A particular highlight is the chapter which treats considerations in planning exponentials. The experience of all the laboratories is drawn upon, and the planning of exponentials is discussed in a manner that will be very helpful to new workers in the field. In the theoretical interpretation of the experimental data, it is assumed that the reader has a knowledge of elementary reactor theory; consequently, this is not a book for beginners. At the end of each chapter, a list of pertinent references is included. This monograph will be a useful addition to the libraries of reactor physicists and engineers.

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Lithium and Sodium

Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry, Supplement. vol. 2, suppl. 2, *The Alkali Metals,* pt. 1, *Lithium and Sodium.* Wiley, New York, 1961. xxxix + 1458 pp. Illus. $45, until 31 May 1962; $55.

The tremendous rate of growth of the body of chemical knowledge is illustrated by the difference between supplement 2 to volume 2 of *Mellor's Comprehensive Treatise on Inorganic and Theoretical Chemistry* and the original volume 2, published 40 years ago and covering the halogens and the alkali metals in 894 pages. The present part 1 of volume 2, supplement 2, covers only lithium and sodium and requires 1458 pages of text to do so. This supplement is the work of 25 contributors, with an editorial board of four, "presenting an enormous mass of information in the form of a collection of monographs having the same general pattern but individual qualities reflecting the author's judgment." The enormous bibliography is distributed among the 41 sections, which list at the bottom of every page the page number of the pertinent reference list. The literature references date largely from the period 1922 to 1952, although some are earlier and a few are as late as 1957.

The few mammoth works of this sort published in the past have tended to be condensed abstracts of literature and compilations of data, often uncritical. The very nature of such a work often renders this difficult to avoid, but the presentation of the material as a collection of monographs minimizes this tendency and occasionally makes for interesting reading. For example, on page 65, the brief discussion of the atomic weight of lithium and the possible effect on it of slight variation in isotopic composition is extremely interesting. These monographs are systematically selected to give complete and logical coverage, but a more extensive index would increase the utility of the volume.

The binding of the book is substantial, but the printing appears to be a photo-offset reproduction of a typewritten manuscript. The spacing is sometimes uneven, and many of the letters, particularly the capitals, are not adequately reproduced in the review copy. However, I will not complain, if the economy practiced in the reproduction of this volume makes available a considerable fraction of its high price for the financial recompense of the many contributors who have toiled long and effectively to make a great body of chemical and physical information more readily available to the scientific public.

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Russian Contributions

Electrochemistry of Fused Salts. I. K. Delimarskii and B. F. Markov. Translated from the Russian by Adam Peiperl. Reuben E. Wood, Ed. Sigma Press, Washington 7, D.C., 1962. xv + 338 pp. Illus. $12.50.

Interest and activity in the electrochemistry of fused salts have greatly increased in recent years. In this country and abroad, a number of symposia have taken place or are being planned and the corresponding research literature is growing at a fast rate. Comprehensive treatises, however, have been lacking, a situation sadly characteristic of electrochemistry as a whole.

The present work, by two prominent electrochemists from the U.S.S.R. (each author is responsible for about one half of the book), is welcome for several reasons: it fills a real need, it makes available in digest form the abundant Russian contributions and gives access to them through numerous references (grouped at the end of each chapter), while at the same time it presents what appears to be a fairly complete and comprehensive survey of the non-Russian work. The index of authors looks predominantly Slavic but most of the Western names one would expect to find are there also. The literature is covered to 1958, but there is no explicit indication of the year of publication of the Russian original. The introduction contains an interesting sketch of the history and of the present geographic distribution of Russian research in the field.

All topics are treated on the basis of a pleasant, easily assimilated balance between theory (vigorously and originally presented in most cases), experimentation, and examples (critically selected). Distributed in eight chapters we find, quite thoroughly treated: conductance, transfer, galvanic cells, decomposition and electrode potentials, solubility of metals, electrolysis and polarization, electrode processes, and polarography. Industrial applications are referred to but not considered in any real detail.

The footnotes contributed by the editor are helpful—for example, the addition of fundamental references to tables of thermodynamic properties published in the United States (page 124) and the critical examination of the authors' table of decomposition potentials (pages 125–128).

A subject index would be useful.

In spite of the authors' statement that their book "is not a textbook or a student manual" I suggest it would constitute an excellent point of departure for a graduate course or seminar.

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ACS Monograph Number 152

Crystallization, Theory and Practice. Andrew van Hook. Reinhold, New York, 1961. ix + 325 pp. Illus. $12.50.

The first of this book's six chapters is a historical review. With its wealth of literature references, this chapter may be the most valuable in the book, since it brings to the reader's attention things that developed before his time. But at least one of the developments that I recall is handled uncritically. The

author espouses Zwicky's theory of a regular secondary structure in crystals; indeed this theory was most popular. But van Hook apparently missed the "Ideal-und Realkristall" Sonderheft of the *Zeitschrift für Kristallographie* in which crystallographers dug a grave for that theory. This very number was also the one in which Taylor's epoch-making paper on dislocations appeared.

