

symptomatic of the apparent lack of fundamental concepts and basic philosophy characteristic of most attempts to study the soil as a whole since the demonstration of the limitations of the zonal concept. Soil science, like regional geography, seeks a holistic view but largely fails to attain anything more fundamental than a catalogue of information. It is significant, therefore, that Sombroek finds it necessary to mix the terminology of the Seventh Approximation with that of the older United States Department of Agriculture Classification (compare "plinthite" with "ground water laterite", and "acrox" with "latosol"), as well as to introduce terms of his own, in order to describe and classify the soils he describes.

The intellectual affinity of the problems of soil science and regional geography is further emphasized in Sombroek's adoption of the "land unit" as the conceptual basis of his consideration of the ecological and agricultural implications of his work on the soils. This concept, originated by the CSIRO, Australia, is essentially derived from the traditional physiographic-morphogenetic view of geography, which is now being supplemented, and possibly superseded, by a more functional and ecological approach. It could be suggested that, in view of the scope of the work, Sombroek's study would have been more happily served by the latter view rather than the former.

These criticisms, however, do not detract at all from the value of the book in respect of source data for this large and poorly known area of the Earth, and in this respect it must remain a significant and important contribution to our knowledge of the South American continent.

R. P. MOSS

WHOLE FUNGI

The Fungi

An Advanced Treatise. Edited by G. C. Ainsworth and Alfred S. Sussman. Vol. 2: The Fungal Organism. Pp. xvi + 805. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1966.) 216s.

THIS is the second volume of the treatise edited by Drs Ainsworth and Sussman and it maintains the high standard set by its predecessor, which dealt with the fungal cell. The editors have secured a reasonably comprehensive coverage of the most important aspects of their enormous field, and all the authors are leading authorities on their respective subjects.

The volume begins with chapters on artificially obtained protoplasts (a fifty page review by Villueva) and on cell aggregation in yeasts, and proceeds to more extensive sections on the multicellular condition (separate chapters on hyphae, conidia and conidiophores, and Ascomycete and Basidiomycete fruit-body structure), mechanisms of morphogenesis, reproductive physiology, genetics, and various aspects of spore dissemination.

There are twenty-three chapters, all by different authors, and it is scarcely possible to do justice to all in a brief review. Special mention must, however, be made of the section on morphogenesis, which contains, among other articles, interesting accounts of work on Myxomycetes (Alexopoulos), cellular slime moulds (Gregg), aquatic Phycomycetes, with emphasis on Allomyces and Blastocladiella (Cantino), and Ascomycetes (Turian). The biochemical approach is much in evidence, and valuable information has been obtained, but it cannot be said that there is much understanding of molecular mechanisms of morphogenesis. Many biochemical correlates of morphogenetic changes are described, but a cause-effect relationship can scarcely ever be deduced with reasonable assurance. In the future, perhaps the biochemical study of genetic mutants will prove to be as fruitful applied to morphogenesis as it has already been applied to metabolic pathways. Such an approach is foreshadowed in Turian's article.

The section on genetics is for me the high point of the book. The chapters on life cycles (Roper), mendelian inheritance (S. Emerson), heterokaryosis (Davies), the parasexual cycle (Roper) and extranuclear inheritance (Jinks) stand among the best accounts of their respective subjects and collectively constitute a rather complete treatise on fungal genetic systems. The chapter on incompatibility, by Esser, is briefer than the importance of the subject would justify, but it is at any rate a clear summary of the main situations found in fungi.

Not surprisingly style and treatment vary considerably between chapters. This is inevitable with multiple authorship but, as with the previous volume, I feel that more could have been done, by way of cross references, to relate the chapters to each other. Another feature which might have been helpful to many readers would have been the inclusion of an outline classification of the fungi explaining the currently accepted nomenclature of the main groups and sub-groups. I may not be alone, to take one example, in not being sure what sort of Basidiomycete a Holobasidiomycete is.

The solid virtues of this volume, however, far outweigh minor criticisms. Those working with fungi will want to recommend the book to their libraries even if they cannot afford it themselves.

J. R. S. FINCHAM

VIRUSES ON THE WING

Insect Virology

By Kenneth M. Smith. Pp. xii + 256. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London) Ltd., 1967.) 92s.

DR KENNETH SMITH has pioneered the present upsurge of interest in insect viruses, and therefore it is not unreasonable to expect his latest work to provide a balanced and authoritative account of the subject. A study of the contents leaves an impression of imbalance between the topics discussed. It is puzzling to find thirty-two pages devoted to plant virus-insect vector relationships and only a fleeting reference to animal virus-insect vector (arbovirus) problems. Dr Smith is of the opinion that plant viruses are more dependent on their vectors than are the arboviruses. This is at very least a debatable point and for completeness one cannot ignore such an important group.

Furthermore, present knowledge of the nuclear polyhedrosis virus of *Tipula paludosa* (Meig) is so meagre that five pages of text seems extravagant. This is particularly apparent when the serological properties of insect viruses are condensed into two pages. There are also omissions of important work; for example, the intriguing discovery of the presence of RNA in the polyhedron protein was first made by Tarasovich in 1946 and not, as implied by the author, by Faulkner in 1962. These findings have been confirmed for other polyhedroses by Estes and Faust in 1965.

In the short section on serology there is an error after the discussion of Krywienczyk and Bergold's discovery that serological studies so far published were actually concerned with membrane antigens and not those of the nucleoprotein. The author says: "It would therefore be of interest to study the serological relationships of the DNA from the different nuclear polyhedrosis viruses and also between the DNA and RNA viruses". There is no doubt that such comparisons would provide very interesting results, but such studies would only be possible if the nucleic acid were linked to a larger protein molecule and only then would it behave as an antigen. I suspect that Dr Smith was thinking of the serological relationships of the inner "membrane" or protein coat of the virus particle.

Insect viruses have received increasing attention in recent years, and the publishers of this book claim that