

understanding, but they exist as evidence that some indication of the structure and morphology of these organisms can be obtained. The same holds true concerning the chapter on fungi where no photomicrographs are used.

This book is well written in a coherent style and is a welcome addition to the texts which already exist in this area. In addition, it can profitably be used as a review book on basic microbiology by graduate and medical students. The Reinhold Company has done an excellent job on printing and binding this book and it is heartily recommended for both the paramedical eye and mind.

Dr. Robert W. Pumper
Department of Microbiology
University of Illinois
Medical Center
Chicago, Illinois

ENDOSYMBIOSIS OF ANIMALS WITH PLANT MICROORGANISMS, Paul Buchner, 909 pp., Interscience Publishers, New York, 1965.

Dr. Paul Buchner is undoubtedly the leading authority in the field of experimental endosymbiosis. This text of 909 pages is devoted primarily to endosymbionts of invertebrates, especially insects. It is an excellent reference.

The first several chapters treat the history of algal, fungal, and bacterial endosymbiosis and tell of the rapid progress from 1910 to the present. Symbionts were often mistaken as host tissue or as parasites.

The main portion of the text is specialized and detailed. Specific topics in this section include:

1. Algal symbiosis in a number of invertebrate phyla. The uses of these symbionts and the significance of their oxygen production is explained.
2. The historical background of the fungi and bacteria associated with cephalopods, fish, and especially many insect orders is elaborated.
3. This section which specialized in very specific cases of symbiosis included insects which feed upon vascular plant tissues and fluids.
4. Also considered are animals which suck vertebrate blood, insects that feed on mixed diets, luminous cephalopods, tunicates, and fish, and cases of symbiosis that are situated in the excretory organs of segmented worms, cyclostomatids, annulariids, and molgulids.

The text contains well over 370 figures and plates of symbionts shown in relation to the host tissue. Well over 1300 references are given. An author index and index of animal

and plant names is also provided. Specificity is the rule as a detailed explanation of the endosymbiont-host association is discussed.

The general section of the text treats methods of transmission, symbiont establishment in the host tissue, and the embryonic and post-embryonic phenomena.

The specific nature of this book will provide an excellent reference for certain areas of research with symbiotic microorganisms and their invertebrate hosts. In addition, there is ample opportunity to apply the basic information contained in this book to a greater appreciation of the concepts involved in the areas of parasitology, ecology (adaptation), nutrition, mycology, bacteriology and protozoology, as well as immunology and invertebrate morphology and physiology. Continued research in the area of symbiotic organisms will undoubtedly contribute greater knowledge to many scientific research areas. This book represents one of the most thorough presentations of the complex interrelations between symbionts and their hosts. Dr. Buchner does more than describe symbiosis—he explains it.

H. L. Zimmack
Biology Department
Ball State University

LIFE IN THE SOIL, A Laboratory Block, David Pramer, 62 pp., Teachers Supplement, 38 pp., D. C. Heath and Company, New York, 1965.

In this Laboratory Block the author, with the excellent staff work of the BSCS group under Addison Lee, has made an excellent summary of some of the biological aspects of soil. The student is led very carefully to analyze the soil, then to analyze the living material in the soil in relationship to CO₂, oxygen, and dehydrogenase activity. Finally, the author explains methods of ascertaining the relationships among soil organisms and some of their activity within the soil.

As usual, the Block gives complete and detailed instructions with very excellent illustrations of equipment for the student to perform the experiments to determine just what the relationships of soil and living organisms happens to be. The entire Block is full of project ideas which may be used individually by students, but taken as a whole, the Block offers an excellent unit for study by students of an aspect of biology which is truly applied. This application is meaningful for man, but the application is more than that, in the sense that the student takes off from a well-known feature of his environment and studies it for its biological activity.

The Teachers Supplement gives full bibliographies, formulae, and very pertinent information for the operation of this particular Block. Of