Additions and Corrections

Calixarenes. 4. The Synthesis, Characterization, and Properties of Calixarenes from *p-tert*-Butylphenol [*J. Am. Chem. Soc.* **1981**, *103*, 3782]. C. DAVID GUTSCHE,* BALRAM DHAWAN, KWANG HYUN NO, and RAMAMURTHI MUTHUKRISHNAN

Page 3784: The ^{13}C NMR spectra shown in Figure 1 were obtained on different spectrometers and are incorrectly normalized to a common base line. This figure should be replaced by the one shown below which contains spectra obtained on a single spectrometer and reproduced without artistic intervention.

Page 3788: The ^{13}C NMR values for 5,11,17,23,29,35,41,47-octa-*tert*-butyl-49,50,51,52,53,54,55,56-octahydroxycalix[8]arene (**2**) (Experimental Section) should be changed to read as follows: ^{13}C NMR ($CDCl_3$) δ 146.6 (28%, Ar), 144.7 (20%, Ar), 128.7 (49%, Ar), 125.5 (59%, Ar), 34.0 (19%, $ArCH_2Ar$), 32.4 (25%, $C(CH_3)_3$), 31.5 (100%, $C(CH_3)_3$).

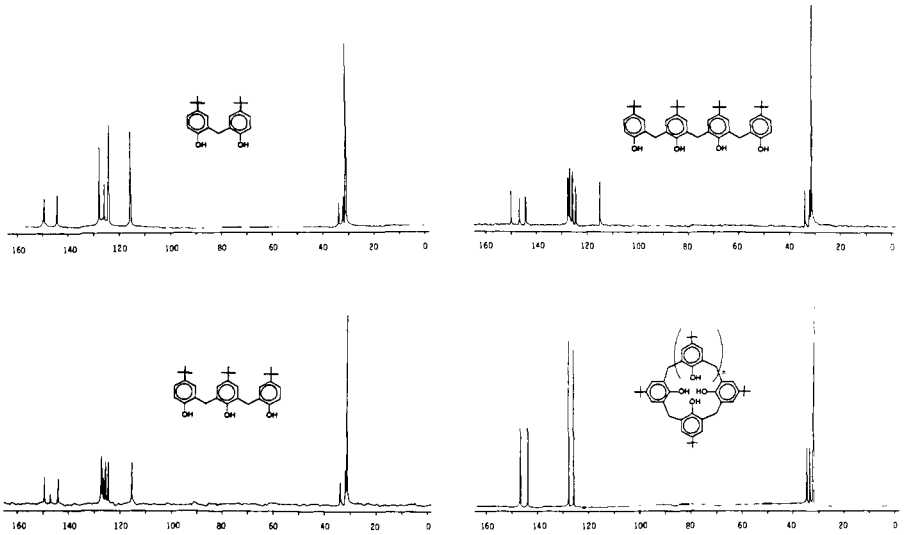

Figure 1. ^{13}C NMR spectra of linear oligomers and a cyclic oligomer from the condensation of *p-tert*-butylphenol and formaldehyde.

Book Reviews *

ETO Multicenter Molecular Integrals. Edited by C. A. Weatherford (Florida A&M) and H. W. Jones (Florida A&M). D. Reidel Publishing Company, Boston, MA. 1982. xvii + 186 pp. $37.00.

This volume contains the Proceedings of the First International Conference held at Florida A&M, August 3–6, 1981. The subject was usage of the ETO (exponential-type-orbital) for the multicenter integral problem, and this was addressed in broadest terms. As far as the multicenter problem is itself concerned, five articles (Steinborn, Silverstone et al., Michels, Harris, and Guseinov) represent efforts by groups who have devoted a large part of their efforts for many years toward different approaches to solving this problem. Most remaining articles address preliminary topics, such as translation formulae and expansion functions, while that of Pitzer recounts his considerable experience with spherical harmonic expansions. Two of the articles address topics that may be related to the multicenter problem.

The volume is most useful as a summary of ongoing effort, which is as it should be for this Proceedings. It is clear that the main problem remains unsolved and efforts toward solution have been greatly reduced because of the successful alternative, Gaussian orbitals, which some feel may always be most efficient. Clearly, workers in the field face an extremely difficult research problem plus an attitude among many colleagues that the problem is largely uninteresting. Support is therefore scant (only several of the 15 articles received other than institutional support, and the latter were largely funded by foreign countries), and this is in fact eloquently addressed in the article by Randic. However, the appearance of this volume and the sponsorship of the Conference by various US agencies offers the hope for some general recognition that this extremely difficult problem is nevertheless interesting and worthwhile. For this, the editors are to be commended.

Walter England, *University of Wisconsin—Milwaukee*

Comprehensive Treatise of Electrochemistry, Thermodynamic and Transport Properties of Aqueous and Molten Electrolytes. Volume 5. Edited by B. E. Conway, J. O'M. Bockris, and E. Yeager. Plenum Press, New York. 1983. xvii + 472 pp. $49.50.

