

Additions and Corrections

Energetic Approach to the Packing of α -Helices. 2. General Treatment of Nonequivalent and Nonregular Helices [*J. Am. Chem. Soc.* **1984**, *106*, 3161]. KUO-CHEN CHOU, GEORGE NÉMETHY, and HAROLD A. SCHERAGA*

Page 3164: Equation 22 should read as follows

$$\begin{aligned}\Omega_p &= 0 && \text{for } p = 0 \\ &= \tan^{-1}(p \tan \beta) && \text{for } -90^\circ \leq \beta \leq 90^\circ \\ &= \tan^{-1}(p \tan \beta) + \frac{p}{|p|} 180^\circ && \text{for } 90^\circ < \beta \leq 180^\circ \\ &= \tan^{-1}(p \tan \beta) - \frac{p}{|p|} 180^\circ && \text{for } -180^\circ \leq \beta < -90^\circ\end{aligned}$$

Page 3164: Equation 23 should read as follows

$$f(S_1, S_2) = \{[t_f + (S_2 L_2 - L_2/2) \sin \alpha \sin \beta]^2 + [t_g - (S_2 L_2 - L_2/2) \cos \alpha \sin \beta]^2 + [S_1 L_1 - L_1/2 - t_h - (S_2 L_2 - L_2/2) \cos \beta]^2\}^{1/2}$$

Hapalindoles: New Alkaloids from the Blue-Green Alga *Hapalosiphon fontinalis* [*J. Am. Chem. Soc.* **1984**, *106*, 6456]. R. E. MOORE,* C. CHEUK, and G. M. L. PATTERSON

Page 6456, left column, line 9 from bottom: This line should read—After 3 weeks the alga was harvested by filtration...

Page 6457: In Table I and footnote 10 the carbon-13 chemical shift assignments for C-4 and C-8 should be reversed. This is supported by a heteronuclear long range coupling CSCM experiment.

Siderophore Iron-Release Mechanisms [*J. Am. Chem. Soc.* **1984**, *106*, 6983–6987]. ROBERT C. HIDER,* DAVID BICKAR, IAN E. G. MORRISON, and JACK SILVER

Page 6986: The last two sentences in the legend of Figure 1 should be replaced by:

Voltage potentials are reported in the figure as recorded and may be normalized to zero hydrogen potential by adding 105 mV

to their values. The reference electrode was standardized against a ferro/ferricyanide potential of 325 mV (430 mV vs. hydrogen electrode).

Cobalt–Carbon Bond Dissociation Energy of Coenzyme B₁₂ [*J. Am. Chem. Soc.* **1984**, *106*, 8317–8319]. JACK HALPERN,* SOOK-HUI KIM, and T. W. LEUNG

Page 8318: (1) The ordinate label in Figure 1 should read: $10^{-4}[k_{\text{obsd}}]^{-1}$, s.

Stereochemistry of the Wittig Reaction. Effect of Nucleophilic Groups in the Phosphonium Ylide [*J. Am. Chem. Soc.* **1985**, *107*, 217]. BRUCE E. MARYANOFF,* ALLEN B. REITZ, and BARBARA A. DUHL-EMSWILER

Page 219: The compound number **5e** beneath the structural formula should be followed by $n = 8$, not $n = 6$.

Page 220: Footnote *n* of Table I should refer to γ -oxido ylide, not β -oxido ylide.

Figure 1 and Table I: A data point for reaction of the ylide from **5a** with hexanal is shown in Figure 1 (on page 219), but this experiment was mistakenly omitted from Table I and the figure caption (the open-circle symbol). The experiment was performed with 2.1 mol equiv of butyllithium, to give a *Z/E* ratio of 3:97 (GLC on column D).

