

do well to recognize that effort by using the book as a source of information and a guide to literature.

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The mangrove ecosystem retains a bit of awe for most biologists, but only respect by biologists working in these coastal interface ecosystems. The mangrove forest consists of specialized halophytes with an extensive forest canopy. Although dominated by the mangrove trees, this specialized estuarine forest ecosystem consists of both terrestrial and aquatic components with particularly large inputs of detrital organic matter to the water and sediments. Macnae (1968) referred to the total terrestrial-aquatic mangrove ecosystem as the *mangal*. Both of these books consist of collections of individual essays on components or characteristics of the mangal or on technical discussions of qualitative and quantitative methods for evaluations of them.

A general characterization of the mangrove ecosystems initiates both books with varying degrees of completeness. In the volume edited by Por and Dor, most of the book describes the characteristics and, in particular, the aquatic biota of the mangal. In the ecosystem overview F. D. Por emphasizes the importance of detritus and detrital food chains. This overview, coupled to the ensuing descriptions of common and recently described biota, provides a reasonable, albeit very uneven, review of many groups of organisms. Insects and fishes of the mangal receive only token mention. The novice should beware, however, of certain major errors (e.g. discussion of the impossible "energy recycling") or deficiencies (e.g. no mention of the massive amount of organic matter in the soluble phase). Certain groups are reviewed in a much more comprehensive, comparative manner than others. The crabs (by D. A. Jones) and the molluscs (by J. C. Plaziat) are

well treated from the standpoint of both global distributions and general ecology.

Only a small portion, consisting of four brief chapters, addresses processes within mangals. The limited data of phytoplanktonic (M. Potts) and benthic algal (I. Dor and I. Levy) primary productivity, nitrogen fixation rates, and a few analyses of decomposition of mangrove leaves (S. Reice et al.) are briefly summarized and compared. A concluding chapter provides a short descriptive case analysis of dominant biotic communities of the mangal of Cananea in São Paulo, Brazil, and their productivity.

Despite one's appreciation of the difficulty of analyzing the biota and regulatory processes of growth and productivity of mangrove ecosystems, it is apparent that there is relatively little quantitative information. Although sufficient insight exists to understand certain generalities of how the mangal functions, commonalities of operation, such as the detrital dominance of carbon and nutrient fluxes, are as yet quantitatively unclear. The collection of papers in the *Hydrobiology of the mangal* adds to the informational stores on these ecosystems but gains little toward a synthesis from the descriptive and few quantitative data.

The book on research methods in the mangrove ecosystem provides a concise introduction to the mangal. Features of coastal landforms that encourage development of mangrove forests are described (B. Thom). The coastal geomorphology is clearly important to species distribution and zonation as well as to succession. Latitudinal gradients in climatic factors are coupled to mangrove biology and influences on distribution and development (F. Blasco). The usefulness of palynological analyses in understanding the successional dynamics of mangals is emphasized.

Eight chapters in the section on evaluating mangrove community structure suggest procedures and methods needed for qualitative and quantitative assays. Classical approaches to plant surveys in the mangrove communities (V. J. Chapman) are briefly discussed with examples and present a rather minimal evaluation that would be needed when studying a new area. Taxonomic counsel is also offered (F. Blasco). Good comparative data on mangrove structure would be enhanced by application of the protocol for physiognomic structure and biomass discussed by G. Cintron and Y. Novelli. The characteristics of anaerobic sediments in mangrove swamps are emphasized (K. Boto) as important regulators of plant and ecosystem metabolism. Classical and somewhat outdated methods for chemical analyses of the sediment, plants, and overlying water are briefly outlined (F. Pannier). Methods for the collection and evaluation of biomass of fauna of the mangrove and nearshore areas as well as benthic diatoms are briefly discussed in the next three chapters.

The final section of four chapters addresses selected mangrove functions and community processes. Methodology for evaluating rates of photosynthesis and water relations in mangroves uses relatively sophisticated techniques. These technical discussions are rather well summarized by F. Pannier. The concluding brief chapters examine how one evaluates litter production and decomposition of particulate organic matter.

