An Introduction to Environmental Biophysics

Campbell's experience in teaching environmental biophysics has served him well in producing this introductory textbook. When I first taught the course it was confined to that used by scientists in the United States, and it seems to be forever delayed with new "Introductions to..." that we report almost monthly a basic set of core ideas and principles. Reflecting back to my own days as a scientist, however, I began to get a different perspective as I progressed through the book. Instead of having to go to a half dozen different sources for necessary background material, here I found a fairly adequate package of requisite groundwork concepts. Temperature, moisture, wind, radiation, and heat, mass, and momentum transfer were all treated sequentially in the first six chapters, each topic proceeding logically from its most basic level to one that gives the student some capacity to appreciate the type of research that is occurring today in the forefront of many different phases of this conglomerate field called environmental biophysics.

The second half of the book is even more interesting than the first, for it is here that Campbell gets into the more applied aspects of the basic principles treated in the first half. Chapters 7, 8, and 9, for instance, introduce us to the responses of animals, humans, and plants to the various types of environments they may encounter, while Chapter 10 describes exchange processes in plant canopies. Specific numerical examples and sample problems illustrating the use of the principles described and give the student an opportunity to more fully grasp the methods of their application. An Appendix deals with terminology and units employed in the text and also contains some notes on much used atmospheric properties. The book is surprisingly self-contained unit. I am sure that many instructors will find it a helpful adjunct to their courses in environmental biophysics and that it will be equally well received by the student. S. B. IDSO, U. S. Water Conservation Laboratory, ARS, USDA, Phoenix, AZ 85040.

Effects of Pollutants on Aquatic Organisms
Edited by A. P. M. Lockwood. Cambridge University Press, 32 East 57th Street, New York, NY 10017. 1976. 193 p. $19.95 cloth, $8.95 paper

This book contains nine lectures by participants in an April 1975 seminar at Liverpool University. According to the Preface, the intent of the series is to "outline the state of the art" of the experimental approach into the subtle influences of the more important substances currently considered to have significant effects on aquatic organisms. This objective was reasonably well fulfilled, although it can be debated whether all of the substances reviewed are genuinely the more important ones; devoting two chapters to petroleum hydrocarbons seems excessive when compared to the importance of similar studies on aquatic habitats. The book is surprisingly self-contained unit. I am sure that many instructors will find it a helpful adjunct to their courses in the United Kingdom. Important work on complete life cycle toxicity studies and behavioral studies commonly used in the United States is only briefly mentioned.

A major shortcoming, typical of complications such as this, is that the reader may be led by the book and some chapter titles to expect a rather broad coverage whereas many chapters deal with very narrow aspects of the topic. Most chapters contain a limited literature review on lethal effects, a broader coverage of some biochemical or physiological phenomenon, and, finally, some original experimental work by the author. The chapters range from good to excellent in terms of readability and soundness of the technical information, although it is difficult for one reviewer to be fully familiar with such a broad range of topics. A large portion of the index is devoted to species names which many readers may not find useful.

For my own particular interests there are three outstanding chapters. The chapter by R. Lloyd and D. J. Swift relativistic biophysics of fish, particularly urine flow rates, to pollutant concentration. They stressed the importance of requiring that a measured response due to a pollutant impose significant metabolic cost in order to be considered a suitable criterion for establishing a detrimental effect—that the response not simply be part of an adaptive process which maintains homeostasis. The chapter by M. R. Reeve et al. reported preliminary experiments with large en-
closures in marine environments and pointed out problems in coping with changing population density of zooplankton, independent of pollutational effects. This methodology will certainly be a valuable means of assessing the predictive capabilities of laboratory experiments when applied to field situations. The chapter on respiratory physiology by G. M. Hughes marks basic research in science which can lead to important advances in solving applied problems. This is illustrated by a review of methodology and findings from many types of basic studies in respira-
tory physiology, showing how these contributions aid in assessment of the impact of pollutants. A result of some original gill morphology studies indicated that fish exposed to sublethal cadmium concentrations for seven months had an oxygen diffusing capacity above one-third greater than controls, possibly due to an increase in respiratory transport which is not impelled by a respiratory point of view, they were in a more favorable environment than controls. If this phenomenon results with other pollutants, it may explain the increased growth and reproductive capacity commonly observed in long-term toxicity tests of fish in low toxicant concentrations.

The book should be useful to scientists working in pollution biology, since they are likely to acquire insight and new ideas on recently developed techniques and background information on new areas of research interest. The inexperienced reader is not likely to have sufficient background to appreciate the advanced material presented.—L. R. ADELMAN, Department of Entomology, Fisheries, and Wildlife, University of Minnesota, St. Paul, MN 55108.

Reclamation and Use of Disturbed Land in the Southwest

This publication resulted from a symposium "Disturbed Land Use and Reclamation in the Southwest" held in Arizona in January 1975. Its purpose is to "contribute to an understanding of the constraints, alternatives and techniques in reclamation of lands disturbed by mining, and to present latest results of major research efforts in disturbed land reclamation in the southwest." The book is divided into six parts: "I. Mining and Land Use Planning; II. Constraints in Disturbed Land Reclamation; III. Mining and the Environment; IV. Mining and the Amentities; V. Water Reclamation Techniques; and VI. Plant Species for Disturbed Lands." Each part consists of a brief summary by the editor, followed by five to seven papers authored by individuals active in these fields. Most authors were employed by universities, federal or state agencies, industry, or professional consultants, and viewpoints of these organizations prevail. Most papers referred specifically to land disturbance in the Southwest U. S., although many principles discussed have application in other regions.

The subject matter covered in this book is rather extensive, as indicated by the titles of the various parts listed above. This is one of the few publications on reclamation that devotes this much space to topics. The majority of the papers in each part, and in the book as a whole, are concerned with policy and planning activities related to the reclamation of disturbed lands in the Southwest. With a few exceptions, the technology of reclamation is confined largely to papers in the last two sections. Generally those papers concerned with policy and planning were without bibliographies and presented a minimum of experimental data, while those concerned with the technology of reclamation presented more data and literature citations.

The coverage of the subject of reclamation in the Southwest is sufficient to provide the reader with a good superficial knowledge of the major problems and suggested solutions. Since there is some duplication of subject matter in the five to seven papers in each part, and particularly between the papers in each title of each part is adequately discussed.

This publication is recommended for those who are seeking an overview of disturbed land reclamation problems, especially for arid regions such as the Southwest U. S. Many seldom-discussed problems in planning and policy are brought up, and some novel methods of study are outlined. Although papers concerned with development of reclamation technology contain considerable data, those active in this field will find that most of the data presented have been published elsewhere since January 1975. Consequently the publication will probably be best suited for students, administrators, planners, and others who are seeking a comprehensive view of the entire subject. Organization, format, and printing all meet high standards.—J. F. POWER, Agricultural Research Service, U. S. Department of Agriculture, Mandan, ND 58554.

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