Mechanism of the Oxidation of NADH by Quinones. Energetics of One-Electron and Hydride Routes [*J. Am. Chem. Soc.* **1985**, *107*, 479]. BRIAN W. CARLSON and LARRY L. MILLER*

Page 483, left column, line 15: The equation should read:

$$E^7_{\text{H}^-} = E^{\circ}_{\text{H}_2} - 0.60pK_a + 0.030(pK_a - 7)$$

Page 483, left column, line 38: The sentence should read: Also given in Table VIII are $E^7_{\text{H}^-}$ values reported for other *o*-quinones measured electrochemically under similar conditions.^{5a}

Page 483, Table VIII: The column headings should be:

$$2 \quad E^{7.1 a} \quad pK_a^b \quad E^7_{\text{H}^-}$$

Book Reviews*

Laboratory Techniques in Biochemistry and Molecular Biology. Volume 12. Photogenerated Reagents in Biochemistry and Molecular Biology. By H. Bayley (Columbia University). General Editors: T. S. Work (Cowes, Isle of Wright) and R. H. Burdon (University of Glasgow). Elsevier Science Publishing Co.: Amsterdam and New York. 1983. xiii + 187 pp. \$22.50, Dfl. 58.00.

Photoaffinity labeling is the type of technique that many an investigator in biochemistry or molecular biology has contemplated using at one time or another to identify a specific receptor, to localize a ligand binding site, or to peruse the physiological neighborhood of a particular macromolecule. Such experiments, when successful, can be particularly elegant. When they do not work, they can be extremely frustrating. The investigator planning an initial foray into the field would be well advised to read Hagan Bayley's review. The author discusses the advantages and the potential pitfalls of the technique, presents the options available to the investigator and provides many examples of successful photolabeling experiments.

The author has written an admirably concise account of photoaffinity labeling and crosslinking that is really more akin to a review than a techniques manual. The book begins with an introductory chapter that describes the use of affinity reagents that are photoactivatable. Chapters 2 and 3 deal with the nature and properties of photoactivatable groups and photoaffinity probes. Chapter 4 gives the specifics of designing and

interpreting a successful photolabeling experiment. Chapter 5 details the use of photolabile crosslinking reagents, while chapter 6 discusses a relatively new area: photoaffinity reagents as probes of membrane structure. The approach adopted by the author is to teach by example. Basic fundamentals of experimental design are presented in the context of actual experiments drawn from the literature. In this fashion the author has provided both an excellent review of the pertinent literature with over 400 references and a very readable guide to the rational design and use of photogenerated reagents.

Robert L. Geahlen, *Purdue University*

The Physical Chemistry of Membranes. By Michael E. Starzak (State University of New York at Binghamton). Academic Press: Orlando, FL. 1984. x + 334 pp. \$42.00.

Recent years have witnessed the maturation of experimental membrane science through the application of a wide variety of physical techniques. This text successfully bridges the gap between biologically oriented monograph series and vigorous texts in physical chemistry. The book is not intended to provide an overview of this rapidly expanding field, but rather to present physical chemistry as an invaluable tool for describing membrane association, composition, and transport. By enlisting basic concepts in thermodynamics, kinetics, and surface science, the author indeed demonstrates that membrane processes are governed by physical laws. Each chapter provides the basic mathematical tools necessary to understand the text as well as tackle current literature topics. Chapters are organized in the following manner: (I) Substantiates the

*Unsigned book reviews are by the Book Review Editors.

membrane model by presenting pioneering experiments and physical methods of characterization; (II) derives thermodynamic laws, Maxwell's relations, and Gibbs isotherms, and utilizes Boltzmann statistics to describe membrane binding; (III) covers basic electricity and magnetism and extends into dipole interactions, image charges, and notions of capacitance; (IV) presents osmosis and Donnan potentials before describing the pH electrode as a specific membrane system; (V) lucidly represents the electrode by equivalent circuits and builds upon this scheme to describe ion motions in solution; (VI) is devoted to functional forms of operational amplifiers and their utility in experimental membrane science; (VII) utilizes circuit theory to model biological membranes while explaining impedance and admittance of basic RC circuits; (VIII) develops electrical double layer theory through Helmholtz and Gouy-Chapman theory; (IX) depicts the essence of membrane diffusion, deriving Fick's law, the Nerst-Planck equation, and the Goldman-Hodgkin-Katz equations; (X) introduces the esoteric fundamentals of irreversible thermodynamics in a clear concise manner; (XI) presents basic kinetics and develops a creative vector analysis of enzyme kinetics later applied to ionophore mediated transports; and (XII) deals with excitable membranes by a detailed analysis of the Hodgkin Huxley Squid axon.

