

ECOLOGY AND FIELD BIOLOGY, by Robert Leo Smith. 2nd ed., 1974. Harper and Row, Publishers Inc., New York. 701 p. Price not given, hardback.

In this second edition many improvements have been made and much of the text has been rewritten to focus on the ecosystem as the central theme. The book is well organized and authoritatively written. The author has achieved good balance between theoretical ecology and applied as well as between the descriptive and quantitative. A new section on resource management has been added.

Although intended for college undergraduates the book has features that make it attractive as a reference for both educators and graduates. These include 163 pages of appendixes, suggested readings, general references, and a bibliography. Further, the text contains many charts, diagrams, and photographs—all black-and-white.

About 262 pages are devoted to energy flow in ecosystems, biogeochemical cycles, ecosystem development, man and the food chain, and man and the biogeochemical cycles. The effects of pollutants have been updated and emphasized. The next section, 155 pages, deals with populations and ecosystems, population regulation and interactions, social behavior, speciation, and natural selection. The next section discusses the organism and the ecosystem; finally, the diversity of ecosystems is covered.

In my opinion, the book is outstanding as a reference and college textbook.

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SCIENCE AND SOCIETY, by David E. Newton. 1974. Holbrook Press, Inc., Boston. 316 p. \$5.50 (softback).

The nature of science (aims, methods, assumptions and limitations, "proof," and "what really goes on in science"); the social impact of science and technology (problems of pollution, power, and population, experiments on controlling people, and anticology); and science as a modern social institution (social responsibilities, politicking, providing information, financing, and related problems) are the book's three sections and, very roughly, their contents. They give a surprisingly broad, prismatic, and thought-compelling look at interactions of science and society. Exceptionally well-chosen essays—a few of them classics—direct to divergent views and further readings. The recommended readings are of very high quality. Newton closes with nine "problems" (including Topic 8, "Disenchantment with Science") with enough lead materials to aid (via reading, discussion, and debate) in comprehension of

the imperfectness of current adjustments of science and society.

The book is suitable for high-school honor students in natural science, for college undergraduates (it would be excellent for an upper-division colloquium), or for continuing education groups. Whoever the reader, Newton treats him as being as intelligently alert as he obviously is—a winning approach with good students of any age.

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BIOLOGICAL SYSTEMATICS, by Herbert H. Ross. 1974. Addison-Wesley Publishing Co., Reading, Mass. 345 p. \$12.95.

This information-packed book will be welcomed by teachers who have attempted to find a textbook for a course in systematic biology only to find that none existed which encompassed botanical, microbiological, and zoological systematics. This integrated approach should be of value not only to students, teachers, and embryo systematists but also to others in science whose objective is to understand the why and how of the diversity of organisms.

The author's objectives as stated in the preface are not only to present the integrated approach but also to "emphasize the scientific aspects of systematics" and to "present the theory and practice of systematics simply and clearly." The book is written in a style that is easy to understand and nearly all major points are reinforced with abundant examples. Most of the hypothetical examples are so simple that a novice could follow. This method may be irritating to some; however, this simplified approach does get the point across.

The author has divided the book into 12 chapters beginning with a historical development of the field of systematics. This is followed by a brief treatise of investigating and recognizing systematic problems and how one goes about gathering evidence. Ross's forthright treatment of scientific reasoning in systematics is a valuable part of the text, although his simplified definition of abductive reasoning as simply "stretching the mind" may not please those with extensive training in logic and reasoning. Progress in systematics has been impeded in some cases by the myth that a definitive treatment with all problems solved is *expected* of the investigator. Ross urges that if "we bring together *all* evidence concerning a problem, we must admit that some of it may be *contradictory*" and "expression of differences, if *clearly explained*, is one of the most powerful tools in stimulating greater search for new evidence or more careful examination of hypotheses and deductions." Those noble suggestions are certainly not uni-

que, but, unfortunately, many textbooks on systematics fail to adequately reinforce them.

The speciation processes are generally adequately covered, although botanists will find the treatment of polyploidy and apomixis disappointing. Both are given only brief coverage and the author does not clearly establish the magnitude of their importance in plant systematics. Guides on interpreting species are presented along with suggestions as to how to proceed with naming when only scanty materials are available.

Chapters on phylogeny, fossils, geographic dispersal, and pathways of ecological diversification are useful in that they contain procedures for constructing family trees and interpreting fossils. Sequences and pathways of dispersal are given additional emphasis with a discussion on the latest developments in global geotectonics. The section on nomenclature compares the rules for naming different organisms as well as the different systems of classification.

The final chapter deals with the future of systematics and includes sections on information retrieval systems and the role that systematics can play in ecological, behavioral, and biochemical evolutionary studies.

Finally, the usage of *Ginkgo* for *Ginkgo* in one place in the book will surely catch the attention of botanical systematists.

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AN INTRODUCTION TO QUANTITATIVE ECOLOGY, by Robert W. Poole. 1974. McGraw-Hill Book Co., New York. 544 p. Price not given.

The author has put this textbook together using the modern approach of mathematical analysis of ecological concepts. Topics covered include population, population growth, density, dispersal, competition, various other interactions, and communities. The entire book is related to models and their construction and use: chapters 9 and 10 are outstanding in the explanation of these ideas.

The book has an upper division college reading level and assumes the student has a good foundation in natural science and statistics but only a minimal mathematical background. Little calculus is used and no models or statistical methods have been derived. The statistics included are applied directly to the presented problem and are used to interpret the model uses, implications, and assumptions.

The unique and informative section of chapter 1 on matrix algebra forms the basis for many of the later statistical methods introduced in the book. The sequence to matrix models, statistics, probability distributions, and Stochastic models of exponential growth flows smoothly and is quite understandable.

