Ecology

Wildlife Biology. Raymond F. Dasmann. Wiley, New York, 1964. viii + 231 pp. Illus. $5.95.

This should prove to be a successful textbook for future game managers. Dasmann stresses ecological principles underlying the production of mammal and upland bird populations with effectiveness and facility. After an initial chapter in which he provides a justification for the art of game management, the author traces the history of man's effect on wildlife in California, and then discusses game populations in a context of their environment and dynamics. He leans heavily on his personal experience with deer and African antelopes. In keeping with the level of the students to whom the book is addressed, presumably primarily American college sophomores, some difficult problems are skirted. There are few outright errors. Those that exist are disturbing because they tend to reflect a lack of consideration for the general at the expense of the special—for example, when lower animals are said, without qualification, to have simple nutritional requirements, or when the logistic curve is attributed to Gause rather than to Verhulst and Pearl. The one remark made about human populations (and that remark almost seems to be an afterthought) is unlikely to appeal to the draft-age student. In a section on carrying capacity, Dasmann suggests that we may come to live at what he defines as a subsistence density, if we are not careful. The alternatives given in the book are an optimum population defined from the hunter's point of view and similar unsatisfactory solutions. However, pointing out such errors and infelicities is doing less than justice to a textbook that is otherwise trustworthy. Moreover, the publisher is to be commended for an attractively produced book, although the arrangement of photographs and of references is not all one could wish.

Without meaning to disparage the author, whose earlier *Environmental Conservation* (Wiley, 1959) answers many of the following comments, it may be pertinent to question the purpose of this book. Although Dasmann deplores the specialization that is exemplified by students of game management not wanting to know the names of plants, a curriculum in which a book such as this is used promotes precisely that sort of anti-intellectualism. This becomes complicated by the special scale of values of the field of wildlife management. The student is not, in my opinion, sufficiently warned against making snap judgments about which species is desirable and which is a pest, nor is there any real recognition of the fact that the game manager is not necessarily an objective conservationist. The implication that, in conflicts of interest between different land users, the professional wildlife biologist can be the referee is rather naive. This is important in this country where much of what passes for general conservation is paid for by the hunter.

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Review of Photochemistry

Photochemistry of Proteins and Nucleic Acids. A. D. McLaren and D. Shugar. Pergamon, London; Macmillan, New York, 1964. xii + 449 pp. Illus. $15.

The rapid advances in our knowledge of the structure and function of large molecules and advances in the use of microanalytical techniques have stimulated extensive work in the field of photochemistry and photobiology. The available comprehensive reviews dealing with these subjects are now at least ten years out of date. This volume, a successful collaborative effort between McLaren in Berkeley and Shugar in Poland, not only brings the general reader up to date, but does the same for the specialist in the field. The book, however, is much more than just a review. It is a careful and critical exposition of the principles, background experiments, and interpretations of experiments dealing with the photochemistry of proteins and nucleic acids and viruses. The authors obviously know their subject well, and they are enthusiastic and lucid about it.

The work may be thought of as divided into two parts—(i) the fundamentals of photochemistry and (ii) the photochemistry of large biological structures. The section on fundamentals, slightly more than one-third of the text, includes the following chapters: "Some principles of photochemistry," "Absorption and luminescence spectra of nucleoproteins and their components," "Action of ultraviolet light on amino-acids, peptides, and related substances," "Photochemistry of purine and pyrimidine derivatives," and, as an appendix, "Some techniques in photochemistry." These chapters are well written and contain a wealth of material previously available only in papers and reviews scattered among many journals and books.

The hard core of the book, on the photochemistry of proteins and nucleic acids, consists of these chapters: "Action of ultraviolet light on proteins: General," "Photochemical and photosensitized inactivation of enzymes," "Nucleic acids and oligo- and polynucleotides," "Inactivation of viruses," and "Some selected problems in photobiology." A bibliography of about 1,000 items plus an index completes the work.

Three features of this volume are impressive: it is up to date (the authors have scoured the literature and have included work up to 1963); it is comprehensive (I did not note the omission of any pertinent articles from the discussion); and lastly, the authors have digested and synthesized almost all the experimental observations they report on. The authors are not hesitant about giving their own points of view, and although it is refreshing to read such a work, it is important to remember that their interpretations and predictions may be wrong. For example (p. 269), they say that "dimerization of (adjacent) cytosine residues (in polynucleotides) is not to be expected," but such dimers have now been observed by several investigators. Here, as in several other places, the references cited in the text are not given in the bibliography, or they are incorrectly given. Bollum and Setlow are cited as having shown that enzymic splitting of thymine dimers results in a partial restoration of ultraviolet-inactivated primer DNA. They did no such thing. It appears that the authors' urge to be up to date got ahead of their ability to read carefully the large number of papers that appeared before the publisher's deadline. In some places this admirable book suffers from a lack of cross referencing. For example, in the discussion on photoreactivation (p. 334), there is no specific reference to the discussion of the enzymic nature of the phenomenon (p. 270).

In several places the authors indulge in mild historical distortion to claim

priority for the predictions, made by Shugar and his co-workers, of subsequent observations by others. Such predictions—for example, those of thymine dimers as an explanation of photochemistry of polypyrimidines and their relations to photobiology (pp. 249 and 261)—were either one of a number of possibilities or appeared at the same time as the experimental observations.

