York, 1969.

A pair of laboratory guides, originally designed to be used as one volume for one course, but now separately printed for the convenience of the instructors who wish to use them in separate courses. More than half of each book is a repeat of the matching volume and made up primarily of appendix material. Also the chapters omitted from one volume and printed in the other are listed with some annotation.

These paired volumes, in tandem or as a unified approach, are unusual, new, and original. The level is high, requires some sophisticated equipment, but at least the exercises are innovative