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