The author's true command of the topics presented is evident from the ease with which rigorous physical chemistry is metamorphosed into a digestible format. The text furnishes the reader with a working understanding of membrane biodynamics while simultaneously developing or reinforcing skills in physical chemistry. This volume exemplifies a unique and imaginative approach to a multidisciplinary field. It is highly recommended for students and researchers in membrane science.

Lee Rand Guterman, *Clarkson University*

Concepts and Models of Inorganic Chemistry (Second Edition) and Problems for Inorganic Chemistry. By B. E. Douglas (University of Pittsburgh), D. H. McDaniel (University of Cincinnati), and J. J. Alexander (University of Cincinnati). John Wiley & Sons, Inc.: New York. 1983. No. 1: xii + 800 pp. \$34.95. No. 2: 298 pp.

This textbook and problem solutions manual are intended for use in upper-level undergraduate or first-year graduate level courses as a general survey of the important topics of inorganic chemistry. This reviewer has used this text in a one-semester course of this type.

Essentially all of the important concepts pertaining to inorganic chemistry are discussed. General principles are presented in chapters on atomic structure and the periodic table, localized bonding, symmetry, molecular orbital theory, and hydrogen bonding and weak interactions. A chapter on inorganic solids introduces the student to close-packing concepts, the structures of ionic compounds, Born-Haber cycles, lattice defects, silicate structures, band theory, and alloys. Chapters on coordination chemistry include bonding and spectra, stereochemistry, reaction mechanisms, organometallic chemistry, a summary of descriptive chemistry, and bio-inorganic chemistry. Chapters on primarily main group chemistry include acids and bases, a summary of the descriptive chemistry of nitrogen, phosphorus, oxygen, sulfur, selenium, the halogens and noble gases, and the boron hydrides (including cluster and cage compounds). A separate chapter on redox chemistry includes an introduction to the use of Pourbaix diagrams. Some specific concepts or factual details are presented more superficially than others.

A discussion of descriptive inorganic chemistry is localized in two chapters, although many of the other chapters include considerable amounts of this material. Ligand-field theory and the electronic spectra of coordination complexes are discussed in the same chapter, and the student is introduced to Orgel diagrams and to Tanabe-Sugano diagrams. The d-orbital splitting energies are expressed in units of Dq as derived from the additivity of effects of combined groupings of ligands rather than by using the angular overlap model (which this reviewer prefers). A description of metal-ligand bonding makes brief use of projection operators. The student is encouraged to use symmetry and character tables, although the sections requiring the use of group theory can be omitted.

A selection of topics is required for the use of this text in a one-semester course. This selection can be made easily, but some forethought should be exercised. For example, although the principle concepts of coordination chemistry are presented in three chapters, the derivation of spectroscopic terms from electronic configurations and the definitions of stepwise and overall stability constants are each included elsewhere in the text.

The solutions manual is quite impressive. It provides solutions for both the problems printed in the text as well as for additional problems. This reviewer has used these problems for student homework and for exam questions.

Overall, this text is certainly an attractive option for a teaching textbook in inorganic chemistry. The instructor can develop a course of considerable variety in both choice of topics and depth of presentation.

The authors should be commended for their effort, and I encourage my colleagues to examine this textbook for use in their survey courses in inorganic chemistry.

