

Book Reviews

PRINCIPLES OF ACTIVATION ANALYSIS. By PAUL KRUGER. Pp. xii + 522. New York, London, Sydney and Toronto: Wiley-Interscience. 1971. Price £11.75.

The contents of this book fall into three parts. The initial chapters give a general account of radiochemistry along traditional lines: nuclear structure, radioactive decay, radioactivation theory, interaction of radiation with matter, detectors, statistics, etc. The second part is devoted to a comprehensive account of activation analysis, including radiochemical and instrumental activation analysis, non-neutron methods, gamma-spectrometry and the applications of computers. A very full account is given of the limitations of activation analysis in a chapter that includes an account of methods, *e.g.*, variable-energy activation analysis, that are aimed to overcome these limitations.

The last part of the book consists of a chapter on applications, which includes a salutary comparison of the method with other techniques of trace analysis and a discussion on how to decide whether activation analysis is *the* method for a specific purpose. The applications discussed include those to cosmology, geochemistry and the life sciences and industrial uses such as the determination of oxygen in metals, well-logging and the uses of stable isotopes as tracers with subsequent determination by activation analysis.

The literature covered is mainly pre-1965, although reference to more recent papers is given in the applications chapter, including mention of recent work on moon rocks. The references are given as footnotes, which tends to limit their number, but each chapter is followed by a very complete bibliography. A number of practical problems are given at the end of each chapter.

The sections of the book dealing with chemical separations are probably the least satisfactory. Thus there is no mention of complexing agents in cation exchange, anion-exchange separation of metals or reversed-phase chromatography. Automatic separation is restricted to two papers, given in some detail, from the 1965 Modern Trends in Activation Analysis Symposium.

There are some typographical errors, although few would mislead the reader. The reference to Zenon with its symbol Zn (page 189) is curious. In some instances there are errors of omission. A formula for the number of plates in an ion-exchange column omits the definition of one of the symbols although this is required to be calculated in a question at the end of the chapter. In a table (page 208) giving the position of subsidiary peaks in a pulse-height spectrum, α (*i.e.*, $h\nu/m_0c^2$) is not defined. The line width of a peak in a germanium detector spectrum is calculated without mention of the Fano factor.

The style of writing is very clear and the book is well produced. It is long, and this is reflected in the price. Many tables are reproduced from the literature and some of these could have been omitted or curtailed, *e.g.*, there are several pages of tables of results of analyses of rocks, trace elements in water, etc., that go beyond "principles."

D. I. COOMBER

MASS SPECTROMETRY: TECHNIQUES AND APPLICATIONS. Edited by GEORGE W. A. MILNE. Pp. xii + 521. New York, London, Sydney and Toronto: Wiley-Interscience. 1971. Price £11.75.

Dr. Milne has edited a substantial book on mass spectrometry that comprises a series of specialist articles written by authors drawn from the younger mass spectroscopists, as the editor himself points out. The work includes the following chapters: Automatic Acquisition and Processing of Mass Spectral Data; Photographic Techniques in Organic High-resolution Mass Spectrometry; The Electrical Recording of Magnetically scanned High-resolution Mass Spectra; Computer-assisted Interpretation of Mass Spectra; Gas Chromatography - Mass Spectrometry; An Application of Artificial Intelligence to the Interpretation of Mass Spectra; Newer Ionisation Techniques; Mass Spectral Studies Employing Stable Isotopes in Chemistry and Biochemistry; Mass Spectrometry in Peptide Chemistry; The Application of Mass Spectrometry to Problems in Medicine and Biochemistry; Mechanism Studies of Fragmentation Pathways; and Some Aspects of Metastable Transitions. Each chapter is accompanied by an often extensive bibliography and in addition there are two extensive indexes at the end of the volume.

With such wide coverage as that given here, it is rather difficult to criticise the book in detail, but the reviewer, whose interests are rather different, does regret the absence of any discussion of organometallic compounds as well as the virtual neglect of the quasi-equilibrium theory, of which there is but the merest mention. In contrast, there are separate chapters in this book that

cover much the same ground and could possibly have been merged. Possibly, although the title does not disclose the fact, the whole work is directed more towards medical and biochemical interests than being intended as a comprehensive review of the state of the art.

This book is fairly free from mistakes, misprints and technical jargon, an increasing hazard in modern works, and the editor is to be congratulated upon this. There is, however, some confusion of ideas, as for instance, with the units used in magnetically scanned instruments.

The book is well produced with clear diagrams and a legible text, as one has come to expect from the known high standards of the publishers.

The careful reader will find within much that is stimulating and instructive. R. I. REED

ANALYTICAL SEPARATIONS AND DETERMINATIONS: A TEXTBOOK IN QUANTITATIVE ANALYSIS.

By C. T. KENNER. Pp. xx + 395. New York: The Macmillan Co.; London: Collier-Macmillan Ltd. 1972. Price £5 (hard-back); £2.75 (soft-back).

One is hesitant before reviewing an undergraduate-level text written for a specific market in an internationally circulated journal, as comments may not be relevant to many readers.

