

ecology, and evolution. The second surveys the animal kingdom, beginning with a tightly organized, 16-page synopsis of 32 phyla. In the expanded, descriptive section which follows, [whether several minor phyla are treated in one chapter or several chapters are devoted to one large or important taxon (e.g. arthropods, chordates)], the chapter format is consistent. Each begins with a brief introductory section on the size of the group, its distribution, and its biological or economic significance, if any. This is followed by a concise list of the major characteristics of the group previewing the information presented in the expanded section which follows. The latter deals with the structural organization, functional biology of the group (e.g. locomotion, feeding, respiration, excretion, reproduction), and interesting aspects of its natural history. Each chapter ends with a number of useful review questions.

In the preface, Nybakken and Stebbins (the two senior authors are deceased) draw attention to the major changes in this edition. They have deleted the traditional second chapter, on the biology of the frog as a representative animal, and have incorporated the information it contained into a later chapter on amphibians and reptiles.

Deletion of the chapter on the frog allowed for the expansion of the material on cellular physiology and biochemistry, thus achieving a much more balanced treatment of the section on animal biology than was characteristic of previous editions. The more up-to-date tone of the text is further enhanced by the inclusion of topics such as the chemistry of muscular contraction, the role of DNA in genetics, the operon hypothesis, continental drift, theories regarding the evolution of metazoa, new material on animal behavior, and a more substantial treatment of ecology. The latter is emphasized by a completely new chapter on the ecology of man.

As the authors suggest, *Elements* is well suited to serve as a textbook in a one-semester zoology course. Its crisp, clear style and its excellent 25-page index should also make it a valuable reference volume for high school biology students. I like its modest but attractive appearance, its clear, well-labeled line drawings, its use of well-chosen black and white photographs, and the retention of the 15-page glossary. I remain ambivalent regarding changes in terminology relating to the classification of animals. The discussion concerning the problems associated with assigning organisms to kingdoms is appropriate, and the choice of Protista for unicells follows current usage; however, the

abandonment of Coelenterata for Cnidaria may be premature. Perhaps these changes and the effort to clarify them may demonstrate to students the dynamic character of modern systematics. That the classification of organisms is fluid, reflecting our expanding knowledge of their evolutionary relationships should be made known even to elementary students.

In summary, I find this modest, well organized, fact-packed, readable volume highly acceptable. I also suggest that it might well be used as a model for the writing of elementary biology textbooks in general providing relief from both the skimpy, oversimplified and the ponderous, beautiful, diffuse, and costly works many of us have recently confronted.

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THE PHYLOGENY OF VERTEBRATA

by Soren Lovtrup. 1977. John Wiley and Sons, Inc., (605 Third Avenue, New York 10016). 330 p. \$32.

To appreciate the vast amount of research as well as the splendid analytical thinking of the author in this book, it is imperative that you do not allow yourself to become frustrated or lost in the maze of technical terminology. Allow yourself the time for a second or possibly a third reading. I learned a great deal from this impressive compilation, but it was not easy reading. One of the quotes from the author has in my opinion summed up the main thought of the book: "The main theme in the progress of science in any field consists of continually attempting to falsify existing theories and finding new ones to take their place." In fact, the author has taken great pains to follow this bit of thinking throughout the entire book with great success. He is constantly supporting his right to introduce new ideas to the reader and develop concepts that should influence you no matter what your background in phylogenetics is based upon. I found my own ideas considerably shaken by many half-truths I had clung to from undergraduate days. I have not read the author's first book on *Epigenetics*, but I certainly intend to do so.

His statement that Neo-Darwinism as a theory of evolution is really no theory of importance since it is confined to genetics and population genetics alone, is one of the notable issues that he documents with impressive data. If phylogenetic evolution is valid it should apply to all disciplines of biology, and not only to a specific concept. This the reader can accept. He then states that "Darwinism,

on the other hand, has a low potential of falsification (PF) since it is a logical trism!" From histograms of weight (body) from recent flying birds to complex charts and dendograms of comparative studies, all well-documented, the author leads the reader on a 'brainy excursion' into the realm of deductive reasoning. I finished my third reading of the book with a desire to fully investigate many of the author's statements to clarify shaken doubts about certain "ironclad" former concepts. In so doing I was proving the author right by "trying to falsify the ruling theories." Admittedly the book can be classed as a heretical volume with many doubts, but it certainly holds the interest of the reader and creates constructive thinking. Isn't this the prime objective of any technical subject?