Charles M. Lukehart, *Vanderbilt University*

Tandem Mass Spectrometry. Edited by F. W. McLafferty (Cornell University). John Wiley & Sons: New York. 1983. xxvi + 506 pp. \$46.20.

This is a comprehensive coverage of the rapidly developing field of tandem mass spectrometry, which has experienced an unusual growth during the past 6 years. This review is a composite of contributions from most of the investigators who have made particularly important advances to these recent developments. A glossary of terms and abbreviations is first given to guide the reader through the review. McLafferty sets the tone of the review in the first chapter by giving some of the historical perspective and early predictions of applications which have now been brought to fruition. Chapter 2 contributed by Busch and Cooks, and Chapter 3, by Levens, present the overall background and status of the field for applications to analytical chemistry and to structure analysis. The following series of chapters deals with ion formation processes: ionic reaction mechanisms (Nibbering group) ionization methods (Hunt), and collisionally activated dissociation at low (Dawson and Douglas) and high (Todd and McLafferty) energy. Recent advances in instrumentation include chapters on the tandem quadrupole method (Yost and Enke), magnetic sector instruments with linked scanning (Jennings and Mason), large radius (Derrick) triple sectors (Gross and Russell), and Fourier-transform ion cyclotron resonance (McIver and Bowers). Chapters on specific developments in methodology include simultaneous ion detection (Boerboom), angle and energy resolved measurements (McLuckey and Cooks), and data analysis. The review concludes with 7 chapters on applications to specific fields that include natural products, pharmaceuticals, industrial chemicals, agricultural studies, environmental problems, and petroleum research. Particular care has been given to introducing the subject to one not familiar with the field. The content of the book strikes a good balance with fundamental studies, instrumentation, and application.

Ronald D. Macfarlane, *Texas A & M University*

NMR of Newly Accessible Nuclei. Volume 1. Chemical and Biochemical Applications. Volume 2. Chemically and Biochemically Important Elements. Edited by Pierre Laszlo (Université de Liège). Academic Press: New York. Volume 1: 1983. xviii + 298 pp. \$59.00. Volume 2: 1984. xx + 436 pp. \$65.00.

The recent availability of true multinuclear FT NMR spectrometers has resulted in an explosion of NMR studies of nuclei which were rarely, if ever, studied in the first 25 years of NMR. This two-volume work is an attempt to survey both the techniques used for these studies and the results obtained from them. The editor has chosen to define "newly accessible nuclei" as all nuclei except ^1H , ^{13}C , ^{15}N , ^{19}F , and ^{31}P . The books deal mainly with solution studies of diamagnetic systems and are aimed at chemists and biochemists wishing to use these nuclei in their NMR studies. The solid state is not covered except for occasional reference to results obtained with either CP-MAS or MAS techniques. The paramagnetic shift is also fairly well ignored.

The first volume is divided into two parts, with the first five chapters devoted to the methods and techniques used for these nuclei. Many of these nuclei have chemical shift ranges that are orders of magnitude larger than those found in ^1H or ^{13}C NMR. Also, many are quadrupolar nuclei. The second part consists of six chapters on selected topics which are mostly on the NMR of ions in solution or in biochemical systems. The editor suggests that "Volume 1 might serve as the text for a one-semester introductory course in NMR aimed at first-year graduate students". In this reviewer's opinion it could serve as a supplementary text but not as a standalone text, for the coverage in the first five chapters is too condensed and lacks any discussion of the basic principles of NMR. It would be a valuable supplementary text for introducing the special problems encountered in doing NMR with some of these nuclei and the techniques used to meet these problems. There is an excellent chapter on factors contributing to the observed chemical shifts of heavy nuclei by G. A. Webb, for example. The special-topic chapters appear to be excellent reviews of the more limited topics they cover.

