

BOOK REVIEW

REEF AND SHORE FAUNA OF HAWAII. Section 1: PROTOZOA THROUGH CTENOPHORA. Edited by Dennis M. Devaney and Lucius G. Eldredge. Bernice P. Bishop Museum Special Publication 64(1). Bishop Museum Press, Honolulu, 1977. 278 p. \$15.00.

I warmly welcome the first volume in the revised series, REEF AND SHORE FAUNA OF HAWAII, because 25 years ago this book's predecessor profoundly affected the direction of my research career.

A first-year graduate student at Yale, I hoped to study the ecology of tropical marine molluscs. G. Evelyn Hutchinson stimulated the questions I was to pose; Sidney J. Townsley responded to my query about Hawaiian marine invertebrates by loaning (and later presenting me with) his copy of the 1946 edition of REEF AND SHORE FAUNA OF HAWAII, autographed by C. H. Edmondson. In the pages of that book, I first became aware of the surprisingly large number of cooccurring species of *Comus* in Hawaii. (Edmondson discussed 22 species and correctly noted that more than 30 occur in Hawaii.) That information, with the question how do they all make a living there and avoid competitive exclusion, formed the basis of my dissertation and of much subsequent research.

The original REEF AND SHORE FAUNA OF HAWAII broadcast the same message that John Steinbeck took from Edward Ricketts' BETWEEN PACIFIC TIDES of the same era: "This book . . . says in effect: look at the animals, this is what we seem to know about them but the knowledge is not final, and any clear eye and sharp intelligence may see something we have never seen. . . . Its purpose is to stimulate curiosity, not to answer finally questions which are only temporarily answerable" (Steinbeck, 1948).

Perhaps Edmondson's book stimulated other students and other dissertations. Mine began in 1954, in part in the old "Beach Lab" mentioned in Hank Banner's tribute to Edmondson in the new book. At that time Dr. Edmondson had retired to the Bishop Museum, and the lab was little used. We only half joked that the Beach Lab stood only because the termites, whose audible nocturnal mastication accompanied our research, had joined hands in the woodwork to hold up the building. In a year, it was gone.

Fine new laboratories in the then new Waikiki Aquarium replaced the old, the Department of Zoology at the Manoa campus and the Hawaii

Institute of Marine Biology at Coconut Island expanded and, in the 1970's, the Kewalo Laboratory of the Pacific Biomedical Research Center is leading a quantum jump in biological knowledge of Hawaii's reef and shore fauna. Now the taxonomic fruits of these studies are joined in the revision of Edmondson's early book. Today the increase in knowledge precludes any one person from doing justice to the broad swath of the animal kingdom that Edmondson managed; Volume I (of a projected 6) is the work of 13 contributors. While all sections are not identical in format, most include keys, species lists, brief descriptions and illustrations, a glossary of anatomical terms, and a bibliography.

F. J. Phillips' treatment of Protozoa is limited to two groups with hard skeletons, the folliculinid ciliates and the Foraminifera. Keys to 23 families of the latter and the commoner genera of several dominant families are illustrated with scanning electron micrographs, and methods for studying forams are included. Phillips notes that more than 400 species of Foraminifera are known from depths of less than 100 m in Hawaiian waters.

The chapter on sponges, by Patricia Bergquist, is briefer but contains a key to all 63 known reef and shore species. Edmondson's 1946 edition mentioned several species but identified only one. Bergquist includes an annotated systematic list of species and unverified records, and a glossary of morphological terms, but no information on habits and specific habitats. Three of the species belong to the Class Calcarea, the rest are Demospongiae. As yet no members of the recently rediscovered Class Sclerospongiae, which occur in Micronesian reefs, seem to have been discovered in Hawaii.

Nine authors contributed to the sections on Cnidaria, which contain more natural history information, following the spirit of the earlier book. Also like Edmondson, planktonic siphonophores, chondrophores and scyphozoa are included.

Edmondson knew of only one Hawaiian reef alcyonarian, a soft coral (Order Alcyonacea). Dennis Devaney now reports—and illustrates with spectacular color photographs—a second alcyonacean, a probably recently introduced telestacean, and a gorgonian, tripling the number of orders of Alcyonaria known in Hawaiian shallow waters. Charles Cutress's long awaited treatment of Hawaiian sea anemones includes a key to 17 genera and describes the 20 known species in a format

faithful to the style of Edmondson's original work. For each species this includes descriptions of external features and color in life, habitats and specific localities, and other original natural history observations. Non-specialists will thank the author for facilitating the determination of specimens without the need for microscopic examination of nematocysts.

Reports of pharmacologically active compounds from Hawaiian zoanthids have recently heightened interest in this small but conspicuous order. Gerald Walsh and Ralph Bowers describe 7 species (Edmondson described 4 but knew others were present) and illustrate colonies with large black and white photos of good quality.

The least knowledgeable worker can easily expand the number of species in a regional fauna; more serious taxonomic knowledge and effort is required to "reduce" the number of species by thoroughly reviewing all described species, critically assessing intraspecific and interspecific variation, and synonymizing names of species described more than once. Edmondson noted that more than 120 species of corals had been reported from Hawaii, 75 on reefs or to 25 m. Subsequently the number reported reached 150. In the new volume James Maragos recognizes 40 reef and shallow water species; he also lists the 29 deep-water ahermatypic species from Vaughan's 1907 monograph. This long chapter (83 pages, or 30% of the book) contains a key to all the species, descriptions and natural history notes, and systematically arranged lists of the species and of doubtful records. All of the shallow water species are illustrated in black and white photographs, many by several pictures showing the living colony, skeleton, and a close view of calice arrangement and skeletal details.

In the final anthozoan order considered, the Antipatharia or black corals, Rick Grigg and Dennis Opresko record, illustrate, and present a key to the 14 known species from Hawaiian waters, 12 more than previously reported. One might consider this chapter irrelevant in a work on reef and shore fauna, because the shallowest antipatharian record

from Hawaii is 25 m, and most of the species are known only from depths exceeding 300 m. However, the new information and the current economic importance and potential for over-exploitation of antipatharians in the jewelry industry justify their inclusion.

Surprisingly, most Hawaiian species of the Phylum Ctenophora are benthic forms. According to Dennis Devaney's account all 5 orders are represented, although not all by as yet identified species. The only order with more than one known species is the poorly studied Platyctenea, whose 4 species are respectively associated, with unknown degrees of intimacy, with the red alga *Hypnea*, the calcareous green alga *Halimeda*, sea urchins (*Diadema* and *Echinothrix*), and the crown of thorns starfish *Acanthaster*.

Rarely does one have the opportunity to review a book—or its reincarnation—that pivotally influenced one's early career. The Bishop Museum is to be commended for its leadership in publishing the new series of Reef and Shore Fauna of Hawaii, the first volume of which reveals so much new knowledge of the Hawaiian marine world. Perhaps it and its successors will tempt others, because it remains as true now as then that "In the laboratories, fissures are appearing in the structure of our knowledge and many young men are peering excitedly through at a new world. There are answers to the world questions which every man must ask, in the little animals of tidepools, in their relations one to another, in their color phases, their reproducing methods. . . . Every new eye applied to the peep hole which looks out at the world may fish in some new beauty and some new pattern, and the world of the human mind must be enriched by such fishing" (Steinbeck, 1948).

REFERENCE CITED

- Steinbeck, J.** 1948. Foreword to *Between Pacific Tides*, by E. F. Ricketts and J. Calvin. Stanford University Press, Stanford.
- ALAN J. KOHN, *Department of Zoology, University of Washington, Seattle, Washington 98195.*