in this field and making it readily available in a readable monograph.

The first four chapters of the book are an introduction to the general mechanistic and kinetic features of free radical telomerization reactions. The significance of chain transfer constants and the processes by which they are determined are presented clearly, and the use of such data in determining the reactivity factors of both monomers and telogens is outlined in chapters 2 and 3. Chapter 4 is an interesting discussion of the kinetics of free radical telomerization reactions in terms of the limitations of steady state treatments that also points out the value of certain empirical approaches to telomerization kinetics.

The next four chapters cover the chemistry of various classes of compounds as telogens. An entire chapter (chapter 5) is devoted to the chemistry of carbon tetrachloride in telomerization reactions. The behavior of other halogen compounds is discussed in chapter 6. Chapter 7 includes the chemistry of many of the oxygen- and nitrogen-containing organic compounds that have been used as telogens. Those telogens that lead to non-carbon-centered radicals (for example, sulfur, phosphorus, and silicone compounds) are discussed in chapter 8. A section on organometallic compounds and their participation in telomerization reactions that probably do not involve free-radical intermediates is also included. The tables in these chapters have been prepared with great care and are most useful. When available, pertinent chain-transfer constants are included along with the structures of the telogens, monomers, and telomeric products formed from them.

The final chapter describes cotelomerization reactions. Although the data available are limited, some examples are presented, and the kinetic aspects of such reactions are examined briefly.

References are placed, in the order in which they are cited, at the end of each chapter. Both an author and a subject index are included.

The book should prove stimulating not only to polymer scientists, but also to chemists interested in the synthetic and kinetic aspects of organic free-radical reactions.

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Marine Ecosystems

The Biology of the Oceanic Pacific. Proceedings of a colloquium, Corvallis, Ore., Apr. 1972. CHARLES B. MILLER, Ed. Oregon State University Press, Corvallis, 1974. 158 pp., illus. $6. Annual Biology Colloquium.

The first six of the seven chapters in this small book are review articles that summarize and assess the status of most of the prominent and exciting inquiries into offshore blue-water ecosystems. John A. McGowan, the leader of the colloquium on which the book is based, summarizes the zoogeographic study of open ocean zooplankton that he and his students have completed in the last decade. Pacific biotic provinces can be defined by the fauna as well as by water masses and circulation. Calling these regions separate "ecosystems," McGowan discusses what he believes to be the basic features common to all of them. "Their basic organization," he says, "does not differ from other ecosystems." McGowan's questions, posed with no answers as to how his "systems" are maintained, are followed wisely by a paper on control of ecosystem processes by Timothy R. Parsons and Bodo R. de Lange Boom, who present a matrix of 15 biological and physical-chemical parameters assumed to be interacting, interdependent components of an open-ocean ecosystem and succinctly review what is known about their interactions. Bruce W. Frost, a former student of McGowan's, appropriately follows with his studies of an important factor in the control of ecosystem structure, zooplankton feeding rates. Robert R. Hessler discusses his new information on the structure of deep benthic communities below the depauperate central gyres outlined by McGowan. Next, Brian J. Rothschild reopens the question whether the vast though seemingly unproductive open ocean has exploitable fisheries resources. P. W. Hochachka gives his views of enzymatic adaptations to oxygen, temperature, and pressure extremes in the oceans, a subject seemingly out of keeping with the previous papers but having an important relationship to all the studies discussed. Each discussion demonstrates the importance of the kinetics of functional responses, even if only by implication, as in Hessler's account of feeding activities around free baited cameras on the deep-sea floor. Many of these responses may be coupled to enzymatic adaptations to open-ocean life.

In the concluding chapter of the book Joel W. Hedgpeth honors the *Challenger* centennial with a history of oceanography in the Pacific, replete with anecdotes.

Were I to be teaching biological oceanography this year, I might choose this inexpensive little book as my text, as it has covered so many subjects so well. Each of the authors has presented his own picture of the open ocean, and the subtle resonance between them is found in theses about which they do not always agree. Each boldly presents his viewpoint in a manner that might never have been managed in strictly refereed journals. Models erected by intuition, with as yet little substantiation, fill the book and could cause continual excitement in a class of graduate students. Are open-ocean ecosystems delimited by zoogeographic boundaries, as McGowan suggests? Does diversity "contribute" to stability, as Parsons and de L. Boom state? Is size in zooplankton grazers important to competitive exclusion? Is there no way in which the high diversity of the deep benthos is related to the "small amount of food entering the system"? I was delighted by Rothschild's graphs of food chain dynamics and efficiencies, but I tend to favor the argument promulgated by J. H. Ryther (*Science* **166**, 72 [1969]) that the open ocean is not the place to look for new food resources. Hochachka's approach to ecology is untrodden, and there will be a long wait before the importance of enzymatic adaptations to ecosystem dynamics is understood.

A notable omission from a book about an ecosystem is a conceptual model indicating the interdependencies among the system components (such as is presented by J. H. Steele in *The Structure of Marine Ecosystems*, Harvard University Press, 1974). An introduction or conclusion dealing with such relationships might have made them more apparent to the student.

C. B. Miller, another of McGowan's students, did an excellent job putting together so much information in such a compact, inexpensive form. I would call the little book a notable tribute to John McGowan as well as to the *Challenger*'s anniversary.

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