This particular text differs from most at this level in that it omits detail for individual experiments, these being the subject of a parallel volume. Despite the title, the contents are mainly classical: theory of weighing, stoichiometry, theory of titrimetric and gravimetric analysis, colorimetry, chromatography and ion exchange. I have grave doubts on the value of describing the Duboscq colorimeter and spending ten pages in explaining equal-arm balances and weighing by swings in 1972.

Numerical problems are given for each area discussed and a valuable feature for students are the many examples that are worked out in full. In these days of rising book prices, there must be some cheaper way to ensure that students have logarithm tables than to print a set in each class text. In addition, is it necessary to spend eight pages explaining their use?

Having been critical of certain of the contents, one must point out that this book gives an excellent exposition for undergraduates of inorganic classical analytical chemistry, the basis of much experimental work, which it is hoped they will meet later in their courses. The book will therefore be useful to teachers in preparing courses and as a class text in a modular scheme that contains an appropriate module. D. THORBURN BURNS

COLORIMETRIC METHODS OF ANALYSIS, INCLUDING PHOTOMETRIC AND FLUOROMETRIC METHODS.

By FOSTER DEE SNELL and CORNELIA T. SNELL. Volume IVAAA. Pp. xiv + 351. New York, Cincinnati, Toronto, London and Melbourne: Van Nostrand Reinhold Co. 1971. Price £11.25.

To state that this book follows the excellent and well known line already established in the series of volumes on colorimetric methods of analysis is but to state the anticipated. Nevertheless, the authors are to be congratulated yet again on publishing a further volume in this series. The present volume deals with enzymes, antibiotics and related compounds, haemoglobin and related compounds and natural pigments. The volume is the modern extension of Chapters 14, 15 and 16 in the fourth volume of the series and deals with the currently available methods such as spectrophotometry and spectrofluorimetry, which are widely used in the determination of the above substances.

The arrangement of the material is such that the worker can readily find information, both by using the extensive subject index and by reading the detailed "procedures" for the desired analyte. There is a wealth of reference to the original literature, but the authors ensure, by their diligent and detailed approach, that there will be few occasions when it is vital to consult the source; their work will in most instances give all that is necessary.

A comparison of this supplementary volume and the original volume reveals how extensive is the work that has been reported on these series of compounds—it also reveals the need for the publication of the supplement. L. S. BARK

CALCULATIONS IN ADVANCED CHEMISTRY. By P. J. F. GRIFFITHS and J. D. R. THOMAS. Second Edition. Pp. viii + 271. London: Edward Arnold. 1971. Price £1.75.

This edition represents an updating of a book which is already a success. The original aim was to provide an illustration by means of typical worked examples of the calculations encountered in the study of advanced physical chemistry. To all students it represented the means whereby

they could study privately the problems that they were likely to meet in their examinations and their unqualified verdict must rest on the great number of copies of this book in the possession of students. The passage of time has meant that the recommendations of the Symbols Committee of the Royal Society must be taken into account with particular reference to the introduction of SI units. These amendments have been introduced and there seems no reason why this edition should not be as great a success as the first edition. The success of the book is to be found in no small measure in the number of worked examples. The printing is clear and the arrangement straightforward. The introduction of a chapter on statistical treatment of data is welcome, and perhaps it could be followed by a greater awareness of this kind of treatment in many of the B.Sc. courses in which it is often sadly neglected.

D. DOLLIMORE

TRANSFER COEFFICIENTS IN ELECTROCHEMICAL KINETICS. By J. P. BRENET and K. TRAORE. Pp. xiv + 158. London and New York: Academic Press. 1971. Price £3.50; \$10.50.

This is a useful but very specialised book intended primarily for research workers in the field of electrochemical kinetics. As such, it will be of little interest to most analytical chemists. The concept of the transfer coefficient is reviewed and developed in the light of current theories of electron transfer reactions at electrode surfaces.

J. M. OTTAWAY

LA CHIMIE EN SOLVANTS NON-AQUEUX. By BERNARD TRÉMILLON. Pp. 240. Paris: Presses Universitaires de France. 1971. Price 18F.

This is a very useful book, dealing with the general chemistry of non-aqueous solvents. It deals with the problem in a very interesting manner, as it concerns itself not only with the type of solvent but also with the types of reaction that occur. In the first chapter solutes and solvents are discussed; this chapter gives good coverage not only of molecular solvents with which many of us deal, such as water, alcohols and hydrocarbons, but also of those eutectics which may be used as solvents. There is very good coverage of the use and application of molten salts, in which the solvent may be regarded as being ionised to a very large extent. Although there is but a passing mention of liquid metals, it is sufficient to bring to mind the fact that there are large commercial plants in which liquid metals are used as coolants and heat exchangers, and that the chemistry of many of these liquids is sometimes unexpected by those who instinctively think of aqueous solution chemistry.

The other four chapters deal with various aspects of chemistry such as acid - base reactions, redox chemistry, ion exchange and lastly the correlation of properties in different solvents.

This book is not aimed at the analytical chemist, but is designed more especially for the physical - inorganic chemist. Nevertheless, it is a most interesting book and the applications of its contents to problems in analytical chemistry are numerous.

The range of all chemistry will be much increased by an improved understanding of solvent systems other than water, and this book will undoubtedly help in this increase.

L. S. BARK