

paper on numerical modelling and an occasional typographic error: but these do not certainly affect the importance of the book.

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Marine symbiosis (Balaban Publishers: Reho vot Zeist, Philadelphia), 1987, pp 365, \$ 75.
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The journal *Symbiosis* (Vol. 4, Nos 1-3, 1987) contains 22 papers presented at the First Eilat Symposium on Marine Symbioses held at the Interuniversity Institute, H. Steinitz Marine Biological Laboratory, Eilat during February, 8-13, 1987. This volume succeeds to project both the diversity and unifying concepts which were brought out clearly in this symposium that included subjects such as molecular, biochemical, physiological, behavioral and ecological aspects of mutualistic relationships among marine organisms. The papers cover a wide variety of organisms ranging from hydrothermal vent bacteria via the prokaryotic *Prochloron* through the widespread zooxanthellae and hermatypic corals, jellyfish and crabs to fishes.

A major concept which has been discussed at the symposium is the unique importance of symbiotic associations for the very existence of ecosystems. Such associations not only include the abyssal hydrothermal vent biota but also coral reefs of warm oligotrophic waters.

Out of the 22 papers, 6 papers are review articles. Inclusion of review articles on carefully selected diversified subjects in a publication of this type is a very good idea and is very useful for the researchers to update their knowledge on the developments that have taken place in their area of interest. These review articles selectively cover subjects like: luminescence bacteria and light organ symbiosis in fishes (J.W. Hastings and others); bivalve molluscs and bacterial association (D. Prieur); nutritional or detoxification role of epibiotic bacteria of annelid polychaetes of hydrothermal vents (A.M. Alayse-Danet and others); microbial symbionts in sponge evolution and ecology (C.R. Wilkinson); nutrition of zooxanthellae (C.B. Cook and C.F. D'Elia) and cleaning symbiosis (G.S. Losey Jr.). All these reviews deal with the state-of-the-art and perspectives of the subject. I sincerely believe that these articles will also serve as an

excellent starting material for the beginners in this fascinating field of 'marine symbiosis'.

The remaining papers cover a wide variety of organisms and their symbionts. While majority of the papers deal with organisms symbiotic with corals, few papers deal with interesting behavioral mechanisms such as plural mutualism (damselfishes and their algal lawns) and guard mutualisms (crustacean guard symbionts). The paper by P.W. Glynn on the ecological consequences of coral-crustacean guard mutualisms in the Indian and Pacific Oceans gives lot of information and data on the degree of protection offered to corals by crustacean guard symbionts. In one of the papers by R. Lenke, the reported finding that the control of cleaning behaviour in Teleost is not only dependent on visual tactile stimuli but also on hormones of the fish's endocrine system is quite interesting. Similarly, the hypothesis that in the origin of species and higher taxa of eukaryotes symbiont acquisition followed by partner integration has been equivalent to neoseme appearance leading to speciation has been convincingly and beautifully discussed with a number of examples by D. Bermudes and L. Margulis in their paper on Symbiont acquisition as Neoseme: Origin of species and higher taxa.

Besides these, papers on 'chimerism' in colonial invertebrates, the role of feeding in the carbon metabolism of the symbiont-bearing foraminifera, the *Prochloron*-ascidian symbioses and the influence of symbiont photosynthesis on the incorporation of oxygen and carbon isotopes into shell calcite of planktonic foraminifer have contributed substantially to our existing knowledge.

As rightly pointed out in the preface, this symposium underscores some important future focal points in the study of marine symbioses: recognition processes among partners on the immunological level, cellular and behavioral mechanisms allowing establishment of associations, nutrient and energy budgets, cost-benefit analyses and ecological factors which enhance the competitive value of mutualistic association in various marine habitats.

The remaining papers of the symposium which might have been got published subsequently would also be of equal interest to the scientific community. The publishers have done an excellent job of printing. The general layout of the papers is quite comfortable for reading and mistakes are hard to find. This particular volume of the journal is worthy of finding place in all marine science libraries.

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