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.

JOSEPH A. VANCE
Department of Geology,
University of Washington

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.

BURRIS B. CUNNINGHAM
Department of Chemistry,
University of California, Berkeley

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.

PATRICK SUPPES
Department of Philosophy,
Stanford University

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