The second volume reviews the NMR properties of specific nuclei. There are individual chapters on ^2D , ^3T , ^{11}B , ^{17}O , ^{27}Al , ^{29}Si , ^{59}Co , ^{103}Rh , ^{109}Ag , ^{113}Cd , and $^{203/205}\text{Tl}$. There are chapters dealing with alkali metals, ^{25}Mg plus ^{43}Ca , and ^{77}Se plus ^{125}Te . A final chapter surveys the elements Be, S, V, Cr, Fe, Cu, Nb, Mo, Ru, Sn, W, Pt, Pb, and Bi. Extensive as this coverage is, it does not cover every nucleus that has been studied by NMR (^{139}La , ^{73}Ge are two examples that come readily to mind). Most chapters follow a similar format, giving specific information on the nucleus and its sensitivity, chemical shift range and trends, spin-spin coupling constants, relaxation properties, and examples of how the NMR has

been applied to solve specific problems. Most chapters have representative spectra, tables of chemical shifts and coupling constants, and a good list of references. This will be a useful book for all laboratories that may be called on to do multinuclear NMR for these elements.

I find both volumes to be excellent and feel they should be on the bookshelves of any chemist or biochemist using NMR studies involving the nuclei covered.

Bruce R. McGarvey, *University of Windsor*

Equations of Membrane Biophysics. By N. Lakshminarayanaiah (Thomas Jefferson University). Academic Press, Inc.; Orlando, FL. 1984. x + 426 pp. \$69.00.

The specialists and advanced students of membrane transport should find this book valuable. It is rich in detailed and quantitative descriptions of transport phenomena and presents a cohesive and complete summary of the physical and mathematical models in use. The first quarter of the book (Chapters 2 and 3) lays the foundation for the rest by developing from basic physical chemical principles the relations necessary for the description of ionic flux, diffusion, surface potentials, and membrane potentials to name a few. Chapter 4 focuses on calculations of membrane potentials with particular emphasis on use of the Nernst-Planck flux equation. Chapters 5 and 6 are devoted to a detailed discussion of transport models based on kinetic (Chapter 5) and steady-state thermodynamic approaches (Chapter 6). The description of the kinetic models is rooted in enzyme kinetics and the Eyring theory of rates of chemical reactions. It includes models of lipid soluble ion transport, carrier mediated transport, and transport by channel-forming ionophores. The description of the steady-state thermodynamic models complements that of the kinetic models by emphasizing nonelectrolyte and water flow. Chapters 5 and 6 constitute the core of the book (about a third) and derive their strength in part from discussions of specific biological examples and comparisons of experimental data with the models. Chapter 7 departs from the main thrust of the previous chapters and is a self-contained description of transient membrane potential changes as contained in the Hodgkin-Huxley equations. The chapter includes a discussion of cable theory as background. Chapter 8 presents an introduction to studies of electrical properties of membranes by noise or fluctuation analysis. This discussion is not as complete as those in the other chapters, but it provides an excellent exposition of the mathematical principles.

Researchers in membrane transport will benefit from a concise, coherent, and rigorous mathematical presentation of this broad subject but are unlikely to find new material. They should be able to use this book as a reference source for either teaching or research. Researchers with peripheral interests in membrane transport should find this book an excellent means of getting beyond a casual understanding of particular problems without a laborious search of the primary literature. The book is not, in my view, a good textbook since the emphasis on the mathematical description makes it more difficult to gain physical or biological insight. However, in conjunction with a more qualitative, descriptive text, this book would provide the opportunity to delve into some subjects in more detail. As a whole this is a good book which fills an important niche in a difficult interdisciplinary science. The title is perhaps misleading since many other areas of membrane biophysics are not discussed. Nevertheless, I shall certainly use my copy for years to come.

Nils O. Petersen, *University of Western Ontario*

Journal of Chromatography Library. Volume 29. Quantitative Column Liquid Chromatography. A Survey of Chemometric Methods. By S. T. Balke (Xerox Research Center of Canada). Elsevier Science Publishers: Amsterdam and New York. 1984. XIV + 300 pp. \$63.50.

