

and illustration of important features. The section on evolution is most interesting and includes much new information. This is the first attempt to reconstruct the history of the anatomical changes within some of the classes and to analyze the functional significance of these changes. This discussion is clearly written and well documented. The broad features of the evolution are illustrated with text figures of the important genera, arranged in the suggested phylogenetic order. These sections of the book are most stimulating, and it is hoped they will encourage workers to do more phylogenetic studies. Certainly, specialists in some groups will disagree with Nichols and will be stimulated to search for more evidence to support their own views.

Nichols devotes chapters to the significance and evolution of pentamerous symmetry, spines and pedicellariae, tube-feet, and larval forms. In a brief chapter he describes the phylogeny of the echinoderms and, in a final chapter, the relation of the Echinodermata to other phyla, particularly the chordates. The classification of the echinoderms provided in the appendix includes most of the orders and all of the genera referred to in the text. The extensive bibliography is divided into sections that correspond to the chapters. Although the author included most of the major works in each field, it is surprising that he omitted Jackson's great work, *Phylogeny of the Echini* (1912), one of the classics in echinoid literature.

Not only is this book an excellent compilation of existing knowledge, but it contains many new ideas. It is a valuable source book for the echinoderm worker and for other zoologists. It can be read and enjoyed by the layman, but it can also be used as a text for a graduate course. It is hoped that Nichols will revise and keep the book up to date. The trend in paleontology is toward more phylogenetic studies, and it is very useful to have these results synthesized and available to students and to those who write textbooks on invertebrate paleontology. In the short time since this book was written a significant breakthrough has occurred in knowledge of the carpoids, a peculiar group of primitive echinoderms: the discovery, by Ubaghs, that in some species the structure that had been previously considered to be a stem is in reality an arm used for feeding. Thus, much of the discussion on the orientation and the function of many of the structures of the carpoids is obsolete. Also, after pub-

lication of the echinoderm sections of the *Treatise on Invertebrate Paleontology*, there will be much new information that should be incorporated into this book.

This book, by its emphasis on the value of synthesis of paleontological and neontological information, should encourage workers in other animal groups to prepare similar syntheses. In this day of scattered literature and narrow specialization, the broad view is especially difficult to attain. Nichols has performed this task admirably for those interested in the Echinodermata.

PORTER M. KIER  
Smithsonian Institution

## Life Cycles of Parasites

**Animal Parasites: Their Biology and Life Cycles.** O. Wilford Olsen. Burgess, Minneapolis, Minn., 1962. vii + 346 pp. Illus. \$6.95.

This book grew out of the teaching device of multicolored plates used by Wilford Olsen to aid students in understanding the complexities of parasitic life cycles. Here the plates, in black and white on mat surface paper, are clean-lined diagrams showing life history stages, gross and minute, of over 100 characteristic species of protozoa, flatworms, and nematodes.

Trailing the spoor of such details for so many species in and out of cells, tissues, and hollow organs of vertebrate and invertebrate hosts (and in the free-living environment, when that is involved) could easily have resulted in a confusing hodge-podge. Instead, through the author's gift for clarity, and his placement of well-labeled 8- by 11-inch plates opposite their explanatory keys, the net result is an impact from page after page of the wonder of life in a world of animal parasites.

The table of contents presents the taxonomic hierarchy from phylum down to the species illustrated, with an accessory listing of the 107 plates. Five of the latter summarize facts concerning particular groups.

Textual material is mostly limited to introducing characteristic subgroups. (The author has fortunately included a digest of his own extensive work on *Uncinaria lucasi*, the extraordinary hookworm of the northern fur seal).

For many species there is added an "Exercise on life cycle," which

points to the utilization of certain forms that may be locally available. Further study is also invited by a few selected references. In the main these are well chosen for the worms, but for the parasitic protozoa they tend to rely heavily on textbooks. I found few errors, although two misspelled genera at the bottom of plate 106 are conspicuous. The index comprises seven pages, triple column.

Relying, as the author does, on an essentially biological approach, he accepts the limitation that his book gives little, except by inference, concerning the great fund of current knowledge on interaction between parasite and host: physiology, pathology, disease, and immunity. Likewise, this is no synopsis of veterinary or medical parasitology. Such deliberate omissions permit the unrelenting emphasis on the phenomena of parasitism as seen in the life cycles themselves.

