

of the eastern oyster since Galtsoff's *The American Oyster* (1964). One has to wonder why this first comprehensive update had to wait for 32 years after Galtsoff's original work. In Europe, the first comprehensive volume on mussels, *Marine Mussels*, was edited by Bayne in 1976 and an update of that review, *The Mussel Mytilus*, was edited by Gosling in 1992.

While the need for a review like *The Eastern Oyster* is undeniable, the final product is a disappointment in several ways. First, the book was almost a decade in development; second, the papers vary dramatically in their thoroughness and appropriateness; and third, important new areas of oyster ecology are omitted. Some chapters are comprehensive and up-to-date, but others are not. For example, Ford and Tripp's paper on diseases and defense mechanisms is well written and extensive, with over 450 references (25% of them since 1990). Newell and Langdon's chapter on the mechanism and physiology of larval and adult feeding offers similar timely and comprehensive coverage. On the other hand, Eble's paper on the circulatory system and Shumway's chapter on natural environmental factors have few citations from the 1980s and none from the 1990s.

There are major omissions from this book. At the organismic level, there is nothing on excretion as a process. There admittedly has not been a great deal of research in this area, but considering the amount of effort that has been expended on oyster feeding and digestion, it seems that what little is known about excretion should be noted. Knowledge of excretion rates of specific materials in conjunction with oxygen uptake observations can often indicate the type and quality of food being utilized by the animal. On a larger scale, excretory products usually close the recycling loop for specific limiting nutrients in estuaries. In the early 1980s, ecosystem-scale studies on clams and oysters in the United States (Cloern 1982; Officer et al. 1982; Dame et al. 1984) and mussels in Europe (Smaal et al. 1986; Dame et al. 1991) began to bear fruit. These studies comprehensively showed that bivalve filter feeders were potential controlling components of estuarine and coastal ecosystems through their benthic-pelagic coupling via filtration and excretion. *The Eastern Oyster* fails to acknowledge the existence of this new and productive area of research in bivalve ecology and biology. Instead, this volume follows the organismic philosophy that has for decades failed to comprehend what the drastic decline of the oyster as a major ecological component of many estuaries would entail. These omissions refute the editors'

claim that "the major thrust of this book . . . is holistic and reflects current approaches to biological processes."

While some chapters in this book are exceptionally good reviews, others are not, and significant components of the book seem to be dated before publication. Libraries and individuals will have to consider their needs carefully before purchasing this volume.

RICHARD DAME

Marine Science
Coastal Carolina University
Conway, South Carolina 29528, USA

References

- Bayne, B. L. 1976. *Marine mussels: their ecology and physiology*. Cambridge University Press, Cambridge, England.
- Cloern, J. E. 1982. Does the benthos control phytoplankton biomass in South San Francisco Bay? *Marine Ecology Progress Series* 9:191-202.
- Dame, R. F., N. Dankers, T. Prins, H. Jongsma, and A. Smaal. 1991. The influence of mussel beds on nutrients in the western Wadden Sea and eastern Scheldt estuaries. *Estuaries* 14:130-138.
- Dame, R. F., R. G. Zingmark, and E. Haskin. 1984. Oyster reefs as processors of estuarine materials. *Journal of Experimental Marine Biology and Ecology* 83:239-247.
- Galtsoff, P. S. 1964. The American oyster *Crassostrea virginica* Gmelin. U.S. Fish and Wildlife Service Fishery Bulletin 64:1-480.
- Gosling, E. 1992. *The mussel Mytilus: ecology, physiology, genetics and culture*. Elsevier, Amsterdam.
- Officer, C. B., T. J. Smayda, and R. Mann. 1982. Benthic filter feeding: a natural eutrophication control. *Marine Ecology Progress Series* 9:203-210.
- Smaal, A. C., J. H. G. Verhagen, J. Coosen, and H. A. Haas. 1986. Interactions between seston quantity and quality and benthic suspension feeders in the Oosterschelde, The Netherlands. *Ophelia* 26:385-399.

Ecology of Marine Bivalves: An Ecosystem Approach. By Richard F. Dame. CRC Press Inc., Boca Raton, Florida. 1996. 254 pages. \$84.95. (Available from the American Fisheries Society; AFS members receive a 10% discount.)

