

PHOTOSYNTHESIS, Hans Gaffron (BSCS Pamphlet No. 24), 36 pp., 50¢, D. C. Heath Company, Boston, 1965.

Hans Gaffron is a recognized authority on the subject of photosynthesis, and this often is a warning signal that the subject will be treated at a level incomprehensible for the high school audience intended. Happily, this is not the case here. The author does not spare details, but he is able to pick out the important ideas and emphasize them. There is also a judicious use of illustrations.

The subtitles reveal an interesting method of approaching such a complete subject. They are in sequence: historical, observing the plant, visible radiation and pigments, primary and secondary reactions, CO₂, summary and evolutionary aspects.

All in all, this work comes off well, and may well be a model for future treatments of the subject in text books.

Zoology

THE PHYSIOLOGY OF NEMATODES, D. L. Lee, 154 pp., \$2.50, W. H. Freeman and Company, San Francisco, 1965.

This book is an excellent coverage of the present knowledge of the physiological process of nematodes. Because the physiological investigations of these forms have not been very extensive, the discussions are at a general level.

Certainly the primitive nematode which has been so highly successful in almost every kind of niche and which is represented by so many varieties of forms must have some unique physiological responses that would be of value, if known, to physiologists.

In his all too brief introduction to the nematode, the author states, the student is oftentimes left with the erroneous impression that most nematodes are parasitic. This thoroughly descriptive treatise on nematodes is very helpful in giving a truer picture of the diversity of the animals.

Dr. Lee has based this work on a great many publications and the result is not only a description of the forms of nematodes, but also an up to date summary of the physiology, biochemistry and behavior information that is known concerning nematodes.

This book should be of use to the student of the invertebrate animals at the undergraduate level. It should be of use to the upper level investigator of nematodes because so much diverse information has been brought together in this volume. It is well written and very well illustrated.

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THE BIOLOGY OF HEMICHORDATE AND PROTOCHORDATA, E. J. W. Barrington, 176 pp., \$2.50, W. H. Freeman and Company, San Francisco, 1965.

This book is a scholarly review of the structure, function and life histories of these very little known forms. These animals are significant to the general biologist because they are considered to have arisen from a common ancestor of the chordates.

These forms are considered to be fixed forms, because very early they became adapted to and filled the niche which they yet occupy today. Therefore, little structural change from early times has resulted.

The study of early adapted forms that arose from a common ancestor with forms that later became very specialized are of value in our understanding of the evolution of these latter forms. This knowledge has been especially valuable in the study of the development of the integrating structures, both nervous and endocrine.

This book should prove provocative to students of biology who have never considered these animals before and it may renew some ideas for those biologists who have not considered these forms for some time. In soft cover with good illustrations it is a good buy for any biologist.

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THE BEHAVIOR OF ARTHROPODS, J. D. Carthy, 148 pp., \$2.50, W. H. Freeman and Company, San Francisco, 1965.

This book is a coverage of arthropod behavior that includes very brief descriptions of the more common behavior patterns. Some accompanying laboratory investigations, when available, are included.

Behavior which is a result of integrative forces that function in response to both the external and the internal environmental stimuli, is by definition, a very complicated phenomenon.

Intelligent observations can be made on animals who have similar sense organ receptors and nerve response receptors that we do. Thus, terminology such as smell, touch, see, hear, and taste can convey a specific meaning. At least a communication between the reader and the reporter can be achieved in the use of this terminology for the forms of life closely related to ourselves. But the same usage of these terms in the description of arthropods can be quite misleading. It is not known that arthropods smell.

It is known that they can receive impulses that are generated by specific chemical molecules. However, the volatility of a compound is descriptive of that compound because of our own perception of it. The invertebrate undoubtedly can utilize specific molecular configurations in ways other than for scent reception. As an example of another kind of response to a chemical, the plant fruit ripening effect in the presence of ethylene can be cited. This gas is recognized to be put out by a fruit which then hastens the ripening effect of the neighboring fruit. However, no one would suggest the fruit perceives the gas through a scent organ.

Dr. Carthy uses such terminology as smelling, hearing, and seeing quite frequently in his explanation of behavior responses. It is probably erroneous to suggest that these animals hear, see, and smell in the context to which we are used to comparing such activities.

Furthermore, the sense receptors that we know receive such information have evolved in the head region of animals which have highly centralized nervous systems. As cited in Dr. Carthy's book, the investigators of arthropod nervous systems have shown these systems to be more localized and not directed toward the head region in many instances. Therefore, it would be logical to suppose that localized receptors would be quite specialized and indeed could be more diverse in nature than our own senses.

It seems that no real understanding of invertebrate behavior can be known until the investigator is willing to give up this comparison of the vertebrate nervous system with the invertebrate system. Undoubtedly a new kind of thinking will have to be developed in the study of the invertebrate. This will be difficult to achieve because these forms must have senses that we, with our limited number, can hardly imagine to exist.

This book is a useful survey of the current methods used in the investigation of arthropod behavior.

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BIOLOGY OF TERMITES, BSCS Pamphlet No. 17, E. Morton Miller, 36 pp., \$.50, D. C. Heath and Company, Boston, 1964.

The amazing wealth of information about termites, while not described in its entirety, is at least the basis for this most entertaining and instructive pamphlet. Truly an amazing creature, the termite is an excellent example of an elaborate social organization, intricate reproductive patterns, intriguing adaptations, and interesting

nutritive habits. The author emphasizes throughout the great significance of the colony.

This pamphlet should be intriguing reading for the biology student but more significant to the reader with some acquaintance with insects.

DICTIONARY OF HERPETOLOGY, James A. Peters, 392 pp., \$11.50, Hafner Publishing Company, 1964.

The growth of science inevitably leads to an increasingly specialized vocabulary in its various fields. Specialized dictionaries, such as this excellent one for herpetologists, serve a dual purpose of being a reference for beginning students and a standard of uniform terminology for research workers. This book presents in detail the definitions of words principally or completely restricted in their usage to the field of herpetology. Synonyms are noted, and many terms include literature citations of first usage, typical usage, or changed usages. The book closes with 30 figures showing the plate nomenclature of a snake head, shell measurements of the turtle, and many other illustrations. This useful book will be a necessity to serious herpetologists who must struggle on with something less than a photographic memory.

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LIFE HISTORIES OF NORTH AMERICAN PETRELS AND THEIR ALLIES, Arthur Cleveland Bent, 315 pp., \$2.75, Dover Publications, New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN WOODPECKERS, Arthur Cleveland Bent, 308 pp., \$2.75, Dover Publications, New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN CUCKOOS, GOATSUCKERS, HUMMINGBIRDS AND THEIR ALLIES, PARTS I AND II, Arthur Cleveland Bent, 492 pp., \$5.00, Dover Publications, New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN JAYS, CROWS AND TITMICE, PARTS I AND II, Arthur Cleveland Bent, 495 pp., \$5.00, Dover Publications, New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN NUTHATCHES, WRENS, AND THEIR ALLIES, Arthur Cleveland Bent, 475 pp., \$2.75, Dover Publications, Inc., New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN THRUSHES, KINGLETS, AND THEIR ALLIES, Arthur Cleveland Bent, 452 pp., \$2.75, Dover Publications, Inc., New York, 1964.

LIFE HISTORIES OF NORTH AMERICAN WAGTAILS, SHRIKES, VIREOS, AND THEIR ALLIES, Arthur Cleveland Bent, 411 pp., \$2.75, Dover Publications, Inc., New York, 1965.