from German and English sources, gives many references to topics which could not be treated or which were only briefly touched upon. The lack of citations to the Russian literature, though understandable, is a regrettable defect in an otherwise comprehensive and authoritative work. With its projected companion volume, this treatise will provide the most complete, detailed summary of specialized geologic techniques yet available in a single work in any language.

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Synthetic Element

The Metal Plutonium. A. S. Coffinberry and W. N. Miner, Eds. University of Chicago Press, Chicago, Ill., 1961. xi + 446 pp. Illus. $9.50.

Writers of science fiction have often attributed remarkable properties to metals containing or composed of previously unknown elements, the classic example being the gravity-screening alloy "cavorite" in H. G. Wells's satirical story, "The first men in the moon." Although plutonium, the first man-made element to be isolated, shows a disappointingly normal behavior in a gravitational field, it is perhaps artistically appropriate that it has, for a metal, quite exceptional properties that continue to plague the technologist and puzzle the theoretical metallurgist even after some 15 years of investigation.

This account of the study of this unusual metal and its alloys begins with the microgram-scale preparation of plutonium in 1943 and continues into 1958. It consists of 35 papers by 43 experts (British, French, Canadian, and American) originally presented at the World Metallurgical Congress in Chicago in 1957, and subsequently edited and updated for publication.

The papers are divided into three main groups, of which the first outlines the development, present status, and probable future course of plutonium metallurgical research in the United States, Britain, Canada, and France.

A second section, the scientific meat of the book, presents (i) data on the crystallography, specific heat, thermal expansion, electrical resistivity, elastic constants, and magnetic susceptibility of allotropes of the pure metal; (ii) some 25 phase diagrams of plutonium binary systems, including a number reported by the Russians at the Moscow Conference on the Peaceful Uses of Atomic Energy held in July 1955; (iii) crystallographic data on about 50 plutonium intermetallics; and (iv) a tentative explanation of the anomalous negative coefficients of expansion of the delta phases.

In addition to this, there is a good deal of technological information about handling plutonium and preparing its alloys. The concluding section deals with the fabrication of reactor fuel elements containing plutonium and contains a lucid discussion of the present and possible future uses of plutonium as a source of nuclear power.

This is an attractive book; it is a must, of course, for the scientist or engineer who deals with plutonium, but even the nonspecialist may find it of interest, because of its first-hand accounts of one of the most exciting periods in the history of metallurgy.

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Vague, Outdated Ideas

Theories in Logic. W. Windelband. Philosophical Library, New York, 1961. x + 81 pp. $2.75.

For several reasons the publication of this book is bizarre. In the first place, the undated preface by Thomas P. Kiernan scarcely mentions the contents of the book and certainly makes no case for republishing it. The book itself is a translation of Windelband's 1912 article, "Die Prinzipien der Logik," which, on page 1 of the volume, is correctly translated as "The Principles of Logic." It is an unsolved mystery, as far as I am concerned, why the book's general title is *Theories in Logic.* Moreover, the name of the translator is not given. Above all, I can see no reason whatsoever for translating and publishing this book. It is a fairly typical piece of post-Kantian German philosophy and is of no apparent interest today. The ideas of logic it sets forth are woefully vague and outdated.

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Science Study Series

Life in the Universe. A scientific discussion. Michael W. Ovenden. Doubleday, Garden City, N.Y., 1962. 160 pp. $0.95.

It is a curious and perhaps suggestive thing that, although few, if any, biologists write popular books on the formation of stars, astronomers seem unable to resist discussing the origin of life. This tradition—in the manner of Jeans and of Hoyle—is maintained in the present book which has been adapted from a series of articles originally appearing in *The Illustrated London News.*

As one of the Science Study Series, the book is intended for secondary school students. The treatment is qualitative and proceeds from elementary concepts to a consideration of the environmental conditions necessary for the existence of life, the origin of life, and the prospects of extraterrestrial life. By ranging more broadly than deeply, and because many concepts of nuclear chemistry, cosmology, and biochemistry were introduced in less than 150 pages, Ovenden allowed little opportunity to critically evaluate competing theories (perhaps there was no great necessity to do so). It is stated, for instance, that petroleum is of plant origin, and the existence of an alternative view (that it arose abiogenically) is not mentioned, although the latter mechanism would be closely related to the abiogenic synthesis of biochemical precursors. While the Miller experiment is described (anonymously), there is no mention of Oparin's suggestions regarding coacervates, or of molecular stabilization at interfaces, or of polymerization, stereospecific or otherwise.