The second chapter, "Basic principles," is concerned with physical chemistry and crystallography. The section on crystallography should have been omitted, for its emphasis shows no perspective and it contains errors. For example, Figs. 2 to 7 show five standard isometric crystal habits, probably copied from another source: one is upside down, and another is standing on its left side. Two adjacent tables show that there are seven crystal systems; the next figure shows that there are only six. There are two stereographic projections and eight lines of discussion; this is inadequate explanation for the novice.

In "Modern theories," chapter 3, the history of the theory of nucleation is outlined from the literature. This survey includes the prediction and discovery of growth about spiral dislocations, but, surprisingly, only a few pages are devoted to this modern and basic aspect of crystallization. No mention is made of the extreme growth of a crystal in the direction of a reentrant, caused by twinning.

Specific data on linear rates of crystallization are given in chapter 4.

Chapter 5 is concerned partly with growing crystals and partly with purification by crystallization. It contains remarks on surface-active agents, crystallization with ultrasonic irradiation, and the chemical engineering aspects of crystallizing such things as salts and sugar.

The practice of crystallizing many products of commercial importance is described in the final chapter. These include not only salts and sugar but quartz, rubies, emeralds, and diamonds. There are also three paragraphs on whiskers, which have figured so prominently in recent literature.

At the end of each chapter there are several pages of references, and in addition there is an appendix entitled "General references on crystallization." The book is the American Chemical Society's monograph No. 152.

In the 10 years that have elapsed since publication of Buckley's *Crystal Growth*, the discovery of growth about spiral dislocations has caused the science of crystal growth to turn in a new direction. It is disappointing that this book did not make more use of this new material and of its bearing on crystallization.

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Hungarian Contribution

Absorption Spectra in the Ultraviolet and Visible Region. vols. 1 and 2. L. Lang, Ed. Academic Press, New York, 1961. vol. 1, 414 pp.; vol. 2, 237 pp. $18 per volume.

These volumes consist of a presentation of 349 visible and ultraviolet spectra, preceded by a 56-page "theoretical introduction." The spectra reported are those of a wide variety of organic compounds plus those of a few transition metal complexes and other inorganic substances. While the results of some solid and vapor phase studies are included, most of the spectra were taken in solution. Except for a few of Polish origin in volume 2, all were contributed by Hungarian workers. The preface to the second volume states that volume 3 is in preparation and that an increasingly international character is anticipated in subsequent volumes of the series.

The spectra are very clearly reproduced in a uniform format in which the logarithm of the molar extinction coefficient is plotted versus the wavelength in millimicrons. A very desirable feature is the fact that, in addition to the spectra themselves, the data from which they are derived are also presented. Moreover, each spectrum is backed on the same sheet by its associated data, and the entire collection is presented in loose-leaf form for ease of handling and organization. Information is also provided on the instrument used, the cell dimensions involved, and the concentrations studied in each case. Each volume is indexed by compound name and formula.

The value of the collection would be much enhanced if the source and purity of the material studied were indicated for each spectrum. In the case of previously published spectra, the appropriate literature reference should be cited. The fact that bibliographies are provided for some of the contributors does not obviate this criticism, since there is no specific cross reference between items in the bibliographies and the spectra presented.

The theoretical discussion that introduces volume 1 is the weakest part of this work. The sketchy outline of such topics as quantum machines and group theory presented there will be of little help to those without previous experience in these fields and is not needed by those with such experience. The many grammatical errors, awkward constructions, and misprints (in both text and mathematical expressions) found in this section detract greatly from its readability. Although the qualitative aspects of the discussion of the spectral features associated with specific chromophores are probably the best part of this introduction, the reader must be very cautious in accepting the detailed theoretical assertions included.

This compilation provides information which complements that found in such standard works as the American Petroleum Institute's catalog and Friedel and Orchin's *Ultraviolet Spectra of Aromatic Compounds* (Wiley, New York, 1951). It should be, in spite of the weaknesses cited, a useful addition to the libraries of academic and industrial research organizations.

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Multilingual

Astronomical Dictionary. In six languages: English, Russian, German, French, Italian, and Czech. Josip Kleczek. Academic Press, New York, 1962. 972 pp. $25.

About ten thousand technical words and phrases used in astronomy or in closely related fields are listed in this volume. It does not replace conventional bilingual dictionaries; instead it supplements them with technical words usually omitted and technical meanings or usages of common words. The dictionary is divided into two approximately equal sections. In the first are the technical terms, divided into 34 successive categories of subject matter —for example, astronomical optics and solar activity. For each term equivalents in the various languages are spread across two facing pages, with each of the six languages in a separate column. The second half contains a separate in-