Soil development, by Barshad, deals with the methodology for interpreting soil-profile development in terms of the effect of developmental factors on parent material. Chemical composition, by Lawton, covers the gross elemental composition of primary minerals and soils.

Soil colloids are described by Toth through their schematic crystal structures and ion-exchange properties. But the exchange phenomena itself is rather thoroughly and competently explored in a separate chapter, by Wiklander, dealing with ion-exchange formulas, the Donnan equilibrium, membrane potentials, amphoteric reactions, and ion-exchange reactions between solids.

The chapter on soil organic matter, by Fraser, discusses plant constituents and their decomposition products. Kardos discusses soil fixation of plant nutrients and the chemical reactions involved that have special implications in soil fertility. Oxidation-reduction processes with respect to soil development and fertility are discussed by Merkle, while Thorne and Seatz cover the chemistry of acid, alkaline, alkali, and saline soils.

The world distribution of trace elements and their behavior in soils are described by Mitchell. The relationship of soil chemistry to plant nutrition, by Mehlich and Drake, forms the concluding chapter. It deals with ion adsorption by plant roots and nutrient availability as affected by soil reactions. An appendix, by Prince, on routine soil analysis is included.

Editor Bear and the authors are to be congratulated on this valuable contribution to the field of soil chemistry. Each chapter is well written and adequately documented. It is a book every worker in soil chemistry and soil fertility should possess, and it would make an excellent text or reference book for an advanced course in the principles of soil chemistry.

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Flora of Winnebago County, Illinois. Egbert W. Fell. Nature Conservancy, Washington, D.C., 1955. 207 pp. Cloth, $3.50; paper, $2.75.

Those concerned with the flora, vegetation, or ecology of the Middle West will be interested in this new book on one of the counties on the prairie border in northern Illinois. This book is the result of many years of careful study of the natural history of the northern part of Illinois; the author went there in 1921 to live.

The introduction is a description of the region, its geography, geology, climate, vegetation, and the range of habitats, with statistics on the geographic relationships of the components of the flora. The main part of the book is an annotated catalog of the vascular plants, with information on the local occurrence of each and interesting notes that particularly concern the plants in this county. Accompanying this are 33 pages of line drawings by the author, illustrating many of the more interesting species. A folded map in the back clarifies the local geography of the county, and a smaller map shows the areal relationships of original prairie and woodland and present-day wooded land.

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Physics and Microphysics. Louis de Broglie. Translated by Martin Davidson. With a foreword by A. Einstein. Pantheon, New York, 1955. 286 pp. $4.50.

This book is a collection of lectures and essays, for the most part, written, I would estimate, more than a decade ago. They suffer from the usual diseases of such a collection of much repetition and overlap. Many of the comments on the most recent scientific developments are seriously out of date, in spite of valiant efforts by the translator in the form of notes.

The book is divided into three parts. In the first, entitled, "Science," the author describes recent developments in science with special emphasis on wave mechanics, nuclear physics, and relativity. A historical approach is employed. These chapters are very lucidly written and can be understood by the nonspecialist, although they contain very little that is new for a competent physicist. The second section is entitled "Scientific philosophy." Here there is much emphasis on the comparison of space and time in classical and quantum physics and the relationship of this question to the wave-particle dualism.

One does not always agree with de Broglie, but his ideas are very interesting and thought-provoking. The road to a great discovery is not an easy one, but, as de Broglie points out in an essay on personal memories of the beginning of wave mechanics, a discovery such as the one he made presents many problems of understanding before it can become completely useful. He discusses the blind alleys he followed in an essay of great interest to me and, I am sure, to other physicists as well as to students of the history of science.

Another chapter in this section that is most ably presented is entitled, "The grandeur and moral value of science." On the other hand, the chapter on the relationship of modern science and the philosophy of Bergson was rather disappointing, probably because only a summary of the chapter is presented and is therefore much too sketchy to be satisfying. There are, however, many other hints throughout the book on the parallels between Bergson's philosophy and modern physics, which I hope de Broglie will someday discuss more extensively in a separate volume.

