an interesting one: does it have a new or lively approach?

I must have read too many geology texts. Or perhaps one becomes hypercritical toward the end of an academic year, for the book has furnished me neither instruction nor interest. As to the latter, however, only you should be the judge. Remember, the instructor may shine by contrast!

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A Working Manual

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.). x + 728 pp. Illus. $24.

This is the final part of volume 1 of the treatise; in all, five volumes are planned. Parts 1a and 1b dealt with general gravimetric and titrimetric analysis; part 1c gives gravimetric and titrimetric methods for each element, with references to other methods, such as absorptiometric or radiometric methods, where appropriate. Within its prescribed limits, the book certainly merits the "comprehensive" used in its title.

In the preface the editors "reiterate [their] aim . . . that *Comprehensive Analytical Chemistry* should be a *working* manual, offering as far as possible direct and immediate assistance." For each element a short review is given of its occurrence and general analytical characteristics; this is followed by a discussion of sample preparation, separation, and determination. Then selected procedures for separation and determination are given in sufficient detail for the reader to use the book directly at the laboratory bench.

The treatment of each element or group has its own bibliography, and in general each reference is followed by a descriptive sentence. The book is therefore an excellent starting point for literature searches. There is a good subject index, but no author index.

Very occasionally the text reads like a review in *Analytical Chemistry*, but it goes far beyond a mere list of references. The merits of different methods are critically discussed, and the 30 authors (seven are American, the others British) draw on their own experiences for their recommendations. Methods such as ethylenediaminetetraacetic acid titration, precipitation from homogeneous solution, solvent extraction, and ion exchange are used freely but with critical evaluation. However, beginning with the first part of the book, the discussion of alkali metals, I was puzzled to find no mention of zirconium phosphate-type ion exchangers for separating rubidium and cesium and other elements in the alkali and alkaline earth groups. Then I looked at the bibliography that follows this section and found only one reference dated later than 1955.

In general the literature is well covered through 1954 and 1955, but no later. (The section on cobalt is an exception.) Thus, there is no mention of the Schöniger combustion technique for elementary analysis of organic compounds, though space is given to other, now antiquated, methods.

I know something of the difficulties of producing a cooperative work of this kind, and the editors are not to be envied. Nevertheless, it is a pity that so long a time seems to have elapsed between the preparation of the manuscripts and the publication of the volume.

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Inside the "Black Boxes"

Introduction to Chemical Instrumentation. Edward J. Bair. McGraw-Hill, New York, 1962. viii + 349 pp. Illus. $10.75.

This new approach to chemical instrumentation will be a valuable addition to the book shelves of many scientists. In the past, existing commercial instruments have been described by treating them as "black boxes" and giving explicit instructions for their operations. Very little attention has been given to what is inside—that is, to how information is taken from the sample, converted to an electrical signal, sorted, analyzed, and then displayed in some sensible form. Up to now there has likewise been no book on electronics which is directed toward chemical applications. As a useful supplement to books on electronics and chemical instrumentation, Bair's book will be of especial use to scientists who must design their own chemical instruments and to those who must extend the use of existing instruments.

A knowledge of electronics, although helpful, is not required. Bair has included a chapter on electronic parts which serves as an introduction to a description of the elementary circuits or electronic components. These components are then treated as units in block diagrams. Thereafter the emphasis is placed on the flow of signals through block diagrams rather than on electronics.

Many helpful hints and instructions are given for the design and construction of new chemical instruments.

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Nuclear Reactors

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

Heavy water exponential experiments using uranium and thorium oxide fuels are discussed in this book's 11 chapters: (i) introduction; (ii) exponential method; (iii and iv) Scandinavian UO_2-D_2O lattice experiments and the interpretation of results; (v and vi) Saclay UO_2-D_2O lattice experiments and interpretation; (vii and viii) Savannah UO_2-D_2O lattice experiments and interpretation; (ix) Argonne UO_2-ThO_2-D_2O lattices; (x) theoretical interpretation of UO_2-ThO_2-D_2O lattices; and (xi) considerations in planning exponentials. Four appendices deal with symbols and units, counting corrections and statistics, a method for interpolation in moderator to fuel ratio dependent bucklings, and a list of nuclear properties of UO_2, ThO_2, Al, and D_2O.

This book treats the experimental arrangements and outlines the theoretical treatment of the data obtained. That the material has been drawn from a variety of laboratories is evident from the chapter headings. The experimental arrangements are reported in considerable detail, and Thie includes the lattice geometry with all the reported buckling information (something that other writers often fail to do). The book does not consist solely of a factual report of data, but a comparison and an interpretation of the different procedures of various laboratories are also made.

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