BOOK REVIEWS

Principles of Soil Science

This book has the subtitle "With Special Reference to Conditions in the Indo-Pakistan Subcontinent," and is designed as a text-book primarily for agricultural students of that area. Many examples are used from that area and were chosen on the basis of the author's personal experience and travels when he served as a member of a Washington State University team at the University of the Punjab in West Pakistan. The work is a factual, up-to-date, readable presentation of the useful principles of soil science and has application and usefulness far beyond the scope intended by the author.

The book is an excellent treatment of principles covering the range from acid, leached soils through semi-arid to an authoritative treatment of salinity and alkali. The latter subjects are often omitted or receive superficial treatment in most texts. The 14 chapters of the book are titled the general nature of soil; physical properties; moisture relations and aeration in soils; the mineral fraction of soils; exchange reactions and pH control; soil organic matter; concepts of soil productivity and fertility; soil nitrogen; soil phosphorus and potassium; soil calcium, magnesium, sulfur and the minor elements; fertility management; the salt problem in irrigated soils; the development and classification of soils; and soil survey and mapping.

The book is remarkably free of errors and mechanical errors. Figure 3-11 has an error in the abscissa—per week, not inches per day. This book is recommended for general reading by those interested in the soil and for consideration as a college text.—FRANK G. VIETS, Jr., ARS, USDA, Ft. Collins, Colo.

Progress in Soil Zoology

The beginnings of zoology can be found in studies of the vertebrates and insects that display a remarkable variety of animals in major body plans. Diversity in the development of zoology was developed by the study of the very different body plans characteristic of the marine fauna. Zoologists have continued to stress basic of these aspects and in their doing have ignored the greatest and most interesting collection of animals. This assemblage is made up of the myriad of organisms to be found in soil all over the earth. The number of individuals is astronomically high and the total bio-mass in soil is very high. One of the reasons why this assemblage of animals is yet to be studied seriously is the lack of knowledge of methods for handling such investigations.

The present volume is a discussion of such methods. Quite appropriately Part I is devoted to ten papers on the statistical aspects of sampling and analysis. This part will be valuable to all scientists who are faced with the necessity of analyzing nonrandom distributions; Part II is composed of 26 papers on methods for extracting the fauna from the soil. Basically there are two such methods: (1) the funnel method; either dry (Berlese or Tullgren) or wet (Baer man) and (2) washing; centrifugation and flotation. The number of fundamental methods is few. The number of variations on these methods is approximately equal to the number of investigators who have collected organisms from the soil. Part III relates soil organisms to the chemical and physical properties of the soil. There are nine papers in this section.

As a group these papers will provide the basis for solidifying investigations in soil zoology.—C. W. WHARTON, Dept. of Zoology and Entomology, Ohio State Univ., Columbus.

Physics of Plant Environment

This book is a welcome addition to the literature on plant environmental science. Edited by W. R. van Wijk, Professor of Physics at the Agricultural University of Wageningen, the book is comprised of ten chapters (van Wijk is a joint-author or author of seven chapters). The book summarizes much of the work and viewpoint on environmental physics for which the authors and Wageningen are well-known.

The introductory chapter by van Wijk is nonmathematical and contains illustrations of the application of quantitative methods to agricultural problems. The remaining chapters consider the physics of the environment and contain, to varying degrees, more involved mathematics. The second chapter, The Atmosphere and The Soil, by van Wijk and D. A. deVries reviews the basic physical properties of the soil and the atmosphere and sets forth physical concepts necessary to the other chapters. Chapter 3, Radiation, by van Wijk and D. W. Scherer is concerned with thermal and solar radiation transmission, emission, and reflection by the atmosphere and the interface. The discussion, though in complete relative to the needs of atmospheric scientists, is valuable to the agriculturist and biologist.

Soil thermal properties, temperature, and heat flow are the subject of the next four chapters: Periodic Temperature Variations in a Homogeneous Soil by van Wijk and D. A. deVries; Central Temperature Variations in a Homogenous Soil by van Wijk; Sinusoidal Temperature Variation in a Layered Soil by van Wijk and W. J. Derksen; and Thermal Properties of Soils by D. A. deVries. Chapter 7, which may well have been placed before the other chapters, gives methods (and many examples) for estimating the heat capacity and thermal conductivity from the soil mineral composition, water content, and porosity; it includes a brief discussion on the effect of vapor transport on conductivity. The discussion of soil thermal behavior in chapters 4 and 5 includes one-dimensional heat flow and temperature distribution under both steady-state and nonsteady conditions in homogeneous soils. The relation of the soil heat flux and temperature to the interface energy balance and atmospheric transport also is considered. The discussion on layered soils includes examples; application to problems concerned with dry surface layers and surface roughness, and their effects on interface temperature as well as in the soil body. The mathematical competence required for reading chapters 4, 5, and 6 is much greater than for earlier chapters; however, example calculations and applications are given that aid understanding by the less prepared reader. With four chapters (over 35% of the text) devoted to soil thermal problems, this aspect of environmental physics is covered much more completely and in greater detail than other topics in the book. Equal emphasis on other topics may have made the book unwieldy; however, the present emphasis lends some imbalance, even though this detailed and specific treatment of soil thermal problems in one book is commendable.

Chapter 8, Turbulent Transfer in Air, by van Wijk and A. J. W. Borghorst is disappointing in its emphasis. A page devoted to experiments on turbulence is of interest but not very informative; about ten pages of the forty pages in the chapter are devoted to temperature variation and the heat wave in the atmosphere and require competence in mathematics. Another ten pages are devoted to a brief discussion of water requirements and actual and potential evapotranspiration that is too short to contribute much to agriculturists. The pages on these three parts constitute more than half of the chapter, but do not help biologists and agriculturists in proportion to the space used. This space could be used better for more discussion in the wind profile section of the aerodynamic transport equations and for an expansion of the sections on advection to include recent work on local advection. Any consideration of transport from single plants or leaves has been omitted and could have been included.

Chapter 9 on the Glasshouse (Greenhouse) Climate by J.-A. Bulterman will be very valuable to the many biologists who do much of their work in glasshouses. Evaporation, temperature, ventilation, radiation, etc., are discussed as well as material such as heating which is pertinent to engineering.

Lastly, Chapter 10, Atmospheric Pollution, by F. H. Schmidt discusses problems of increasing concern to agriculturists.