This book is a timely and well-written account of the application of chemometric methods to optimization, quantitation, and calibration in high-performance liquid chromatography. The material is presented in a form suitable for use by graduate students in chemistry and similarly experienced persons. An advanced knowledge of mathematics and statistics is not assumed; indeed, one of the strengths of this book is the extent to which the author goes to explain mathematical concepts in words as well as equations. Another attractive feature of the book is that most mathematical concepts are immediately applied to relevant chromatographic applications. The major portions of the book cover linear and nonlinear regression, error propagation, curve fitting, simplex optimization, and pattern recognition techniques (thus, this book is not a treatise on the theory of chromatography). The various statistical procedures are illustrated by examples drawn mainly from reversed-phase and size-exclusion chromatography.

Chapter 1 serves as an outline for the book. Chapter 2 is a useful review of statistics and chemometrics as applied to chromatographic data. Chapter 3, headed fractionation, deals with peak shape analysis, solvent and mode selection, optimization of separations, gradient elution, window

diagrams, and overlapping resolution maps. The performance characteristics of detectors (largely spectroscopic), the use of response factors in quantitation, and molecular weight calibration are discussed in Chapter 4. Chapter 5 is headed calibration. This the author defines as solute identification by correlating the solute properties with chromatographic retention times. Discussed in this chapter are the use of single- and multiple-solute standards, retention index scales, and polymer molecular weight distributions. The final chapter is headed resolution correction, defined by the author as the use of mathematical methods to improve separation of chromatographic peaks. In this section are discussed curve fitting and deconvolution techniques to extract information concerning the individual concentrations of overlapping peaks.

This book should find a wide readership. It is written in plain English and thankfully free of jargon. The practicing chromatographer will like the book because it states clearly the approaches and underlying concepts of chemometrics; the expert will find the detailed literature survey and tabulated data useful.

Colin F. Poole, *Wayne State University*

Clinical and Biochemical Analysis Series. Volume 14. Practical Immunoassay: The State of the Art. Edited by Wilfrid R. Butt (Birmingham and Midland Hospital for Women). Marcel Dekker, Inc.: New York. 1984. ix + 318 pp. \$55.00.

As the title implies, Volume 14 of this series is meant to be a practical guide for immunoassays. Each chapter has been written by different authors as a separate entity, with extensive but clear discussion of the principles of various assays, their usefulness, and their limitations. Critical discussions of the applications and shortcomings of some available instruments and methods suggested by manufacturers are a welcome help in setting up a new laboratory or switching to different methods. There is a long chapter (Chapter 6) on nephelometric methods, which are seldom treated extensively in immunology manuals. The last chapter (Chapter 10; Data Analysis and Quality Control of Assays: A Practical Primer), by R. P. Channing Rodgers, should be read by anyone who has to make decisions on the basis of data obtained through automated or semiautomated assays. It stresses the importance of standards and of valid mathematical and statistical analysis of results. Several chapters have a section on methodology, describing protocols in sufficient detail (concentrations, amounts, tube size, etc.) to set up the assay without further search. These include methods for labeling through radioiodine (Chapter 2); enzymes (Chapter 3), fluorescent reagents (Chapter 4), and chemoluminescent reagents (Chapter 5) and even for the use of monoclonal antibodies (Chapter 8). Since the specificity and sensitivity of immunoassays are making them more and more widely used, this volume should be one of the first ones to consult whenever a new technique must be used or developed; it will also be extremely useful to laboratory managers for quality control of the data generated. The very readable text and the simple but clear illustrations also make this volume a choice textbook for courses in immunoassays. Although most of the material covered was presented at a 1980 meeting in Birmingham, the extensive reference at the end of each chapter have been updated through 1982.

Alfred C. Schram, *West Texas State University*

Organic Functional Group Preparations. Volume 1. Second Edition. By S. R. Sandler (Penwalt Corp.) and W. Karo (Polysciences, Inc.). Academic Press: New York and London. 1984. xiv + 657 pp. \$75.00.

