

vide a view of the variety of living things from what is to me the most fascinating attribute of living systems—the behavior of organisms is a remarkable evolutionary product.

To illustrate von Frisch's style, emphasis and breadth of scope the following paragraph is apropos:

Some species build very unobtrusive nests completely underground or under stones. Many tropical species prefer to build in tree trunks or branches, very likely as a protection against flooding. In Ceylon ants' nests are found in trees: they are made from leaves sewn together with spun-silk threads. This is rather curious as grown-up ants have no spinning glands. Only larvae have them to spin their cocoon with, but they lie as helpless little maggots in their nurseries and cannot crawl around in the leaves to build. The solution of this puzzle sounds like a tall story, but it is founded on the observations of most conscientious biologists. Nests were torn apart to see what would happen. Immediately a crowd of ants came marching along, arranged themselves along the tear, and pulled the rims together. Then from the depth of the nest came some others that held grown larvae in their jaws, squeezing them and making them spin threads of silk. Then they applied the larvae's heads first to one and then to the other side of the tear, thus producing a silk weft, by using the living larvae as ditsaft and shuttle at one and the same time.

The entire book abounds in passages as delightful and informative as this. Every high school library should have at least one copy of this book, and I would recommend a classroom set to be used as a supplement, even for BSCS programs where the treatment of the behavior of organisms is limited. For more advanced students, *Behavior and Evolution* by Anne Roe and George Gaylord Simpson (Yale, 1958) would be an excellent extension. Our students will live out most of their adult life in a period when the elucidation of the nature and modification of organismal behavior are likely to be the dominant concerns in biology. This area cannot be overemphasized in biology programs.

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NERVE CELLS AND INSECT BEHAVIOR, Kenneth D.

Roeder, xi ÷ 188 p. \$4.75, Harvard University Press, Cambridge, Massachusetts, 1963.

After preliminary chapters on biological coding, Roeder discusses methods for studying animal behavior and the structure and physiology of neurons. He then turns to the tympanic nerve response of noctuid moths. The tympanic organ of these moths contains only two acoustic sense cells. These are sensitive to the ultrasonic vibrations used by bats in echolocation of objects in their path—including their

insect prey. The author presents experimental evidence that the ear of the moth is a bat detector and that the behavior of moths in response to acoustic stimuli are escape responses.

The study of conduction is illustrated by the evasive or startle response in the cockroach. Here, the giant nerve fibers are mechanisms for increasing the velocity of nerve conduction. Particular emphasis is given to the synaptic connections between these internuncial giant fibers and the smaller sensory and motor neurons.

In a discussion of endogenous activity, Roeder describes the mating behavior of the praying mantis where the female may devour the head and part of the thorax of her mate during the sex act. Finally, he turns to the brain of insects and suggests that the central regulation of local systems is effected, for the most part, through the inhibition of built-in activity patterns.

This is an interesting and well written book that should stimulate the curiosity of the better-than-average student. It is recommended for teachers who want their students to know that behavior studies are something more than anecdotal descriptions.

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KEYS TO THE TREMATODES OF ANIMALS AND MAN, K. I. Skrjabin, 351 pp., \$10.00, University of Illinois Press, Urbana, 1964.

This is an excellent translation of the keys to the trematodes in the first 20 volumes of *Trematody Zhivotnykh i Cheloveka* edited by K. I. Skrjabin. This work is still incomplete but the present compilation will be invaluable to students in all parts of the world. It has been almost impossible for the ordinary parasitologist to identify parasitic trematodes of animals other than man even to genera unless he is a specialist or has ready access to large multilingual libraries. This book should make a distinct advance in this regard.

The beginning student will find that he needs considerably more than this work, however, before he can begin to identify trematodes at random. The keys are concise and quite clear, but there are many specialized terms which will require reference to other books. There is no mention of the fact, but a considerable background in microtechnique is also necessary before a trematode can be properly fixed, mordanted, stained, cleared, and mounted for study. Once this is accomplished, the many fine illustrations can be used with good results.