It needs hardly to be added that these numerous life histories, fair samples as they are of all that is known, represent no more than an informative cross-section of discoveries made over the last century of how Mother Nature has contrived to maintain her parasitic species. New and old alike in this beguiling field of interest, however, be they neophyte biologists or professional parasitologists, will be enlightened and enkindled by Olsen's presentation of the intrinsic variety and nuances of adjustment that occur in life cycles of animal parasites.

NORMAN R. STOLL  
Rockefeller Institute,  
New York, New York

## Plant Diseases

**Insects in Relation to Plant Disease.** Walter Carter. Interscience (Wiley), New York, 1962. xiv + 705 pp. Illus. \$25.

Following the introduction (chapter 1), this book is divided into three parts. In part 1, which treats plant pathogens transmitted by insects, chapter 2 deals with bacterial pathogens and chapter 3 with the fungal pathogens. Part 2 deals with the toxicogenic insect and phyto-toxemia and includes three chapters: "Localized toxic effects," "Primary malformations," and "The systemic phyto-toxemias." Part 3, which deals with the plant viruses, is divided into eight chapters and takes up most of the book,

pages 269 to 692. Such an allotment of space seems logical, because 39 pages are required just to list the plant viruses and their insect vectors, 42 pages are needed for a tabulation of arthropod vectors of plant viruses and the viruses they transmit, and five pages are devoted to a list of plant viruses for which no insect vectors are known. A subject index (pp. 693-705) completes the volume and greatly enhances the value of the book as a reference volume.

Each of the 13 chapters is followed by a list (varying in number from 14 to 241) of pertinent references to the literature published all the way from 1801 to 1962, and of inestimable value to the serious-minded researcher who wishes to add to the knowledge already accumulated. It seems probable that the restrictions of special interest, which most biologists have in these days, are such that none will try to make a thorough study of this book in its entirety. In any book covering such a broad field, especially one with the size and scope of *Insects in Relation to Plant Disease*, errors in interpretation or of omission are inevitable. In the area with which I am most familiar, I noted a few such errors. However, these shortcomings do not detract greatly from the book, and the author deserves much commendation for doing a very creditable job of covering so thoroughly the whole of such an extremely broad field of study to which he has devoted his entire professional career.

FRED W. POOS

Arlington, Virginia

## Note

### Geophysics

**Fundamental Problems in Turbulence and Their Relation to Geophysics** (American Geophysical Union, Washington, D.C., 1962. 236 pp. Illus. \$5), edited by Francois N. Frenkiel, contains 32 of 41 papers that were prepared for a symposium sponsored by the International Union of Geodesy and Geophysics and the International Union of Theoretical and Applied Mechanics. The symposium was held at Marseilles, France, in September 1961.

Although the contributors represent many countries, including the United States, the U.S.S.R., Japan, and Germany, all of the papers are in English.

The volume is a reprint, without change of pagination, of the papers as they were published in the *Journal of Geophysical Research* [67, No. 8 (July 1962)].

Most of the papers are concerned with meteorological problems, but many, particularly the fundamental theoretical papers, are of more general interest. Some are related to turbulence in the ocean.

At any rate, the volume gives a useful picture of the present development of turbulence theory and of its possible applications to geophysics.

A. E. SCHEIDEGGER

Department of Mining, Metallurgy, and Petroleum Engineering  
University of Illinois

### New Books

#### Biological and Medical Sciences

**Advances in Biological and Medical Physics.** vol. 8. Cornelius A. Tobias and John H. Lawrence, Eds. Academic Press, New York, 1962. 467 pp. Illus. \$15.

**Advances in Clinical Chemistry.** vol. 5. Harry Sobotka and C. P. Stewart, Eds. Academic Press, New York, 1962. 343 pp. Illus. \$12.

**Advances in Food Research.** vol. 11. C. O. Chichester, E. M. Mrak, and G. F. Stewart, Eds. Academic Press, New York, 1962. 464 pp. Illus. \$14.50.

**Advances in Immunology.** vol. 2. W. H. Taliaferro and J. H. Humphrey, Eds. Academic Press, New York, 1962. 400 pp. Illus. \$12.

**Concepts of Forest Entomology.** Kenneth Graham. Chapman and Hall, London; Reinhold, New York, 1963. 400 pp. Illus. \$9.50.

**Culture Collections.** Perspectives and problems. Proceedings of the specialists' conference (Ottawa, Canada), 1962. S. M. Martin, Ed. Univ. of Toronto Press, Toronto, Canada, 1963. 231 pp. Illus. \$8.