This is Volume 5 of the title treatise, but it stands alone as a reference work on the physical chemistry of ionic solvation, activity, conductance, protic media, and molten salts. The preface states that the book "covers several main topics in the field of physical chemistry of electrolytes that are of interest in the various broader areas of electrochemistry treated in other volumes of this treatise". Each of the five chapters attempts to provide a blend of the fundamental theory pertinent to the topic with a substantial body of experimental results that can now be understood in the context of that theory.

Desnoyers and Jolicoeur introduce ionic solvation with special emphasis on aqueous solutions. In addition to a discussion of the classic

*Unsigned book reviews are by the Book Review Editor.

thermodynamic and transport properties, they include infrared, NMR, and other spectroscopic data that provide new insights into the kinetics and structure of ion–solvent interactions. This chapter concludes with a summary of the theoretical descriptions of solvation now in use and under active development.

Conway has written a clear and comprehensive chapter on activity and ion–ion interactions. The first third describes the Debye–Hückel theory and many extensions and improvements that have been made since its introduction in 1923. The middle one-third deals principally with the effects of ion solvation on activity and the final third with short-range interactions—ion pairing. In both, theory and experimental results are closely integrated.

After an historical introduction to advances in the theory of conductance during this century, Justice presents a thorough derivation of the Onsager theory of electrolyte solution conductance and compares various approximate solutions to the continuity equations. In its second half, this chapter discusses recent developments and their comparison with experimental data. Prominent here is a discussion of computer methods of finding the best parameters of a theoretical equation that fit the conductance data.

The volume concludes with two short chapters. Lengyel and Conway discuss experimental evidence for the structure of proton complexes (principally in water) and data on the rates and mechanisms of proton-transfer reactions in homogeneous solution and at electrode surfaces. Papatheodorou summarizes the developments of the field of structure and thermodynamics of single-component molten salts and of multicomponent salt mixtures.

While the intended audience is electrochemists, this work should be an excellent reference also for spectroscopists, separations chemists, and others interested in the physical behavior of electrolyte solutions.

Larry B. Anderson, *The Ohio State University*

Electrochemistry. Senior Reporter: D. Pletcher (The University of Southampton). The Royal Society of Chemistry, London, England. 1983. x + 252 pp. $69.00.

This Specialist Periodical Report, Volume 8 in the Electrochemistry series, is comprised of chapters that review the "recent literature" (through 1981) in five areas: the electrochemistry of porous electrodes, electrode processes in molten salts, the electrochemistry of transition-metal complexes, the electrochemistry of oxygen, and synthetic aspects of organic electrochemistry. Each of the chapters is well written and most are very well referenced. The Senior Reporter's selection of topics is quite timely and reflects current areas of intense research activity. Particularly strong are the reviews of the electrochemistry of oxygen and of synthetic organic electrochemistry. In the former, the review is couched in terms that make it interesting and very useful reading for electrochemists, biochemists, inorganic chemists, and other investigators of oxygen electron transfer processes. The organic electrochemistry chapter focuses on synthetic aspects of the area and the literature of the 1976–1981 period is reviewed. Both the physical quality of the monograph and its contents are consistent with prior volumes in the series; it is hoped that the Senior Reporter's desire to again offer these Specialist Periodical Reports on Electrochemistry on an annual basis will be realized.

Henry N. Blount, *The University of Delaware*

Mechanical Properties of Solid Polymers. Second Edition. By I. M. Ward (University of Leeds). John Wiley & Sons, New York. 1983. xv + 475 pp. $54.95.

The new edition of this fine text will be especially useful to advanced students in materials science and those in other research areas who need an authoritative introduction and review of this important field. The extensive use of figures and bibliographic notes, together with a very clear and concise style of writing, make this book an excellent introduction to the great body of information it concerns. According to the preface of the first edition, this book was intended to be used as a textbook for graduate-level classes. Certainly this would still be an appropriate use for the second edition, but the absence of problems to accompany even the first few chapters would tend to limit its use to that of a supplementary text. The lack of an extensive index would also seem to make it somewhat less useful as a textbook or reference volume.

The first eight chapters are largely didactic and virtually identical with those in the first edition. The remaining four chapters have been considerably modified from the first edition, mostly by including reviews of the literature from the last few years. These later chapters are concerned with the following topics: nonlinear viscoelasticity, anisotropic and yield behavior, and fracture studies. These chapters will be principally useful to the polymer scientist or rheologist and less so to the physicist or chemist interested in the fundamentals of polymer behavior. The book is filled with valuable information and phenomenological concepts, but the discussions of properties from a microscopic view are largely qualitative. The chapters on instruments and viscoelastic properties would have benefitted from a more comprehensive introduction to acoustic wave-propagation methods as well as some mention of the techniques of neutron and light scattering, which recently have contributed enormously to our knowledge and models of the microscopic properties of polymers.

