50 meters may well have been only approximate. Although it is understandable in a volume too expensive for frequent revision, there is a significant lack of absolute values in the material concerned with production and trade. Moreover, the information about European cooperative affairs is inadequate.

Each chapter is written by a noted French geographer. While the present is described, the style resembles geography 40 years ago. In other words, chapters are concerned with the features, natural and cultural, which one might investigate to demonstrate the ancient notion that the environment rigidly governs what life shall be like in a country. Of course, geographers almost universally have abandoned any notion of proving such a theme, but here is a case where descriptive geography is cast in the remnant mold—devoid of theory, strangely focused only on facts, and bereft of the satisfaction of leading the reader to significant demonstrable relationships. Accordingly, to some readers the materials will appear to be shallow—the kind of information that is commonplace or public record, hardly the product of substantial reasoning. An occasional lapse may even give cause to wonder if geographers really are done with "environmental determinism"; in one example, Norway is linked to developments in meteorology, oceanography, and Birkeland's nitrogen fixation process with these words, ". . . in this country of rugged rocks and noble mountains reflected in the fjords, thoughts turn naturally to the sky and the sea."

Maps and pictures are often unsatisfactorily reproduced; the special color plates are delightful, but some are separated by dozens of pages from the appropriate chapter; color maps, inserted with each clutch of countries, are garish and virtually useless; the statistical and atlas appendices are helpful, but the latter is wholly inadequate for finding an unusual place name.

What *is* valuable here is that much factual information about each country of Europe is available in pleasantly assimilable form. Disappointingly, this book does not represent, although its title encompasses all of geography applied to Europe, a field now greatly invigorated by a renewed focus on scientific purposes.

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Incisive Selection

Sexuality and the Genetics of Bacteria. François Jacob and Elie L. Wollman. Academic Press, New York, 1961. xv + 374 pp. Illus. $10.

It seems a shame that a book, originally published in French, need, like one in Chinese, be translated for an English-reading public. This necessity did, however, allow Jacob and Wollman to enlarge their *La Sexualité des Bactéries*, published in 1959, into *Sexuality and the Genetics of Bacteria.* The result is not a complete treatment of bacterial genetics but rather a fine description of some of the ways in which bacterial sexuality, now well understood, has illuminated the genetics of bacteria. Since the work of Lederberg in the mid-1940's, bacteria have come to be among the best-known organisms genetically, through a dazzling series of what most would call elegant experiments. (Jacob and Wollman use this cliché only three times; although they may be a bit verbose, they do not often deviate from the usages of good English.) This knowledge has been put to general biological use in the illumination of mechanisms that regulate gene action—pointing the ways in which the now central problem of biology, differentiation, will be solved —and in the analysis of the nature of the prophage, a representative of the new class of genetic entities, the *episomes*, whose recognition, in bacteria at least, is becoming widespread.

The approach of this book is that of the authors in their laboratory—experimental, pragmatic in the best tradition of science in France. Jacob and Wollman are not strictly molecular in their approach, but this book demonstrates how they contributed to the birth of this new level in biology. The authors leave many questions unanswered, historical, theoretical, and factual; how could they otherwise review a new field incisively and with taste! As André Lwoff said, with true elegance, in his preface to the French edition, the authors have engaged their adversaries on the passionate battlefield of microbial genetics. But they have remained above the struggle and can count themselves among the most inspired, most penetrating, and most fortunate practitioners of their art.

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Specialized Techniques

Lehrbuch der Angewandten Geologie. vol. 1, *Allgemeine Methoden.* A. Bentz, Ed. Enke, Stuttgart, Germany, 1961. xii + 1071 pp. Illus. DM. 145.

This massive compendium gives broad but concise summaries of techniques and methods used in a wide area of specialized geologic fields. The largest and generally most satisfactory section, nearly half of the book, is devoted to the techniques of geophysical measurement and exploration. The remainder is divided about equally between methods of field investigation and mapping; mineralogy, petrology, and geochemistry; paleontology; and soil studies. A complementary volume, announced for early publication, will treat the geology of fuels and metallic and industrial minerals; ground water and hydrology; and engineering geology.

The general coverage in volume 1 is unusually complete. Each section outlines the planning of field work, describes available equipment, and discusses techniques of collection, presentation, and analysis of the data. Though the book emphasizes techniques, it does so largely without sacrificing the geologic fundamentals essential to evaluation of the results. The incorporation of numerous specific problems, drawn from the experience of the writers, helps to clarify the descriptive text, as do the many illustrations.

The book is the product of some 39 contributors working under the editorship of Bentz. As in most such collective efforts, the quality and comprehensiveness of the various sections is somewhat uneven, and the work may be criticized for failing to always integrate material from related fields and to adequately show how different techniques may complement each other in certain problems. Beyond these relatively minor, and perhaps unavoidable shortcomings, the book succeeds remarkably well as a compilation of the techniques of modern geologic practice.

The text contains an encyclopedic volume of information, for the most part very clearly presented, and in this country the volume should be very useful as a reference work. An extensive bibliography, mostly drawn

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