It is quite apparent that only modest progress has

been made in enhancement of our understanding of the mangal ecosystems since the extensive monographic treatment of African mangrove swamps and forests by Macnae in 1968. The UNESCO manual on methods is a small but significant step toward commonality of techniques for certain analyses. One can only conclude that our ignorance exceeds greatly our understanding of mangrove ecosystems. These books help to reduce the gap.

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VALIELA, I. 1984. **Marine ecological processes.** Springer-Verlag, New York and Heidelberg. 346 p. \$34.00.

In recent years, new books, however tempting their titles may sound, more often than not turn out to be a random collection of specialized articles which either belong in a journal or should never have been printed at all. It is, therefore, a pleasure to receive a book which attempts to cover an entire field of inquiry in a coherent fashion. Valiela's book belongs to this category. Its scope and ambition is to cover all aspects of modern marine ecology, emphasizing processes and dynamics.

The book is structured according to ecological processes: primary producers, consumers, interactions, organic matter and nutrient cycles, and the structure of marine communities. These comprise 15 chapters. The topics are illustrated with examples from all conceivable types of marine environments, and an attempt has been made to exemplify and integrate different types of approaches: environmental physiology, population and community ecology, field and laboratory experiments, biological oceanography, and fisheries biology. The number of studies cited is overwhelming and, wherever I was able to judge, comprehensive. The literature list includes about 1,500 references, and the book documents the author's unusual, comprehensive knowledge of marine biology and represents an impressive amount of work.

The book is well produced and generally attractive. It is, however, regrettable that proofreading was somewhat less than perfect; most trivial typos are easily forgiven, but equations with interchanged symbols and variations in the spelling of individual authors do not facilitate reading. Some of the innumerable graphs are quite complex and, when combined with an incomplete figure legend, are hard to comprehend. A few redundancies seem unavoidable considering the width and structure of the book.

The preface claims that the text is "aimed principally at the beginning graduate or advanced undergraduate

student, but was written also to serve as a review and, more ambitiously, as a synthesis of the field." A textbook it is not; it is quite hard to read due to the encyclopedic and even-handed treatment of the subject (although I suppose that selected chapters together with some original papers could serve well for an advanced course). However, the author has achieved his second goal. As a review and synthesis of marine ecology and as a guide to recent literature, it will prove invaluable for graduate students and professional marine biologists and as such is warmly recommended. In this respect, the book has no equal and will have no competitor for some time to come.

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MEYERS, D. G., AND J. R. STRICKLER (Eds.). 1984. **Trophic interactions within aquatic ecosystems.** AAAS Selected Symp. Ser., 85. Westview Press, Boulder, Colorado. 472 p. [Typewriter composition.] \$35.00.

This book is the result of a symposium held in Toronto in January 1981 whose original title was "Trophic dynamics of aquatic ecosystems." The change of the title from "Trophic dynamics of . . ." to "Trophic interactions within . . ." accurately reflects the concept and contents of the book. There is only one article in the volume (Hecky) dealing with "trophic dynamic aspects" and efficiencies in the sense of Lindeman. The emphasis on the who-eats-whom approach of trophic interactions in ecosystem analysis is certainly due to the opinion of the editors who invited the participants. The ESA Lindeman Symposium at Minneapolis in June 1985, however, showed that this approach is currently favored by many ecologists.

There are other biases in the book. For example, "aquatic ecosystems" are predominantly freshwater and nearly exclusively pelagic. Some people may feel that the importance of fluid dynamics is overstressed. The formulation "within ecosystems" makes it easy to include the most specialized topics. Of course, even the Brownian movement of molecules takes place "within ecosystems," but probably nobody will consider it to be of predictive value for the understanding of structure and functioning of ecosystems. I am personally very much in favor of a physiological approach to ecosystem analysis which considers the physiological and genetic constraints of adaptations. But where should we place the limits? We know, for example, that selective predation and selective grazing have enormous impact on the structure of pelagic communities. But do we understand this impact better by studying the electromyograms of muscles associated to feeding of a fish (Liem) or by the precise cinematographic observation of the "fling and clap" mechanism in a copepod's feeding motion (Strickler)? One may doubt this, although some investigators think that it is more promising to study the primary processes than the effects.