This book was advertised as one that "presents the 'big picture' of marine life interactions"—a rather tall order. As presented, it is an attempt to synthesize the vast amount of knowledge available on the biology and ecology of bivalve molluscs from an ecosystem approach, and to do so in only 235 pages measuring 6 x 9 inches. Generally, the

book is written in a monotonous style that makes reading it as a continuum difficult. It opens with two chapters ("Ecosystem Perspective and Bivalve Molluscs" and "Physical-Environmental Interactions") that include an evolutionary history (1.5 pages) and an attempt to put the book into some grand perspective. The writing here is so pedantic and tedious that the reader is loathe to continue; for example, a definition of temperature is provided. Perseverance pays off, however, and Chapter 3, "Organismic Level Processes," begins to introduce the reader to the biology of bivalves and the physiological processes that shape the structural and functional roles of bivalves in ecosystems. The energy budget concept is introduced on page 35; however, it isn't until page 221 that the application of scope for growth is discussed. Other such disjointed discussions in the text make it difficult for the reader to focus on a particular topic. Subsequent chapters include "Population Processes," "Grazing," "System Metabolism and Nutrient Cycling," "Ecosystem Experiments: Models, Experimental" Ecosystems, and Field Manipulations," and "Bivalves as Components of Ecosystem Health." All of these topics are covered briefly and in some cases superficially, but many interesting and specific examples demonstrating the complicated role of bivalve molluscs in various ecosystems are provided.

The "Conclusions" (Chapter 9) section is particularly disappointing. The author suggests that there is sufficient existing information on systems dominated by bivalve filter feeders to construct a generic model that might elucidate the benthic-pelagic food web phase shift. While excruciating details are presented for some model systems throughout the book, no such generic model is ever presented. Such a model would have served to tie together the various points made in the text and provided the reader with a tangible 'take-home message.'

Line drawings, graphs, and tables are used sparingly and not always effectively. Figures are not consistent in their lettering size or shading. Some shading actually makes the figures difficult to read. Nonetheless, the book is generally well produced and has a very attractive cover.

This is a highly specialized book that begins to fill the niche between species-specific biological studies, populations studies, and ecological integrations. While each topic covered in the book could fill a volume of its own, the author has pared down the information to provide readers with a compact volume on bivalve ecology that contains

a large, but not comprehensive, list of references. It should prove useful to uninitiated students and scientists wanting an introduction to the topic and a starting point for their studies. Seasoned researchers will find little new material overall; however, they should find some specific aspects of interest and food for thought in the various discussions.

SANDRA E. SHUMWAY

*Natural Science Division
Southampton College, Long Island University
Southampton, New York 11968, USA*

Cephalopod Behaviour. By Roger T. Hanlon and John B. Messenger. 1996. Cambridge University Press, New York. 232 pages. \$79.95.

Have you ever wondered what alien intelligence might be like? While many people search for alien communications from beyond the earth, animals swim and crawl through the oceans with advanced brains that evolved independently from those of our vertebrate relatives. Whereas the nervous systems of chimpanzees, dolphins, birds, frogs, and fishes have all developed from a common precursor, cephalopod brains and sense organs are derived separately from a molluscan ancestor. The cephalopods, including the squids, cuttlefishes, octopods, and the chambered nautilus, are important in marine ecosystems, fisheries, and biomedical research. Their behavior is complex and varied. This book summarizes current knowledge about the behavior of these fascinating creatures. Furthermore, it is an excellent resource for those of us who are mystified by terms like "deimatic" and "protean."

The book reviews much of the literature on cephalopod behavior. The authors also provide a good overview of their extensive experiences observing cephalopods in the field and laboratory. Following the general introduction, the presentation is divided into the following sections: senses, effectors, and the brain; color change and body patterning; feeding and foraging; defense; reproductive behavior; communication; learning and the development of behavior; and ecological aspects of behavior. The genus *Nautilus* is discussed in a separate chapter because it is so different from all of the other living cephalopods. Each chapter ends with a useful summary and recommendations for future research directions. I think that these recommendations will be helpful for graduate stu-