The third section is entitled "History of the sciences" and contains essays on the future of physics, the relationship of pure and applied science, a sketch on the history of the radio, and finally some remarks on nuclear energy, which, when one remembers that they were written before the explosion of the first atomic bomb, are remarkably prescient.

The book will prove to be of interest to the nonphysicist, who will find not only the philosophy of modern physics very clearly discussed but also such very important matters as the relationship between science and the scientist, between science and applied science, and between science and society illuminated by cogent and stimulating concepts.

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Ordovician Cephalopod Fauna of Baffin Island. Memoir 62. A. K. Miller, Walter Youngquist, and Charles Collinson. Geological Society of America, New York, 1954. vii + 234 pp. Illus. + plates.

The publication of this volume in the memoir series of the Geological Society of America is very timely, in addition to being intrinsically valuable, because of current special activity of the Geological Survey of Canada in exploration of the arctic region, including Baffinland. Several field parties working in Baffinland in the summer of 1955 have added materially to knowledge of areal geology and structure; a preliminary report on this work is now in preparation.

The study by Miller and coauthors is concerned primarily with the characters exhibited by 23 genera of nautiloid cephalopods obtained from a single locality (Silliman's Fossil Mount) near the southeastern extremity of Baffinland. Brief descriptions and excellent illustrations of various brachiopods, corals, and the widely distributed spongelike fossils (*Receptaculites*) are given also, and the volume contains a report on 23 species (four new genera and subgenera) of trilobites (by H. B. Whittington) as well

as short sections on graptolites (by C. E. Decker and fossils in Paleozoic rocks near the main fossil locality (by Y. O. Fortier).

Main interest attaches to the age of the fossil-bearing formations and content of the faunal assemblage. Based on occurrence together of some supposed Late Ordovician (Richmond) species with forms that elsewhere predominantly occur in Middle Ordovician (Trenton) strata, the cephalopod assemblage is interpreted to signify an early part of Late Ordovician times. Other fossils, especially the trilobites, point less ambiguously to Trentonian age.

New paleontological information obtained from the northern margin of the North American continent is not only furnishing basis for accurate interpretation of the geologic history of this region but may contribute importantly to understanding paleontological features of formations in the interior of the continent.

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Basic Mathematics for Science and Engineering. Paul G. Andres, Hugh J. Miser, and Haim Reingold. Wiley, New Work; Chapman & Hall, London, 1955. vii + 846 pp. Illus. $6.75. (A revision of *Basic Mathematics for Engineers,* 1944.)

This textbook is proposed for a unified freshman year of mathematics work to include algebra, trigonometry, and analytic geometry. It is an adequate basis for the study of the calculus and is directed, as its title states, to students in science and engineering. This is a revision of an earlier volume by the same authors. Considerable space (about 100 of the 800 pages) is given to prerequisite high-school mathematics so that students may have ready access thereto. This review material is unusually well treated with emphasis on radicals and exponents, fractions, and solution of equations. There is an abundance of word problems, many of an unusual form; and manipulation of many formulas with other variables besides x and y is carefully included.

The usual material in college algebra, trigonometry, and analytic geometry is adequately covered. The authors are to be congratulated on a careful analysis of important material and on the omission of certain topics that still appear in many textbooks *only* because of tradition. For example, the solution of certain oblique triangles by the law of tangents or half-angle formulas is replaced by the use of the laws of sines and cosines—a commendable feature in this day of electric desk calculators. Reference is frequently made to applications in science and engineering with the primary purposes of stimulation in study and of bridging the gap between mathematics and its utilization. As a second example of these authors' analysis, the solution of simultaneous linear equations is treated by the Doolittle method; hence, in the study of determinants, the students should realize that they are concerned beyond the mere solution of three or four equations in as many variables. The theory of determinants, so requisite to matrix theory and to computer theory, is covered only for second- and third-order determinants but more competently than is usual; evidently the belief of the authors is that students can learn the theory for the general order more thoroughly and easily in a later course.

