it is observed and as analysis fills out observation. Chapter 4 extends our knowledge to the sun's interior, outlining the brilliant theoretical attack (to which Gamow himself contributed significantly) that has resulted in our now knowing more about the interior of the sun than we know about the interior of the earth. Chapter 5 gives our present understanding of the nuclear sources of solar energy. Chapters 6 and 7 turn from the individual sun (a middle-class, middle-aged star) to all the stars and consider their numbers, their varieties, and their life history.

This is the latest of Gamow's popular expositions of science. It has the Gamow virtues—direct chatty style, masterful use of analogy, vivid examples, clarity. It has also carelessness in detail that leads to occasional misstatements—for example, "the hydrogen absorption lines must be all but absent in the Fraunhofer spectrum" (p. 67), although the figure on page 31 shows these same lines among the strongest in the spectrum. And more seriously, it deliberately touches up historical and biographical details for effect, as an after-dinner speaker embroiders anecdotes—for example, the argument of Anaxagoras on the sun's distance (p. 3). Although Anaxagoras *might* have reasoned in this way, no actual record warrants this account. Finally, our knowledge of the sun has even today more "if's" and "perhaps's" than Gamow suggests. But if you are interested in the sun, read and enjoy this book.

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Chemical Technology

Organoboron Chemistry. vol. 1, *Boron-Oxygen and Boron-Sulfur Compounds*. Howard Steinberg. Interscience (Wiley), New York, 1964. xxxii + 950 pp. Illus. $33.

Organoboron Chemistry, volume 1, by Howard Steinberg, vice president and director of research for the U.S. Borax Corporation, contains 21 chapters covering all aspects of boron-oxygen and boron-sulfur chemistry. Volume 2 will treat the nitrogen compounds of boron, and volume 3 will cover the boron-carbon bonded compounds. The literature for volume 1 is covered from the beginning of work in this area to 1 January 1962. The monumental task encountered by the author is reflected in the 1709 references cited.

The subject matter is well organized. Chapters 1 and 2 are devoted to introductory material; chapter 3 is concerned with nomenclature; chapters 4 through 20 consider systematically and separately each specific class of compounds in which boron is attached to oxygen or sulfur (but not, at the same time, to carbon); and chapter 21 discusses hydrolytic stability of boron oxygen compounds. Particularly well presented and informative are chapters 3, 4, and 21. Chapter 3, "Nomenclature," contains the rules of nomenclature adopted for this book. This presentation is based on an American Chemical Society report, "The nomenclature of boron." The discussion presented in this chapter will hopefully help to systematize future nomenclature in this area. Chapter 4, "Symmetrical orthoborates of monohydric alcohols and phenols," covers the area that can be considered the backbone of boron-oxygen chemistry. The chapter contains more than 500 references and is by far the most comprehensive treatment of this important subject available anywhere. Chapter 21, "Hydrolytic stability," discusses a subject that, in recent years, has become increasingly important and interesting to those concerned with the applications of boron compounds. Singling out these chapters should in no way indicate that the other chapters are not as well written or informative. Undoubtedly each reader will prefer those chapters which reflect his own personal interests.

This is, of course, a comprehensive reference book rather than a textbook. However, the author presents mechanisms for many of the important reactions and discusses the merits of each mechanism in detail. What is perhaps an even more unusual feature is the author's evaluations of mechanisms reported in the literature. If a mechanism does not seem logical, or does not explain the facts in hand, the author proposes a mechanism of his own. And so the book is, to some degree, a treatise in which one can find an evaluation of boron-oxygen and boron-sulfur chemistry as well as a compilation of voluminous factual data.

There can be little question but that the author has succeeded in gathering, summarizing, and at times evaluating the tremendous amount of work in which the chemistry of boron-oxygen and boron-sulfur compounds are described. If the other volumes in this series maintain the same high caliber reporting, the series should represent an excellent standard reference on organoboron chemistry for many years to come. This volume represents a job well done, and I heartily recommend it as the most comprehensive source of information available in the areas of organoboron chemistry covered.

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Solid-State Physics

Low Temperature Solid State Physics. Some selected topics. H. M. Rosenberg. Oxford University Press, New York, 1963. xvi + 420 pp. Illus. $10.10.

A person shopping around today for a book on solid-state physics, of either the general or specialized varieties, has a large selection from which to choose. In view of this happy circumstance, one might seriously question whether one more book is worth the effort. However, one might expect a warm welcome to be accorded the present book. The author's credentials are known, and he has produced a general treatise covering only a few topics which are of particular interest to him, topics that are also largely at the forefront of present-day research on solids. Whether the reader feels that his expectations are fulfilled, though, probably will depend on his personal tastes vis-à-vis books of this kind.