**Diffusion and Membrane Technology.** Sidney B. Tuwiner. Chapman and Hall, London; Reinhold, New York, 1962. 431 pp. Illus. \$12.

**Enzyme Histochemistry.** And its application in the study of neoplasms. M. S. Burstone. Academic Press, New York, 1962. 635 pp. Illus. \$22.50.

**Enzyme Models and Enzyme Structure.** Report of a symposium, 1962. Brookhaven National Laboratory, Upton, N.Y., 1962 (order from the Office of Technical Services, Dept. of Commerce, Washington, D.C.). 447 pp. Illus. \$3.50.

**Food Values of Portions Commonly Used.** Anna dePlanter Bowes and Charles F. Church. Revised by Charles F. Church and Helen Nichols Church. Lippincott, Philadelphia, ed. 9, 1963. 136 pp. Paper, \$4.50.

**General Zoology.** Claude A. Villee, Warren F. Walker, Jr., and Frederick E.

Smith. Saunders, Philadelphia, ed. 2, 1963. 868 pp. Illus. \$8.50.

**International Review of Tropical Medicine.** vol. 2. David Richard Lincicome, Ed. Academic Press, New York, 1963. 439 pp. Illus. \$16.

**Introduction to Dynamic Morphology.** Edmund Mayer. Academic Press, New York, 1963. 555 pp. Illus. \$16.

**Invertebrate Zoology.** Robert D. Barnes. Saunders, Philadelphia, 1963. 646 pp. Illus. \$10.

**Klinik und Therapie der Kollapszustände.** Proceedings of a symposium (Mainz, Germany), 1962. R. Duesberg and H. Spitzbarth, Eds. Schattauer, Stuttgart, Germany, 1963. 310 pp. Illus. DM. 68.

**Klinische Physiologie.** Aktuelle probleme in übersichten. vol. 1. W. A. Müller. Thieme, Stuttgart, Germany, 1963. 102 pp. Illus. Paper.

**A Laboratory Manual of Comparative Anatomy.** William Montagna and Walter Kenworthy. Wiley, New York, ed. 2, 1963. 115 pp. \$2.95.

**Malnutrition and Food Habits.** Report of a conference (Cuernavaca, Mexico), 1960. Anne Burgess and R. F. A. Dean. Macmillan, New York, 1962. 230 pp. Illus. \$4.50.

**The Organic Constituents of Higher Plants.** Their chemistry and interrelationships. Trevor Robinson. Burgess, Minneapolis, Minn., 1963. 310 pp. Illus. \$6.75.

**Physiological Measurements of Metabolic Functions in Man.** C. Frank Consolazio, Robert E. Johnson, and Louis J. Pecora. McGraw-Hill, New York, 1963. 515 pp. Illus. \$14.50.

**Physiologie de l'Hippocampe.** A symposium. Éditions du Centre National de la Recherche Scientifique, Paris, 1962. 475 pp. Illus. NF. 58.

**Progress in Drug Research.** vol. 4. Ernst Jucker, Ed. Interscience (Wiley), New York, 1962. 606 pp. Illus. \$30.

**Recent Advances in Food Science.** Papers read at the residential summer course (Glasgow, Scotland), 1960. vols. 1 and 2. vol. 1. *Commodities* (316 pp.); vol. 2. *Processing* (350 pp.). J. Hawthorn and J. Muil Leitch, Eds. Butterworth, Washington, D.C., 1962. Illus. \$12.50 each.

**Specific and Non-Specific Factors in Psychopharmacology.** Proceedings of a symposium held at the Third World Congress of Psychiatry, Montreal, Canada (1961). Max Rinkel, Ed. Philosophical Library, New York, 1963. 192 pp. Illus. \$3.75.

**A Stereoscopic Atlas of Human Anatomy.** Section 8, *The Back*. David L. Bassett. Sawyer's, Portland, Ore., 1962. 112 stereoscopic transparencies.

**Temperature.** Its measurement and control in science and industry. Charles M. Herzfeld, Ed. vol. 3, pt. 3, *Biology and Medicine*. James D. Hardy, Ed. Reinhold, New York; Chapman and Hall, London, 1963. 695 pp. Illus. \$22.50.

**Transfusionspraxis.** P. Dahr and M. Kindler, Eds. Schattauer, Stuttgart, Germany, 1963. 347 pp. Illus. DM. 60.

**Vitamins and Hormones.** Advances in research and applications. vol. 20. Robert S. Harris and Ira G. Wool, Eds. Academic Press, New York, 1962. 725 pp. Illus. \$16.