Book Reviews

Details versus Models

The Ecosystem Concept in Natural Resource Management. Based on a symposium, Albuquerque, N.M., Feb. 1968. GEORGE M. VAN DYNE, Ed. Academic Press, New York, 1969. xiv + 386 pp., illus. $16.50.

Despite the large number of recent books which have somehow combined the notions of "ecology" and "system" in the title, the text, or both, this book is unusual to a startling extent. The subject matter orientation is different from that of preceding offerings: nine of the chapters are by authors whose primary interest is in range, or forests. Only one of the ten chapters deals with fish and game management. The philosophical orientation is different from that of many other books. This book insists that to understand the natural world we must have a great deal of detailed information about many different aspects of that world—minerals, soil, water, weather, plants, animals, and the interactions among these—or we simply won't understand how the system functions. By implication, this book makes a strong argument for the case that ecosystems cannot be understood in terms of a small number of simple principles. Rather, it argues, a great deal of information must be collected over a considerable period of time; any other approach is likely to be misleading. Only by understanding how all the components of the system interact can we understand the system. Thus, for example, the key to the arctic lemming cycle may be found in the interacting system of nutrients, soil, vegetation, and herbivores.

A clear implication of this argument is that big teams and big budgets are required for ecosystem analysis, and part of the book provides insight into the organizational problems of such big teams and how to surmount them. However, on the subject of methodology, the book is somewhat baffling. In the last chapter, on training natural resource scientists to deal with ecosystems, Van Dyne indicates that Ph.D. programs in experimental systems ecology should be 12 percent mathematics, statistics, and logic and Ph.D. programs in theoretical systems ecology should be 39 percent these subjects. Yet this is one of the most totally nonmathematical books on modern science this reviewer has ever seen. A number of interpretations can be placed on this observation, and one of these is most thought-provoking. Perhaps many of us are oversold on the importance of mathematics, statistics, and computers. Perhaps tremendous knowledge of an actual system, as demonstrated in this book by several authors, is an adequate means of dealing with complexity. At any rate, not enough experience in dealing with extreme complexity has accumulated yet in ecosystem analysis for us to know for certain which methodology is best. Another extremely interesting point is made in the chapter by Charles Cooper. He notes that preliminary computer experiments have shown that hypothetical simple systems are far more sensitive to changes in the relations between components than to changes in the values of the components themselves. Since this same finding is coming from different groups of people working on models of cities, it may be a fundamental statement about the properties of systems in the biological and behavioral sciences.

Ecosystem analysis is just beginning; this book is an essential tool for scientists who wish to be informed about that beginning.

KENNETH E. F. WATT
Department of Zoology,
University of California, Davis

More Man-Made Problems

Noise and Man. WILLIAM BURNS. Lippincott, Philadelphia, 1969. x + 338 pp., illus. $11.

This book, first published in Great Britain in 1968, reflects—quite accurately—in information, concern, and mood the views that interested life scientists, physicians, and engineers came to hold throughout the '50's and the '60's regarding the effects of noise. With the exception of the rather brief introductory historical summary, it is only in the final paragraph of the book that we read that noise "is yet another by-product of technical advance which has not been adequately controlled" and that the elimination of noise "should be viewed as a part of the practice of preventive and industrial medicine, such as the provision of clean water supplies, and the continued attention to such problems as atmospheric pollution, the chemical contamination of foods, traffic and industrial accidents, and the ill effects of cigarette smoking."

So ends a book written to make it easier for "audiologists, engineers, medical officers in industry, medical practitioners, otologists, physicists and health physicists, safety officers in industry, psychologists, public health officers . . . and administrators in local government" to become acquainted with what the author labels a rather wide and confusing field. The common denominator of this professional conglomerate is to him the "enquiring nonspecialist reader" who would like a short factual account of the many problems that arise from noise: annoyance, interference with conversation, leisure, sleep, and efficiency; in particular, potentially harmful effects on hearing.

Burns deals as follows with these topics: There are three chapters on sound and its measurement, three chapters on hearing—the peripheral mechanism thereof, measurement of hearing and deafness—and then a short chapter on various disturbing effects of noise including those alleged to affect man's physical and mental health. After a chapter on how to assess and reduce certain interference effects, there follow three chapters on temporary and permanent noise-induced hearing losses and on hearing conservation. The next two chapters touch such topics as aircraft noise and the sonic boom. Finally there are 4 pages of conclusions and about 50 pages given over to a dozen