Rosenberg has not written a textbook; neither has he written what the expert would regard as a particularly good reference book. He has written, however, a very good "cultural" or background book and by so doing has filled a definite present-day need. The tyro in solid-state physics today need never fear that he will not encounter the full mathematical development of the phenomena of solids. What the beginner usually does not encounter is a treatment with the mathematical facade stripped away and the phenomena presented as just plain physics. The author regards experimental observations as fundamental. He presents the lore of several important areas and proceeds to explain and unify things, using essentially physical reasoning. The results of elegant calculations are pre-

sented when necessary, but only to illuminate or justify simpler arguments. Such a book must, of course, be incomplete, even though the approach is downright refreshing.

The chief topics covered are magnetism, superconductivity (including post-BCS), semiconductors, electrical and thermal properties of metals and alloys, and thermal properties of insulators. The study of specific heats is exhumed and shown to have post-dark age utility owing to its application as an introduction to an enormous variety of phenomena. Methods for studying Fermi surfaces are interlarded throughout the book, but by anyone's standards receive less emphasis than they should. A chapter on low-temperature mechanical properties is included, but I find the treatment disappointing. Those who contemplate using the book as background material in a formal course might cavil at the author's choice of topics. This incompleteness is amply balanced by the physical insights that both students and experts will gain from the volume.

The author's style is felicitous, holding Britishisms (whilst and the like) to a minimum, and the book is done up with the usual high quality of Oxford University Press. However, the expert will notice the putative Oxford-Cambridge habit of citing only Oxford-Cambridge research unless recognition of outsiders is absolutely necessary. This has the result that for a book published in 1963 the treatment of a few topics, which I know are of intimate present-day concern to the author, seems curiously outdated.

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Chemistry

Cosmetic Science, 1962. Proceedings of the Second Congress of the International Federation of Societies of Cosmetic Chemists, London, 1962. A. W. Middleton, Ed. Pergamon, London; Macmillan, New York, 1963. xvi + 270 pp. Illus. $12.50.

This book is a compilation of papers presented at the Second Congress of the International Federation of Cosmetic Chemists. The papers were contributed by representatives from nearly a dozen countries and cover subjects pertaining to cosmetic science; they range from analytical tests applicable in production control to methods for determining the performance of skin secretions under normal conditions as well as in the presence of certain compounds or preparations.

This book has been made easily readable by heading each paper with a concise abstract. The discussion at the end of each article gives the reader the benefit of reading the comments made by those who heard the paper delivered. The range of subjects is so diffuse that in a limited space it is impossible to provide an overall summary of the contents.

Many of the tests seek to apply very precise methods of measuring to samples that do not lend themselves to such precision. For example—while it is in a molten condition lipstick gradually changes color. Samples taken at short intervals would differ. Color measurement which is more precise than the sample warrants gives the reader a wrong impression of the degree of accuracy that can be obtained. This same criticism is true with respect to many of the papers in this book.

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Mathematics

Continued Fractions. A. Ya. Khinchin, Translated from the third Russian edition (Moscow, 1961) by Scripta Technica. University of Chicago Press, Chicago, 1964. xii + 95 pp. Illus. Paper, $1.95; cloth, $5.

This little book by a great Russian expositor is an interesting introduction to a generally neglected but significant subject. The casual reader may be discouraged by the blunt introduction of a formal apparatus having little intuitive connection with fractions. But he can quickly recover by writing down a few finite continued fractions and using them to put meat on the formal skeleton. He will soon see that the notation serves to avoid the unmanageable clumsiness of compound fractions, and the payoff comes in chapter 2 on the representation of numbers. Here the reader will get a good idea of the importance of continued fractions and their deep connection with the properties of real numbers. The third chapter, which occupies the second half of the book, cannot be fully understood without some familiarity with the elements of measure theory. However, the reader without such a background will get some feeling for the problem of determining the relative frequency of real numbers enjoying special kinds of rational approximations and continued fraction expansions.

There are a number of errors that indicate carelessness in translation, editing, and proofreading, but they do not seriously detract from the clarity and charm of the exposition.

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Marine Biology

Plankton and Productivity in the Oceans. John E. G. Raymont. Pergamon, London; Macmillan, New York, 1963. viii + 660 pp. Illus. $15.

This book, one of the series of monographs on pure and applied biology, is concerned primarily with the North Atlantic ocean and is based for the most part on literature in which that part of the ocean is considered. Apparently only English versions of the extensive Soviet literature were consulted. Of course, most of the work has been done in the Atlantic, and the general features elucidated are applicable to other temperate seas. The book will serve as a good starting point for students of plankton biology and as a complement to work on fisheries. The author fully recognizes that one cannot consider plankton and productivity in the oceans without reference to the benthos, and he concludes with an excellent chapter on the bottom fauna and nekton, again, however, without serious consideration of fish and fisheries. Nevertheless the book is a valuable summary of a large literature, and it will be useful to marine biologists everywhere.

Although there are many illustrations, most of those that represent organisms lack sufficient detail or are poorly reproduced. While the book is not intended to be a guide to plankton as such, the poor quality of reproduction of many of the figures is an unnecessary economy on the part of the publisher, and it detracts from the value of an expensive book.

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