The first edition of this work, in 1968, received a very favorable welcome for the large amount of practical help it gave. The second edition retains the good features, such as the inclusion of many laboratory descriptions of representative examples (for example, there are five examples of sulfonation of arenes), a critical comparison of major synthetic methods, and leading references to the minor ones. It continues to be a reliable reference of first recourse on how to accomplish a desired preparation.

The authors state that some of the chapters have been extensively rewritten, and much new information has been added to the others. A scan of the reference lists confirms this claim, for references from the 1970's are abundant. Citations dated after 1981 appear to be absent, or very rare, but this fact is not as important as it might be, for the great majority of standard synthetic methods remain the same.

There are 21 chapters, which cover hydrocarbons, carbonyl compounds of various sorts, isocyanates and relatives, amines, hydrazines, diazo and nitro compounds, nitriles, and sulfur compounds from mercaptans to sulfonic acids. Each chapter begins with a very detailed table of contents, which makes it easy to locate desired information; there is also an extensive subject index. The methods are then presented in logically organized fashion, with general equations and specific examples, but rather few tables. A list of miscellaneous methods, each with references, concludes each chapter.

The authors emphasize safety aspects, a commendable fact. They

report that it is in most states illegal to provide antidotes in the laboratory for cyanide poisoning, and one is expected under the law to await the arrival of a physician, even if immediate treatment is obviously required. One wonders if such laws will cause the deaths of more chemists than it will protect: The authors' concern with safety is somewhat uneven, however, for they caution strongly against the use of azides, and decline to discuss the Curtius rearrangement, but they are not deterred from giving much space to synthetic application of diazomethane, which some chemists regard with far more trepidation than hydrogen azide. It seems to be a question of what one is used to; the known danger is more easily dealt with in safety than the unfamiliar, but lesser, one.

This is the sort of book that will see a lot of use, so if the price dissuades you from personal purchase, you might urge your library to order more than one copy.

Solubility Data Series. Volume 15. Alcohols with Water. Edited by A. F. M. Barton. Pergamon Press: Oxford and New York. 1984. xix + 438 pp. \$100.00.

This latest volume in the Series, of which A. S. Kertes is the Editor-in-Chief, is concerned with binary systems containing only water and a monohydric alcohol. It sets out the data in the form characteristic of the series, with a generous allotment of space, details of experimental methods and reliability, and graphic presentation as a frequent supplement to tables of numerical values. The forepages contain the only textual material, and the preface notes some interesting features about alcohol solutions, such as the fact that although the solubility in water of a homologous series of alcohols decreases in geometric progression as the number of carbon atoms increases arithmetically, the solubility of water in the alcohol phase remains high, even with alcohols as large as dodecanol. Indexes of compounds, registry numbers, and authors complete the volume.

Advances in Laser Spectroscopy. Volume 2. Edited by B. A. Garetz and J. R. Lombardi. John Wiley and Sons: New York. 1983. ix + 261 pp. \$44.95.

This book is the second volume based on an annual symposium held at the Polytechnic Institute of New York. The format has ten review articles written by research leaders in a variety of subjects. The articles are well written and generally emphasize introductory material, explanation of techniques, and the scientific importance of the resulting research. The editors and authors should be commended for generally achieving a useful set of articles for both students and active researchers. The selected topics use many similar techniques, and new information on methods is contained in several articles. The subjects of the reviews include chlorine dioxide spectroscopy and photochemistry, spectroscopy at high vibrational excitation, diatomic Rydberg states, unimolecular energy transfer, vibrational optical activity, surface Raman spectroscopy, theory of laser induced processes, and ferroelastic phase transitions. The techniques of multiphoton spectroscopy and photoionization spectroscopy are covered in several articles. Double resonance methods, polarization spectroscopy, picosecond nonlinear spectroscopy, time-resolved infrared absorption, and Brillouin scattering are all discussed in one or more articles. The book will be useful because the majority of articles are not merely descriptive of techniques but include a scientific overview of the relevant fields. These overviews generally lack comprehensive accuracy and historical development, but will introduce the reader to the scientific significance of the problem and the uniqueness of laser techniques for providing new insights.