The medical parasitologist will find use for this work in areas where accidental and facultative parasitism of man by animal parasites is

frequent. There are also excellent summary bibliographies on many subjects of medical interest.

The English translation was made by Raymond W. Dooley of the University of Illinois and the translation edited by Hisao P. Arai of the University of Alberta and the University of Illinois.

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ANIMAL PHYSIOLOGY, Bradley T. Scheer, 409 pp., \$9.95, John Wiley and Sons, Inc., New York 16, 1963.

The purpose of this book is to present a modern approach to comparative animal physiology in a way which synthesizes a great deal of material that has been discovered about many of the principles which are common to most animals. Thus, one major section of the book deals with metabolism, and this is broken down into the nature of biological oxidations, energy transformation in cells, cell structure in metabolic localization, and functions of the cell boundary. Another major section on irritability includes chapters on excitation of animal cells, contraction of muscle, excitation of receptors, and transmission of excitation from cell to cell. The third section on the vegetative activities of animals takes up subjects like nutrition, transport, and intermediary metabolism. The last section on integrative functions in animals divides into nature and mechanisms of integration, conservative regulation, progressive and cyclic regulation, and reactive integration.

As one may immediately perceive by the section and chapter headings, the book is a true synthesis of animal physiological principles. It assumes a great deal of chemistry background as well as some physics. It is, in truth, a high level text, but it should be an excellent source book for those who are not primarily concerned with it as a text.

The author is quite skilled in presentation of intricate material which combines information from a variety of sources. In most cases, the references are up to date, and the diagrams and illustrations are quite pertinent and detailed.

If one of the major aspects of current biological research and education is in the field of physiology, both cellular and organismic, this book is essential for reference.

PARASITOLOGY, E. R. and G. A. Noble, 724 pp., \$11.00, Lea and Febiger, Washington Sq., Philadelphia 6, Pa., 1964.

Comparison of this second edition with the first which appeared in 1961 shows that it has undergone a thorough revision. Chapters have been expanded, divided, integrated, and gen-

erally improved. The revision is extensive and worthwhile.

The book is aimed at undergraduate students who have completed at least one year each of chemistry and zoology. It is well-written for this level. The text is comprehensive with emphasis on the ecology and evolution of parasites. Parasitology is not intended to serve as a clinical text and would not meet the needs in such a course.

The 724-page text is amply illustrated with 381 drawings and photographs including three color plates showing stages of (1) *Plasmodium vivax*, (2) *Plasmodium malariae*, and (3) *Plasmodium falciparum*.

Of the 26 chapters, eighteen are devoted to descriptive material organized under the various phyla. The Protozoa occupy four chapters; Platyhelminthes, five; Acanthocephala, one; Nematoda, three; Arthropoda, four; and a remaining chapter describes the few parasites found in all the additional phyla.

There are chapters on: life cycles, evolution, ecology, and introductory material. Two chapters of particular interest to the reviewer deal with the effects of parasitism on both the host and the parasite itself. The effects of parasitism on the parasite are rarely discussed in textbooks of this type and provides a unique and valuable addition.

Each chapter is documented with an extensive bibliography. A 34-page index is complete and well compiled.

Noble and Noble have improved on their original effort and produced a fine text. No university could go wrong by adopting this book for its parasitology classes.

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ANIMAL PHOTOPERIODISM, Stanley D. Beck, 124 pp., \$1.28, Holt, Rinehart, and Winston, Inc., New York, 1963.

One of the paperback *Holt Library of Science Series*. The title immediately tells of the book's contents, a subject written about extensively in connection with plants. The term photoperiodism, however, includes rhythms and cycles not directly related to light as the term implies.

It is a most interesting book, replete with diagrams and illustrations showing the work done to date on this fascinating subject. The rhythms correlated with other environmental factors are discussed, but the author wisely sticks to the topic at hand. Most interesting studies are taken up, and the chapters on mammals and man suggest many further projects, some presumably feasible at the high school level. The work done on invertebrates and birds