retical. However, the approach throughout is from the physical chemical point of view, and there are many references to the physical methods that are used in determining the properties and structures of inorganic compounds and the mechanisms of inorganic reactions.

This book was doubtless intended to serve as a reference volume, but because of the breadth of the subject matter included, it can also serve very well as a text in "special topics" or seminar courses. The selection of subject matter in each chapter is excellent and the writing is of uniformly high quality.

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## A Fauna and Its Environment

**The Zoology of Tropical Africa.** J. L. CLOUDSLEY-THOMPSON. Norton, New York, 1969. xvi + 356 pp. + plates. $12.50. World Naturalist Series.

**Animal Twilight.** Man and Game in Eastern Africa. J. L. CLOUDSLEY-THOMPSON. Dufour, Chester Springs, Pa., 1967. x + 204 pp., illus. $6.95.

In *The Zoology of Tropical Africa* Cloudsley-Thompson endeavors to describe environmental adaptations for a broad spectrum of animals. He provides background information on geology, climate, soils, vegetation, and zoogeography at the outset, and at appropriate places elsewhere, as a basis for relating descriptions of behavioral and physiological adaptations to the environment. In the first half of the book, in which chapters are organized according to major biomes, a general survey at the species level provides a valuable compilation of information for the student and lay reader, as well as the professional zoologist interested in an overview of African animals. General ideas about ecological problems, both human and biological, are included.

Considerable attention is paid to the interesting subject of adaptations, in terms of temperature regulation and water economy, to humid and dry heat. Although descriptions are detailed and specific, this section is also in the nature of a general survey of the subject. Discussions of population regulation, migration, and biological rhythms are brief and limited by the current level of understanding of these phenomena. Here and elsewhere Cloudsley-Thompson tends to oversimplify basic concepts. A final chapter, concerned with the evolution, diseases, and ecological impact of man on African fauna, is also limited in scope and somewhat superficial.

This is not a profound book, but it is the first attempt to present a general zoological account of African animals from the viewpoint of behavioral and physiological adaptations. The information it contains will be useful to the student and general reader, at least as an introduction.

*Animal Twilight* is a historical account of man's relationship to African animals based on information from nearly 2000 references. Cloudsley-Thompson has selected interesting, although not always relevant, passages from the books and journals of early explorers and hunters. As with most historical information of this type its usefulness in determining population trends is limited greatly by its qualitative nature. Apparently the book was written to put into perspective the threat man presents to the future of African animals, an objective that will require far more attention than this book provides to the present-day impact of man.

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## Cytology

**Plant Cells.** F. A. L. CLOWES and B. E. JUNIPER. Blackwell Scientific Publications, Oxford, England, 1968 (U.S. distributor, Davis, Philadelphia). xviii + 550 pp., illus. $21. Botanical Monographs, vol. 8.

The modern philosophy of teaching biology tries to do away with such antiquated subjects as botany or zoology and to simplify the biological curriculum by teaching "general biology" or—at the level of the cell—"general cytology." In such a course an idealistic picture of "the cell" is offered, taking into account the nucleus, the mitochondria, the Golgi apparatus, the microtubules, the endoplasmic reticulum, the ribosomes, and other such structures.

These general notions may be satisfactory for biochemists and biophysicists, but for the biologist they give quite an inadequate idea of cellular performance, whose essence, in metabionts, is differentiation, diversification, and histogenesis. Therefore it is gratifying to review a book by two young research fellows who have the courage to deal with "plant cytology." The special features of the plant cell—the controversies concerning its plastids, the formation of its cell wall, the meaning of its pronounced vacuolar system, and the nature of its tonoplast—are given an extensive discussion based on a wide study of the newest literature. A most important chapter is that on specialized cells. Next the meristematic cell, which together with the liver cell is the objective of the "general cytology" mentioned, the differentiation of stomata, tracheids, xylem vessels, sieve tubes, laticifers, secreting cells for resin, for salts, or for slime, and enzymes of insectivorous plants, haustoria of parasites, and bacterial nodule cells are dealt with. This enumeration shows that the biologist has to decide whether he will concentrate on animal cytology (differentiation of muscle fibers, nerve cells, and so on) or on plant cytology. Knowledge of the first is needed in medicine and of the second in agronomy and forestry, and the requirements of these applied fields cannot be met by "general cytology." This fact shows the importance of the monograph under consideration. It includes an outline of the techniques in cell research (light and electron microscopy, autoradiography, chromatography, centrifugation, x-ray diffraction) and the established results of molecular biology (DNA cycle and replication, RNA and DNA in plastids, protein synthesis, and so on) and genetics at the level of the cell (chromosomes, polyploidy, totipotency).

To the reviewer's mind more stress should be laid on the ontogenetic succession of the different objects (for example, proplastids → chloroplasts, or hemicelluloses → cellulose → lignin, instead of the reverse arrangement) so as to emphasize the dynamical character of cytology. Together with the discussions of the function, the inheritance, and the diversity of the cell organelles presented here, a consideration of ontogenetic factors would help to banish the erroneous view that cytology is merely a descriptive science.

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