I would have preferred more emphasis in analytic geometry on the locus derivation and, consequently, on fewer boldface formulas (which really do not need to be memorized). The treatment of solid analytics is too brief (31 pages in all), and cylindrical and spherical coordinates are omitted.

The slide rule is treated in the first chapter; far fewer problems than usual follow in the text with trick numbers of solutions. This is both commendable and desirable, for the psychological attitude of expecting simple answers is an inevitable but unfortunate consequence of study with many textbooks.

This textbook, then, is of some significance in the current trend of experimentation that is so important if mathematics instruction is to be progressive and not static. I wish that some other way could be found to cope with the inadequate preparation of the entering student than to make the requisite material available for reference in a college-level textbook; certainly improvements in education in the high school must occur if college instruction is to yield more and better trained students in science and engineering.

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Books Reviewed in The Scientific Monthly, April

Plant Taxonomy, E. L. Core (Prentice-Hall). Reviewed by L. Constance.

Quantitative Analysis, A. F. Daggett and W. B. Meldrum (Heath). Reviewed by A. D. Bliss.

Advanced Calculus, A. E. Taylor (Ginn). Reviewed by A. W. Hobbs.

The Botany of Cook's Voyages and Its Unexpected Significance in Relation to Anthropology, Biogeography and History, E. D. Merrill, vol. 14, No. 5/6 (Chronica Botanica; Stechert-Hafner). Reviewed by J. M. Fogg, Jr.

Die Binnengewässer in Natur und Kultur. A. Thienemann (Springer). Reviewed by A. D. Hasler.

Rome beyond the Imperial Frontiers, M. Wheeler (Philosophical Library). Reviewed by M. H. Adams.

Fact, Fiction, and Forecast, N. Goodman (Harvard Univ. Press). Reviewed by R. J. Seeger.

Contributions to Plant Anatomy, Irving W. Bailey (Chronica Botanica; Stechert-Hafner). Reviewed by J. Philpott.

Introduction to Social Welfare, W. A. Friedlander (Prentice-Hall). Reviewed by W. W. Boehm.

The Unified System Concept of Nature, S. T. Bornemisza (Vantage). Reviewed by G. Hardin.

Sir Joseph Banks, the Autocrat of the Philosophers, 1744–1820, H. C. Cameron (Batchworth). Reviewed by J. Ewan.

The Luminescence of Biological Systems, F. H. Johnson, Ed. (AAAS). Reviewed by C. E. ZoBell.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Informe de la Tercera Conferencia sobre los Problemas de Nutrición en la América Latina. Held at Caracas, Venezuela, 19–28 October 1953. Publicaciones Científicas No. 12. Oficina Sanitaria Panamericana, Washington 6, 1954. 54 pp.

The Sergestidae of the Great Barrier Reef Expedition. Great Barrier Reef Expedition 1928–29, Scientific Reports, vol. VI, No. 5. Isabella Gordon. 11 pp. 5s.

The Otiorrhynchine Curculionidae of the Tribe Celeuthetini (Col.). Guy A. K. Marshall. 134 pp. 35s. British Museum (Natural History), London, 1956.

Learning about Tests. Junior Life Adjustment Booklet. Joseph C. Heston. Science Research Associates, Chicago 10, 1955. 40 pp. $0.50.

The Report of the Principal to the Trustees and Ten-Year Reports of the Department Chairmen. vol. 52, No. 1, of *Phillips Exeter Bulletin.* Phillips Exeter Academy, Exeter, N.H., 1955, 61 pp.

Handbook of Toxicology. vol. I. WADC Tech. Rept. 55-16. William S. Spector, Ed. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, 1955. 408 pp.

Lung Function in Coalworkers' Pneumoconiosis. Medical Research Council Rept. Ser. No. 290. J. C. Gilson and P. Hugh-Jones. Her Majesty's Stationery Office, London, 1955. 266 pp. $3.78.

Cytotaxonomic Studies in Allium. I, *The Allium canadense Alliance.* Research Studies of the State College of Washington, Monographic Suppl. No. 1. Marion Ownbey and Hannah C. Aase. State College of Washington, Pullman, 1955. 106 pp. $2.