

by Hessler entitled "The Structure of Deep Benthic Communities from Central Oceanic Waters" compares major community changes in standing crop, diversity and trophic structure of the benthos of deep ocean gyres, and shallow inshore waters.

Most informative and enjoyable is the concluding paper "One Hundred Years of Pacific Oceanography," by Hedgpeth. His extensive knowledge and wit provide the reader with an excellent survey of advances in Pacific oceanography since 1872. Students of oceanography should place this paper on their reading lists.

*The Biology of the Oceanic Pacific* is best suited for students with a background in ecology or oceanography. High school instructors will find some papers of use for their classes, but most benefit will be gained by individuals at the college level.

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**ECONOMICS OF ENVIRONMENTAL IMPROVEMENT**, by Donald T. Savage, Melvin Burke, John D. Coupe, Thomas D. Duchesneau, David F. Wihry and James A. Wilson. 1974. Houghton Mifflin Co., Boston. 210 p. \$4.50 (softback).

Teachers of environmental education, economics, environmental resources, and similar courses, as well as students interested in the diverse problems encountered while studying about the quality of the environment, should find this book to be of value. Whether used as a basic textbook, resource book, or for general supplemental reading purposes, this book, interdisciplinary in scope and philosophy, is most useful in supplying a basic understanding of the many economic intricacies involved in the process of ameliorating the nation's environmental problems. Since the true definition of environmental education is a most encompassing one and should include a basic understanding of many disciplines, including economics, this book should help to fill the economics void created so often in the vast array of published material that deals with environmental topics. One senses the urgency for a closer working relationship between experts in all fields for the purpose of devising solutions and preventative schemes in examining environmental insults, as a result of reading this book.

Although basically the book is centered around economics theory and principles, the authors have supplied relevant background information about the causes of pollution (though sometimes simplistic) in order to give the reader a reasonable understanding of the interrelationships involved in analyzing environmental problems. The examples used are representative of some

of the nation's most pressing industrial problems; the treatment given to the relationship between various industries and newspaper production is illustrative of the book's theme of relevance and its succinct presentation is easily understood. The interdependence of producers and consumers in this example emerges as an unmistakable reality when one looks at today's economy. Unmeasurable factors resulting from environmental degradation, such as aesthetics, personal feelings, and the various adversities attributed to psychological manifestations suffered by diverse segments of society, are given just consideration throughout the book. These oftentimes unmeasurable parameters of environmental insults are rarely considered (but should be) when assessing the true nature of the environmental problems faced by humankind.

The chapter on costs involved in pollution abatement directs itself to the problems of air and water. The explanations of state and federal rules and regulations, combined with economic ramifications, are excellent. Regardless of the time period cited, the data presented are highly significant in terms of the overall impact on the economy. The authors stress that pollution abatement analysis is only one step that should be used in setting environmental improvement standards, and a separate chapter more than adequately covers the basic policy alternatives—regulation, user charges, effluent charges, and subsidies—that follow initial analyses.

Environmental improvement and preservation as related to compensation theories and practices are adequately discussed in conjunction with political ramifications and influences on employees and business management. The reader is presented with both sides of the arguments, and it is pointed out that, given enough time, most industries should be able to meet certain standards leading to improved environmental qualities. The role of the consumer as the enforcer of regulations is stressed throughout the book.

In terms of the total implications and broad meaning of environmental awareness and education, this book adequately serves as a basic primer in leading one to understand the so-called hidden micro- and macroeconomic effects that are prevalent in the struggle between economic growth and environmental improvement. The bibliographical notes and index make this book highly usable and most valuable as a ready source of information. A number of lessons, using economics as a vehicle leading to a better understanding of environmental problems, can be derived from this book. It should prove to be a welcome addition to the reference shelf of any teacher or student seriously concerned with the environment.

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**THE WHALE PROBLEM: A STATUS REPORT**, ed. by William E. Schevill. 1974. Harvard University Press, Cambridge. 423 p. \$12.95 (hardback).

Since many people have recently become alarmed by the decline of whale populations throughout most of their range, this book is obviously timely, perhaps late. It is a compilation of revised papers originally presented at the International Conference on the Biology of Whales, in June 1971, under the auspices of the Department of the Interior and others. The purpose of the meetings, called by Walter Hickel after he placed 8 species of whales on the endangered list, was to bring together cetologists from all over the world to discuss what was known of the biology of whales, and what further information was needed before a workable program of whale management could be constructed.

The book consists of 19 chapters, each by different authors. These have been combined into five sections which cover (i) the conference's major conclusions; (ii) the current status of whales in several geographical areas and how their distribution relates to oceanic productivity; (iii) the biology of sperm whales and the relationship between whale biology and management; (iv) sperm whales and the relationship between whale biology and management; (v) whale management and conservation, including the role and history of the International Whale Commission (IWC), mathematical treatment of population dynamics and recruitment, sampling techniques, and a protectionist's reflections on past management; and (vi) tagging and telemetric methods available or needed for direct study of whale movement.

The authors clearly show how difficult it is to properly manage a living resource when an understanding of its biology must be derived from indirect or questionable data sources. The "current status" section explains how the age or recruitment, birth rate, natural mortality, migration, social structure, and past and present stock (population) sizes are estimated from whaling and sight records and autopsies of dead whales. From these, the rate of recruitment, "sustainable yield" (s.y.) and "maximum sustainable yield" (m.s.y.) are calculated in section four. Proper management demands that only the "surplus" be taken, and determining this surplus (s.y.) requires precise understanding of population dynamics and age and social structure. Considering the limitations of the data, I was surprised at the accuracy of early 1960 s.y. predictions. My impression from sections 2, 3, and 4 is that modern population theory was being used to generate whale-management proposals from questionable data. Certainly more direct observations, and increased financial support are necessary if whales are to be understood and managed.