BOOK REVIEWS

Soil Mechanics—New Horizons

The book is written in Australia primarily for those whose interest is in construction of highways, earth structures, or buildings. The book extends development published in an earlier book, Soil Mechanics—Selected Topics, Butterworths, London (1968), edited by I. K. Lee. The present book is divided into seven chapters and it is believed that agricultural workers will find one or more of these chapters of interest.

Chapter 1, "Compaction," and Chapter 2, "Stabilization," provide general insight and references which are a review for those readers who are well-versed in the construction fields. Chapter 3, "Application of Statistics in Soil Mechanics," provides a broad survey over those aspects of design to which statistical methods have potential use. A preliminary treatment of statistical concepts is followed by a discussion of distribution function, variability of soil properties, sampling theory, the precision and accuracy of soil tests, specifications and control, and statistical design. The central theme of this chapter is the application of statistics to the decision-making process—by way of such techniques as prediction equations. Chapter 4, "Behaviour of Unsaturated Soils," is a chapter of great interest to workers in agriculture and in arid regions where nonsaturated conditions generally prevail. The retention and movement of water, the prediction of pore pressures, and the deformation of soil under loading are broadly discussed. Chapters 5 and 6 provide an "Analyses of Soil Settlement and Stability and Earth Pressures." Consolidation of soil and soil reactions to loadings are analyzed from the standpoint of structural loadings in a concise, comprehensive manner. Chapter 7 discusses "Some Recent Developments in the Theoretical Analysis of Pile Behaviour." One section is devoted to applying theory to model and field tests.

The book is well-referenced by chapters, which is ideal from the standpoint of readers whose interest is limited to certain chapters. All chapters are illustrated amply and clearly. The material reads well, but has some style differences because of the various authors.

The book, while prepared for consulting engineers and engineering professors, does provide information to their counterpart in agriculture and some of the basic material is of interest.—WILLIAM R. GILL, Director, National Tillage Machinery Laboratory, USDA, ARS, SR, Auburn, Ala.

Humus Acids of Soils
by D. S. Orlov. Moscow University Press, Izdatelstvo Moskovskogo Universiteta, Ulitza Gertzena 5/7, Moscow, USSR, 332 p., 71 illustrations, over 1,000 references. 1974. Rb. 2.78 (Under direct exchange approximately $3 to $4). Possible U.S. distributors are Four Continent Book Corporation, 156 5th Avenue, N.Y., NY 10010 and Vicktor Kamkin, Inc., 12224 Park Lawn Drive, Rockville, MD 20852.

Humus acids are widely distributed in soils, peat deposits, and natural waters. They influence the soil productive capacity, the migration and accumulation of mineral elements, and the plant uptake of nutrients. Recently humus acids have found utility in industry and medicine.

The 10 chapters of the monograph include the following subject matter pertinent to humus acids: the role and conditions of formation; physical properties; elemental composition; structural units; size and form of particles, their molecular weights; electrophoresis; infrared spectroscopy; pyrolysis and differential thermal analysis; colloid-chemical and electrochemical properties and X-ray diffraction; and the problem of standardization and characterization. The book summarizes numerous investigations conducted by the author and his associates in the biochemical laboratory of Moscow University. Their studies embraced a wide array of genetic soil types formed under peat, forest, and swamp vegetation. Their information is juxtaposed with important information generated by other Soviet and foreign investigators.

A restriction of humus analyses to definite soil-vegetation units, be they called geobiocenes or ecosystems, are likely to effect a considerable reduction in the variation and dispersion of analytical values. The humus layers of such a broad division as sod-podzolic soils originated under the influence of several different groups of humifiers: arthropods, fungi, and earthworms. The exoskeletons or tissues of these animals as well as their metabolic byproducts, impart to the humus-enriched horizons a markedly different chemical composition; the latter is particularly true of the pH value and redox potential, the factors which are of decisive importance in determining the fate of the biochemical components.

The treatise presents an important advance along the very long road toward our knowledge of the all-important factor of soil development and soil fertility, "the product and the source of life." The extensive bibliography of about 1,000 references, of which almost 500 describe investigations conducted in the USSR, should be particularly valuable to those students of humus chemistry who find difficulty in acquiring sources of Russian literature.—G. CHESTERS AND S. WILDE, University of Wisconsin, Madison, Wis.

Microclimate: The Biological Environment

This new book by Norman Rosenberg of the University of Nebraska will be a welcome addition to the libraries of many practicing scientists and engineers who are unfamiliar with the subject matter covered, and who are turning their attention to problems of environmental quality, to quote from the author's preface. The subject is the climate in and around agricultural crops. Students of "the biological environment" may find it tough going unless they have a good grounding in the physical sciences. Nevertheless they should try it because it contains many words of wisdom from a practicing scientist.

Rosenberg has included a great deal of new data from his own research or that of his colleagues. Although this is somewhat indigestible on first reading, it certainly makes the book more interesting to a reader who is already familiar with the subject. There is much that will repay deeper study in this book.

The book invites comparison with John Monteith's recent book Principles of Environmental Physics (Edward Arnold, London, and American Elsevier, New York, 241 p., 1973), which treats similar topics in a different manner. The starting point of both books is the fact that "the biological environment" obeys the laws of physics. Monteith states the laws better, in my opinion, and his solutions are more elegant, but there is no doubt that Rosenberg gives us more practical answers. It is obvious that these books were produced in quite different microclimates. Both are to be read and enjoyed. Both contain a minimum of folklore.

As might be expected, the biological principles which govern the responses of plants and animals to their environments receive scant treatment in these books. Rosenberg's brief foray into crop physiology (Chapter 8, "Photosynthesis") contains so many false or misleading statements (for example, that C4 and C3 plants get their names from respiration patterns) that it needs to be rewritten, or left out of future editions. The subject of crop responses simply cannot be compressed in this manner.


Rosenberg has made a brave attempt to eliminate nonmetric terms from his book, but I managed to find a few (Bu ft⁻² min⁻¹ on pages 6 and 294, miles on page 13, feet on page 27, gallons on page 160, bushel and acre-inch on page 241). I personally prefer SI units, but I realize that this is not current practice in meteorology. The book provides about as consistent a set of terms and units as the subject allows.

I recommend this very readable book to soil scientists who wish to learn more about the above-ground microclimates of crops.—K. J. MCCREE, Texas A&M University, College Station, Tex.