Despite the above shortcomings, everyone working on the photochemistry of proteins and nucleic acids should have access to this book. They will be stimulated by it, and they will profit immeasurably from it.

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The Maryland Piedmont

The Geology of Howard and Montgomery Counties. Ernst Cloos, G. W. Fisher, C. A. Hopson, and Emery T. Cleaves. Maryland Geological Survey, Baltimore, 1964. xvi + 373 pp. Illus. Plates. Paper, $3; cloth, $4.

This book is a milestone in the understanding of the geologic history of the core of the central Appalachians. Its meat is Hopson's long chapter (pp. 27 to 208) on the crystalline rocks. There are shorter chapters on history and geography, on post-Triassic rocks, and on structural geology, by Cloos, and on the Triassic rocks and mineral resources by Fisher and Cleaves, respectively.

Hopson's fresh insights into the complex and long-disputed geology of the Maryland Piedmont within these counties and beyond make his chapter far more than conventional descriptive geology. His most significant contribution is the recognition of graded graywacke and other sedimentary features within the metamorphosed Wissahickon Formation of the Glenarm Series. He proves it to be a thick flysch-like sedimentary mass; associated pebbly mudstones had earlier been termed Sykesville Granite and Laurel Gneiss. He also convincingly dates this sequence as late Precambrian.

The oldest rocks of the area are those of the Baltimore Gneiss in the cores of mantled domes in eastern Howard and Baltimore counties. Although alteration and migmatization obscure the original character of the gneiss in most places, its composition, where least altered, indicates its derivation from volcanic rocks of intermediate to silicic composition.

Unconformably above the gneiss are quartzose rocks of the Setters Formation and the Cockeysville Marble. These are overlain by the Wissahickon, which in the western part of the area is overlain by the Ijamsville Phyllite. In contrast to the flysch-like graywackes of the Wissahickon, the Ijamsville contains crossbedded quartzite that shows a change of sedimentary environment to that of shallow water molasse.

Plutonic rocks consist of an earlier mafic series, including the Baltimore Gabbro and related rocks, and a later granitic series. The Baltimore Gabbro, where best preserved, displays rhythmic graded layers that were apparently formed as flat-lying sheets prior to folding of the enclosing Glenarm Series. With continuing deformation, the basement Baltimore Gneiss was partially mobilized to produce the migmatitic Gunpowder Granite, and synkinematic magmatic quartz diorite, quartz monzonite, granite, and pegmatites were emplaced.

Radiogenic mineral ages give essential information on the temporal spacing of these events. Zircon and microcline from the Baltimore Gneiss give ages between 1000 and 1100 million years and indicate a major metamorphic or plutonic event at that time. Zircon ages from early granitic intrusive rocks give dates of 570 million years, and younger ages of other granitic intrusive rocks are confirmed by radiometric ages as low as 370 million years.

The Wissahickon Formation is thus older than 570 million years but younger than 1000 million years, and therefore is comparable in age to the Ocoee Series of the Southern Appalachians, which has similar sedimentary characteristics and stratigraphic relations. The Cambrian or Ordovician age that had been widely suggested for the Glenarm Series is thus rejected.

Hopson's observations include a wealth of petrographic and chemical information with which pertinent experimental data are compared. His chapter is a model of the application of the newer developments in geology in combination with old-fashioned good field observation to yield definitive solutions to classical problems in earth history.

Although 89 photographs convincingly supplement the text, the county geologic maps that were issued separately some years ago do not accompany this volume. Instead, there is a crude sketch map of the two counties (at 1:125,000 scale) which conflicts in several respects with the earlier maps and with the report. Maps of these and the other counties of the Maryland Piedmont that are consistent with Hopson's findings should now be prepared.

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Mathematical Analysis

The Elements of Real Analysis. Robert G. Bartle. Wiley, New York, 1964. xvi + 447 pp. Illus. $10.95.

A course variously described as an introduction to mathematical analysis, real analysis, or the theory of functions—a replacement for the former advanced calculus—now serves as a bridge between the intuitive and manipulatory courses in the freshman and sophomore years and the courses in advanced analysis, topology, and geometry in graduate school. It is an essential course that should be taken by every undergraduate in preparation for graduate work in mathematics.

The Elements of Real Analysis is an excellent textbook for this undergraduate course in mathematical analysis. The definitions are precise, the proofs rigorous, and the exposition good. The chapters have the following titles: "A glimpse at set theory," "The real numbers," "The topology of Cartesian spaces," "Convergence," "Continuous functions," "Differentiation," "Integration," and "Infinite series." The theoretical nature of the treatment of these subjects is indicated by the following sample of theorems: Bolzano-Weierstrass theorem, Heine-Borel theorem, Cantor intersection theorem, Lebesgue covering theorem, Baire's theorem, fixed point theorem for contractions, Stone-Weierstrass theorem, Tietze extension theorem, Arzelà-Ascoli theorem, Riesz representation theorem (for bounded positive linear functionals), Cauchy-Hadamard theorem, and Bernstein's theorem. There is no mention of functions of a complex variable nor of Lebesgue measure or integration.

Most of the book presents a multidimensional theory in the language of vectors. A sequence is a function whose