As a former student Romer was, and still is, one of the leading authors in the field of phylogenetics. His *Story of the Vertebrates* is still widely used in all undergraduate classes. The author takes issue with Romer on a number of evolutionary concepts, particularly the Irish Elk and the origin of birds. He asks the question: "How could selection allow such misfits to appear when *Megaoceros* was an evolutionary failure that was predictable?" The author's graph on the allometric relationship between the length of antlers and length of radius of ten species of Pleistocene cervids and the Irish Elk is an example of how thoroughly he goes into each concept in the book. He differs also with Romer on origin of Aves, stating that Aves arose not through the dinosaur *Ornithischia* alone, but either through a bifurcation of two orders, namely; *Ornithischia* and *Saurischia*, or better still from *Saurischia* as a single ancestor. These and other thought-provoking suggestions made this reviewing enjoyable and a bit frustrating at the same time.

I highly recommend this fine work to graduate zoology and biology majors. It will make you angry, frustrated, and ready to question every statement. However, it also will provide you with a challenge of academic proportions.

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AN ILLUSTRATED LABORATORY TEXT IN ZOOLOGY

by Richard A. Booloottian and Donald Heyneman. Brief ed., 1977. Holt, Rinehart and Winston (383 Madison Avenue, New York 10017). 263 p. Price not given.

This manual is a shortened version of the authors' *Illustrated Laboratory Text*

in *Zoology* and is designed to accommodate single semester or quarter zoology courses that use a phylogenetic approach. The manual is unique in that it contains an extensive index and is typically cross referenced for seven of the most frequently-selected college zoology textbooks.

The manual's approach is very classical. Considerable emphasis is placed on invertebrate structure, although some coverage of the frog, rat, and fetal pig is included. Questions interspersed throughout the exercises reinforce the authors' carefully considered classical approach and are designed to increase the students' accuracy at observation.

The exercises are clearly and concisely presented, require minimum equipment and supplies and are supported in most cases by excellent photographs. An accompanying appendix contains the usual supply sources, formulae for solutions described in the exercise (along with valuable "how to" notes), conversion tables, and an introduction to scientific notation.

Anyone adopting this laboratory manual should encourage his or her students to carefully read the preface. It contains an excellent statement of the importance of laboratory in biology and the relationships that exist between laboratory and lecture in an introductory biology course, even when these relationships may be difficult to perceive.

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BOOKS RECEIVED

- THE ECOLOGY AND EVOLUTION OF ANIMAL BEHAVIOR, by Robert A. Wallace. 1977 Goodyear Publishing Company, Inc., Santa Monica, California. 348 p. Price not given.
- OUR CHANGING CLIMATE, by James D. Hays. 1977. Atheneum Publishers, New York. 101 p. \$6.95.
- SEXUALLY TRANSMITTED DISEASES, by Gavin Hart. 1976. Carolina Biological Supply, Inc., Burlington, North Carolina. 15 p. Price not given.
- PIGEONS AND DOVES OF THE WORLD, by Derek Goodwin. 2nd ed., 1977. Cornell University Press, Ithaca, New York. 446 p. \$27.50.
- CELLULAR BASIS OF BEHAVIOR, by Erick R. Kandel. 1976. W. H. Freeman and Company, San Francisco, California. 727 p. \$45.00 hardback; \$19.95 softback.
- SWIMMING MAMMALS, by Susan Harris. 1977. Franklin Watts, Inc.,