The story, told as it is, with a background of cosmic grandeur, can scarcely be criticized for the omission of details primarily of concern to the specialist. However, the lack of a bibliography, references to the literature, or suggestions for further reading, for the benefit of the stimulated reader, is unfortunate. The existence of a detailed and sophisticated literature on this subject should be made known to the high school student.

Since the topic is universal in appeal and the approach is an engaging one that cuts across several scientific fields, it should prove enticing and

valuable to the science-oriented high school student and to the thoughtful layman. It is indeed a commendable enterprise to provide solid but digestible intellectual fare, in an economical form, specifically at the secondary school level.

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Cherokee Group

Desmoinesian Brachiopoda and Mollusca from Southwest Missouri. Richard D. Hoare. University of Missouri Press and Missouri Geological Survey, Columbia, 1961. xii + 260 pp. Illus. $4.50.

Richard Hoare has made a commendable attempt to bring together information about the brachiopods and mollusks of the Cherokee Group (Pennsylvanian) and about their distribution, both stratigraphic and areal, in a portion of southwestern Missouri. The short introductory section contains general information on the thickness and lithology of the rocks that comprise the Cherokee Group and discusses the inferred environmental conditions that prevailed during their deposition. Since the stratigraphic distribution of the fauna studied is, as the author subsequently notes, very decidedly controlled by fluctuating environment, a considerably expanded treatment of the paleoecology of the Cherokee rocks, from both a regional and a local point of view, would have been useful. On the basis of the collections available to him, Hoare indicates the existence of a recognizable faunal break separating the Cherokee into a lower, Krebbs subgroup and an upper Cabaniss subgroup in Missouri. The collecting localities of the fauna studied are listed, but the list would be far more useful if accompanied by a map.

The bulk of the book is a well-ordered taxonomic summary of the Cherokee brachiopod and mollusk fauna. The descriptions of species are concise yet understandable, and they are augmented by photographs. The descriptions would be improved by a quantitative treatment of ranges of variation within the taxa recognized, especially in cases where several species or subspecies occur together but appear to differ only slightly. The treatment of brachiopod groups, such as the *Terebratulacea* and *Rhynchonellacea*, in which precise knowledge of internal structure is requisite for proper generic placement, reveals a tendency to neglect the study of such structures in the identification of the material. The author is to be commended, however, for efforts to embody in the work the results of recent taxonomic revisions in the groups considered.

As a source of basic information about the fauna of the Cherokee Group, this book certainly serves a useful function, and it will also be a stepping-stone to those engaged in further investigations on the subject or in similar studies elsewhere.

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New Books

Mathematics, Physical Sciences, and Engineering

Abstract Sets and Finite Ordinals. An introduction to the study of set theory. G. B. Keene. Pergamon, New York, 1961. 116 pp. Illus. $3.50.

Cartesian Tensors. Harold Jeffreys. Cambridge Univ. Press, New York, 1961 (reprint). 100 pp. Paper, $1.65.

Classical Electricity and Magnetism. Wolfgang K. H. Panofsky and Melba Phillips. Addison-Wesley, Reading, Mass., ed. 2, 1962. 508 pp. Illus. $12.50.

Comprehensive Analytical Chemistry. vol. 1c, *Classical Analysis.* Gravimetric and titrimetric determination of the elements. Cecil L. Wilson and David W. Wilson, Eds. Elsevier, Amsterdam, 1962 (order from Van Nostrand, Princeton, N.J.). 758 pp. Illus. $24.

The Electrochemistry of Semiconductors. P. J. Holmes, Ed. Academic Press, New York, 1962. 407 pp. Illus. $12.