Kenneth G. Spears, Northwestern University

Quantitative Electron-Probe Microanalysis. Edited by V. D. Scott and G. Love (University of Bath). Ellis Horwood Limited: Chichester, UK; distributed in the U.S.A. by John Wiley and Sons: New York. 1983. 345 pp. \$44.95.

It is perhaps appropriate to include "X-ray" in the title of this book, since it deals overwhelmingly with the quantitative analysis of the X-rays

(as opposed to the electrons) emitted when a solid sample is bombarded with electrons for the purpose of determining specimen composition to an accuracy of about 1%. The substances amenable to study by electron-probe microanalysis include metals, ceramics, polymers, minerals and biomaterials.

The book starts with a concise historical introduction by T. Mulvey, which I recommend even to readers with only a general interest in this technique. This is followed by a somewhat oversimplified but adequate description of the physics behind electron-probe microanalysis. The spectrometers used are described in Chapters 3 and 4 which, along with the first two chapters, serve to orient the reader and to give him a feeling for the essence of the technique.

The remaining nine chapters are a rather detailed look at data acquisition and interpretation, with the last chapter dealing with the modified approach needed when studying thin films and particles (rather than bulk specimen).

The authors have generally succeeded in keeping the size of the book manageable without sacrificing clarity. They opted wisely to omit the description of individual commercial spectrometers since this information is often revised and since most users are not involved in the development of instrumentation. They did include many references to detailed work, however, which the serious reader will ultimately have to consult for a more complete understanding of the subject.

Overall, although this book does not compare the advantages and disadvantages of electron-probe microanalysis with those of other techniques, it should fulfil its purpose of appealing to a wide audience. I recommend it highly for workers interested in the proper use of this method.

M. S. Banna, Vanderbilt University

Microcomputers and Laboratory Instrumentation. By D. J. Malcolm-Lawes (Kings College, London). Plenum Press: New York. 1984. x + 246 pp. \$35.00. ISBN 0-306-416689.

The rapid changes in the microcomputer field have made many books on computer interfacing obsolete. This book is an attempt to fill some of the voids created by these advances. After brief reviews of analog and digital signal handling, aspects of microcomputer architecture are examined, and a number of methods used in interfacing small computers to various laboratory instruments are discussed. Much of the discussion centers on the use of newer logic in the design of interfaces. Emphasis is placed on 8-bit systems, with the Commodore PET receiving the bulk of the author's attention. The hardware aspects of standard interfaces, and many nonstandard interfaces, are covered fairly thoroughly. Details of the development of software for controlling microcomputer interfaces are provided only where they clarify discussion of the hardware; all discussion of software is made in the BASIC language.

Although brief sections reviewing basic analog and digital electronics are provided, much of the treatment is at a level beyond most of the introductory books on interfacing. Many of the more subtle aspects of interfacing are covered, but because practical experiments in interfacing are omitted from the book, the book is not easily accessible to the chemist without much electronics experience. For the chemist who has a basic knowledge of electronics and who desires a better understanding of interfacing, however, it is invaluable. It has a particularly useful chapter giving details on the complete design of a microcomputer interface to a chromatograph. In this chapter, all of the steps needed in the design of an interface are treated in detail, including decisions needed in the design and development of hardware and software. Limitations of the book are few; these include a lack of adequate coverage of 16-bit systems, which receive only two pages of text, despite their increasing importance in the chemical laboratory and their relative availability. In addition, the lack of detailed coverage of 8-bit systems other than the PET, whose popularity in Europe has not matched that in the US, will be somewhat disappointing to those Apple and AIM-65 users seeking hints on interfacing their computers to instruments.

Steven D. Brown, Washington State University