- New York. 32 p. \$4.33.
- TERRARIUMS, by Alice Parker. 1977. Franklin Watts, Inc., New York. 48 p. \$3.90.
- COUGAR, by Kay McDearmon. 1977. Dodd Mead and Company, New York. 48 p. \$4.95.
- LOOK FOR A BIRD, by Edith Thatcher Hurd. 1977. Harper and Row, Publishers. New York. 32 p. \$4.95.
- THE INVERTEBRATES, FUNCTION AND FORM, by Irwin W. Sherman and Vilia G. Sherman. 2nd ed, 1976. Macmillan Publishing Company, New York. 334 p. \$9.95.
- THE ANATOMY OF THE LABORATORY RAT, by Rudolf Hebel and M. W. Stromberg. 1976. Williams and Wilkins Company, Baltimore, Maryland. 172 p. Price not given.
- MARINE AQUARIUM LABORATORY, by Raleigh T. Philp. 1976. Jewel Industries, Inc., Chicago, Illinois. 48 p. \$4.95.
- A LABORATORY GUIDE TO HUMAN PHYSIOLOGY, by Stuart I. Fox. 1976. William C. Brown Company, Publishers, Dubuque, Iowa. 318 p. Price not given.
- THE EVOLUTION OF MEMORY, by J. Z. Young. 1976. Carolina Biological Supply Company, Burlington, North Carolina. 16 p. Price not given.
- HUMAN SEX AND SEXUALITY, by Edwin B. Steen and James H. Price. 1977. John Wiley and Sons, Inc., New York. 338 p. \$9.95.
- LABORATORY ANATOMY OF THE CAT, by Robert B. Chaisson. 6th ed., 1977. William C. Brown Company, Publishers, New York. 95 p. Price not given.
- PROGRESS IN PSYCHOBIOLOGY, Readings from *The Scientific American*. 1977. W. H. Freeman and Company, San Francisco, California. 392 p. \$7 softback; \$14 hardback.
- OLD IS WHAT YOU GET, by Ann Zane Shanks. 1976. The Viking Press, Inc., New York. 110 p. \$10.
- POISONS AND TOXINS, by Joan Arehart-Treichel. 1976. Holiday House, New York. 153 p. \$6.95.
- PATTERNS OF SEXUALITY AND REPRODUCTION, by Alan S. Parkes. 1976. Oxford University Press, New York. 148 p. \$3.75.
- ENERGY BASIS FOR MAN AND NATURE, by Howard T. Odum and Elisabeth C. Odum. 1976. McGraw-Hill Publishing Company, New York. 297 p. Price not given.
- THE AMERICAN CHAMELEON, by William White. 1977. Sterling Publishing Company, Inc., New York. 80 p. \$4.95.
- WAYS OF WILDLIFE, ed. by Eleanor Horowitz. 1977. Citation Press, New

- York. 176 p. \$7.95 hardback; \$2.95 softback.
- IMAGERY: CURRENT COGNITIVE APPROACHES, ed. by Sydney Joelson Segal. 1971. Academic Press, Inc., New York. 137 p. Price not given.
- WONDERS OF RACCOONS, by Wyatt Blassingame. 1977. Dodd Mead and Company, New York. 80 p. \$5.95.
- HOW BIRDS FLY, by Russell Freedman. 1977. Holiday House, Inc. New York. 64 p. \$6.95.
- LIVING TOGETHER IN NATURE, by Jane E. Hartman. 1977. Holiday House Inc. New York. 36 p. \$5.95.
- REPTILES AND HOW THEY REPRODUCE, by Dorothy Hinshaw Patent. 1977. Holiday House, Inc. New York. 124 p. \$6.95.
- SHARKS, by Sarah R. Reidman. 1977. Franklin Watts, Inc., New York. 48 p. \$4.90.
- THE GOLDEN CIRCLE, by Hal Borland. 1977. Thomas Y. Crowell Company, New York. 53 p. \$8.95.
- TURTLES, by Richard E. Nicholls. 1977. The Running Press, Philadelphia, Pennsylvania. 150 p. \$4.95.
- ALBUM OF SHARKS, by Tom McGowen. 1977. Rand McNally and Company, Chicago, Illinois. 64 p. \$5.95.

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burgeoning curriculum, programs of this kind become more and more valuable as an introduction or possibly a final review.

The Lower Invertebrates tries to introduce in a general and casual manner the taxonomy, general structure, and physiological characteristics of the organisms in each of the phyla treated. The subjects discussed and the quantity of information provided seem appropriate to the interests and abilities of high school students in introductory biology. Showing unique and most picturesque species, each part of the program gives the impression of the incredible diversity that can be found within each of the major phyla of lower invertebrates. Also mentioned are such concepts as parasitism, symbiotic relationships and predator-prey interactions.

The Lower Invertebrates is divided into five parts: flatworms; nematodes and rotifers; sponges; coelenterates and ctenophores; and mollusks.

The accompanying background music is repetitive but does not substantially detract from the high quality and educational value of the program.

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