Electromagnetics. Robert M. Whitmer. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1962. 367 pp. Illus. Trade ed., $13; text ed., $9.75.

Electromagnetic Waveguides and Cavities. Georg Goubau. Pergamon, New York, 1961. 672 pp. Illus. $13.50.

Elementary Quantum Mechanics. Peter Fong. Addison-Wesley, Reading, Mass., 1962. 381 pp. Illus. $9.75.

Experimentation and Measurement. W. J. Youden. Published for the National Science Teachers Association by Scholastic Book Services, New York, 1962. 127 pp. Paper, $0.50.

Flight Test Instrumentation. M. A. Perry, Ed. Pergamon, New York, 1961. 163 pp. Illus. $8.50.

Group Theory and Its Application to Physical Problems. Morton Hamermesh. Addison-Wesley, Reading, Mass., 1962. 524 pp. Illus. $15.

Heavy Water Exponential Experiments Using ThO_2 and UO_2. J. A. Thie. Pergamon, New York, 1961. 170 pp. Illus. $6.

International Symposium on Mining Research Proceedings. vols. 1 and 2. George B. Clark, Ed. Pergamon, New York, 1962. 871 pp. Illus. $30. Report of the symposium which was held at the University of Missouri, February 1961.

An Introduction to Fourier Analysis. R. D. Stuart. Wiley, New York, 1962. 126 pp. Illus. $3.

An Introduction to Physical Oceanography. William S. von Arx. Addison-Wesley, Reading, Mass., 1962. 432 pp. Illus. $15.

Jet Engine Manual. E. Mangham and A. Peace. Philosophical Library, New York, ed. 3, 1961. 161 pp. Illus. $3.75.

Metallurgy and Fuels. vols. 3 and 4. H. M. Finniston and J. P. Howe, Eds. Pergamon, New York, 1961. 941 pp. Illus. 189s.

Organic Peroxides, Their Formation and Reactions. E. G. E. Hawkins. Van Nostrand, Princeton, N.J., 1961. 440 pp. Illus. $12.50.

Physics and Techniques of Electron Tubes. vol. 1, *Principles of Vacuum Technique.* R. Champeix. Pergamon, New York, 1961. 234 pp. Illus. $10.

Principles of College Physics. vols. 1 and 2. George Shortley and Dudley Williams. Prentice-Hall, Englewood Cliffs, N.J., 1962. 896 pp. Illus. + appendix. Trade ed., $14.65; text ed., $11.

Reactors. vol. 2. H. R. McK. Hyder, Ed. Pergamon, New York, 1961. 563 pp. Illus. $15. The second volume of the "edited" proceedings (16 papers) of the Second International Conference on the Peaceful Uses of Atomic Energy, Geneva (1958).

Resonance Radiation and Excited Atoms. Allan C. G. Mitchell and Mark W. Zemansky. Cambridge Univ. Press, New York, 1961 (reprint). 354 pp. Illus. Paper, $2.95; cloth, $6.

The Shift and Shape of Spectral Lines. Robert G. Breene, Jr. Pergamon, New York, 1961. 335 pp. Illus. $15.

Tables of the Individual and Cumulative Terms of Poisson Distribution. Defense Systems Department, General Electric Co. Van Nostrand, Princeton, N.J., 1962. 215 pp. $8.

Théorie Electronique de la Catalyse sur les Semi-Conducteurs. Th. Wolkenstein. Masson, Paris, 1961. 150 pp. Illus. NF. 30.

Ultra-Violet and Visible Spectroscopy. Chemical applications. C. N. R. Rao. Butterworths, Washington, D.C., 1961. 177 pp. Illus. $5.25.

University Calculus with Analytic Geometry. Charles B. Morrey, Jr. Addison-Wesley, Reading, Mass., 1962. 768 pp. Illus. $12.50.

The World We Live In. A new interpretation of earth history. Amadeus W. Grabau. Geological Soc. of China, Taipei, 1961. 260 pp. Illus.

X-Ray Powder Data for Ore Minerals, the Peacock Atlas. L. G. Berry and R. M. Thompson. Geological Soc. of America, New York, 1962. 287 pp. $8.25.