It is chapter 17 on energy flow and nutrient cycling that really fulfills the primary purpose of this textbook and sets it apart from and above most others in the field.

The expanded table of contents is good for rapid reference, as is the index. The graphic aids are revealing and well placed in the text, but chapter summaries are missing and needed. The literature cited section is current and extensive.

This thought-provoking informative textbook is a fairly ambitious presentation of present-day ecology. The author has successfully met his goal of presenting quantitative ecology to the non-math student.

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MAN, NATURE AND ECOLOGY, by Keith Reid, J. A. Lauwerys, Joyce Joffe, and Anthony Tucker. 1974. Doubleday and Co., Inc., Garden City, N.Y. 426 p. \$14.95 (hardback).

It is refreshing to find a book about man and his environment that is different. The subject is introduced with striking pictorial essays of the most pressing environmental problems: population, food supplies, resources, pollution, endangered species, and urban failure. The text begins by describing natural ecosystems and how they function, presenting basic ecological principles in very understandable terms. The emphasis is on energy relationships and efficiencies, biogeochemical cycles, and adaptations of organisms to the varieties of geographical and climatic conditions which they encounter.

Man's impact on his world ecosystem is discussed in relation to the stages of his civilization, from hunter-gatherer to herdsman, agriculturalist, and machine-age manipulator. Each of the stages is described in ecological terms, with its accompanying use and misuse of resources at hand. Thus these chapters point out how man's manipulation of his environment has gradually produced the problems we encounter today. The impact of man's interference with his environment has increased in direct proportion to man's population size, so that it is the present scale of his manipulations that is so truly frightening.

The book concludes with examination of possible patterns of action and reaction that can take place in the future, concentrating on the areas of population, natural resources, capital investment in industry and agriculture, and pollution. A summary of these actions is presented in a blueprint for a new kind of civilization by 2075, which proposes necessary steps toward self-sufficiency and self-regulation. Another

blueprint provides specific actions that each individual can take toward achieving these goals.

This volume would be valuable to any library, be it school, classroom, or home. It is a thoughtful and constructive examination of the why and wherefore of today's massive environmental problems, and as such would also be a stimulating ecology textbook.

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COMMON MARSH, UNDERWATER AND FLOATING-LEAVED PLANTS OF THE UNITED STATES AND CANADA, by Neil Hotchkiss. 1972. Dover Publications, Inc., New York. 228 p. \$3.00 softback.

This book is a combination of two previous publications of the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior, authored by Neil Hotchkiss: *Common Marsh Plants of the United States and Canada*, 1970, and *Underwater and Floating-Leaved Plants of the United States and Canada*, 1967. Its organization is based on the two prior publications, comprising two separate sections, each with its own title, contents, introduction, page numbering, and index. This procedure has its slight disadvantage to the user by the necessity of locating the separate subsections for the contents of the book and page references of included species. A convenience of the subsection organization for reference purposes, however, is that each species is associated with others of similar appearance into subgroups within the titled subsection, thereby reducing the number of subgroups the user must survey. The subsection organization is also advantageous in limiting the introductory content to specifics about each major group of plants, reducing the total volume the reader must peruse to familiarize himself with each particular reference group. All the plant species included in this book are indexed according to both their scientific and common names. The author cites three taxonomic references within the introduction of both subsections. These references are more technical and each encompasses a specific region of the geographic area incorporated within this book and, thus, may supplement its use.

The validity of this book is questionable only if the user is a dedicated taxonomic "lumper" or "splitter" because Hotchkiss may be classified as both, depending upon the cross-reference source. However, the author notes discrepant species names by the cited authorities for those used in this book, both in the introductions and the main text but his practice is not consistent with any one reference. This book is most useable to the beginning taxonomist because its content of specific characters is inadequate for definitive

classification of most of its inclusive species. Although the book includes a few pteridophytes, bryophytes, and algae, it is predominantly a taxonomic reference of flowering plants. There are over 750 illustrations but all are drawings, some rather crude and somewhat deviant from similar illustrations in more technical references. For general use, however, the deviations may not be severely limiting and may primarily be variations in visual interpretation of the particular characters. To further illustrate the general nature of this book, the author repeatedly uses the term "seed" for fruit and "pod" for a variety of fruit forms. Since there is no definition of terms, one can only assume the reference is written in general terminology for the novice. The author also departs from standard taxonomic procedure by failing to capitalize species names taken from proper nouns.

This book is an adequate reference for use by students at the beginning taxonomic level, either high school or college, and for general ecological use within the specified habitats. It is relatively inexpensively priced and, although softback, is very durably constructed, adequate for field or classroom use. The paper quality is good, the print and illustrations are outstandingly clear and legible, the pages fold flat, and there is adequate space for field notes on each page.

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THE BIOLOGY OF THE OCEANIC PACIFIC, ed. by Charles Miller. 1974. Oregon State University Press, Corvallis. 157 p. \$6.00 (hardback).

This small book is a collection of seven papers presented at the thirty-third annual biology colloquium held at Oregon State University. The papers were designed to survey advances in knowledge of the oceanic Pacific since the *Challenger* expedition.

The lead paper by McGowan on oceanic ecosystems provides an update on plankton distribution and ecosystem characteristics. It is informative and will be of interest to advanced high school and college level ecology students. McGowan acknowledges areas of inadequate information and problems of collecting and interpreting data.

Papers by Parsons and de Lange Boom dealing with physical, chemical, and biological factors controlling ecosystem processes in the sea; Frost writing on "Feeding Processes at Lower Trophic Levels in Pelagic Communities"; Rothschild concentrating on fishery production from catches and food chain dynamics; and Hochachka on enzymatic adaptations by marine organisms to oxygen, temperature, and pressure are more specific, somewhat mathematical, and directed at the specialist in the field. An excellent paper