In summary, this new edition continues to represent an excellent introduction and review of the vast body of data and phenomenological mechanics concerned with solid polymers.

David B. Fenner, *University of Santa Clara*

***Ab initio* Molecular Orbital Calculations for Chemists. 2nd Edition.** By W. G. Richards (Oxford University) and D. L. Cooper (Harvard-Smithsonian Center for Astrophysics). Clarendon Press, Oxford University Press, New York and Oxford. 1983. viii + 116 pp. $16.95; £8.95.

The first edition of this book was very successful as an introductory book for students and research workers interested in using ab initio calculations and not willing to spend months learning the basis. This second edition has the same goal and will certainly meet the same success.

This well-written book should be considered as a manual for the numerous ab initio programs available. Without unnecessary mathematical developments, it describes most of the notions and jargon used in this field in simple words.

The authors discuss the SCF methods and the closed- and open-shell calculations and describe the use of orbital energies to ionization and excitation. Two chapters are devoted to polyatomic molecules. They have in particular the excellent idea to explain typical input and output data. More advanced methods are described in the chapter on correlation.

In summary, a good small book, especially useful to help nonspecialists doing their own calculations or those who would like to understand the research done in that field.

O. Eisenstein, *University of Michigan*

VLSI Electronics Microstructure Science. Volume 5. Edited by N. G. Einspruch. Academic Press, New York. 1982. xii + 404 pp. $54.00.

VLSI stands for Very Large Scale Integration, the art of packing large numbers (>10 000) of small transistors (<10 μm) on a silicon surface. VLSI lies at the heart of today's overwhelming proliferation of computer technology. The cost/device, reliability, packing density, and speed and power improvements in solid-state electronics have all been growing at a rate of 50–100% per year for the past 10 years, and show no signs of slowing down to any great extent. This series of volumes explores in some depth the engineering and economic aspects of VLSI technology, and to a lesser extent some of the chemistry involved.

The chemistry of integrated circuit technology can be broadly grouped into three areas: photoresists, etching processes, and the production and controlled doping of ultrapure silicon. What chemistry is found in this volume focuses mainly on the last of these, i.e., materials science, solid-state chemistry, and the management of crystal lattice defects.

Included in this volume are (among others) chapters on Silicon Material Properties for VLSI Circuitry; Nanometer-Scale Fabrication Techniques; Materials Science, Chemistry and Physics at Small Dimensions; and Quantum-Mechanical Limitations on Device Performance. Each chapter consists of a review with current references (through 1981).

Kurt W. Hillig II, *University of Michigan*

Encyclopedia of the Terpenoids. By J. S. Glasby (ICI Organics, Limited). John Wiley and Sons, New York. 1982. Two Volumes. 2646 pp. $530.00.

The two handsome volumes of this Encyclopedia bear a resemblance to the Compact Edition of the Oxford English Dictionary, and the comparison is in some ways quite appropriate. A survey of the literature of the terpenoids has been carried out from early years to the end of 1979 and more than 10 000 compounds are listed in alphabetical order. There are usually four listings per page. A listing comprises a compound's name, molecular formula, molecular weight, physical constants (melting or boiling point), biological source, crystal habit and crystallization solvent, and the key references for the determination of structure, chemical study, and synthesis (if the compound has been synthesized). We thus obtain in a few lines a summary of the compound's history and chemical investigation. The structure appears beside these data.

The value of such an encyclopedia lies first in its facilitation of literature searches. Second, it allows organic chemists to survey the enormous field of terpenoid chemistry for new research areas, whether they be subjects for further chemical or biological study or targets for total synthesis.

The interpretation of the scope of the term "terpenoids" is usefully broad. There have been included monoterpenoid alkaloids like yohimbine (although not such variants as uleine) and the diterpenoid aconite and

related alkaloids. There are also included some straight-chain insect pheromones which are not clearly isoprenoid. Occasionally purely synthetic compounds are included because of their general relevance to related natural products, e.g., 9-methylenebicyclo[4.2.1]nonane. The listings are strictly alphabetical, so that the section under "I" carries many "iso-", listings which owe their proximity to each other to etymology rather than to chemical relationship.

A worthy job has been done in selecting compounds and references, and I found very few errors in the sections I explored in depth. The drawings of the structures are clear, stereochemically informative, and esthetically pleasing, and the book is well produced.

At the end of the book there is a formula index and a classification of a number of the compounds according to biological activity and significance.

This monumental work will be essential for reference libraries in institutions performing terpenoid-related research. It will also be a valued possession in a personal library.

Philip W. Le Quesne, *Northeastern University*

Diarrhea and Malnutrition. Edited by L. C. Chen (Ford Foundation) and N. S. Scrimshaw (MIT). Plenum Press, New York and London. 1983. XV + 318 pp. $39.50.

This book is the result of a workshop in Bellosio, Italy, in 1981 in which a representative group of leading investigators in diarrheal and nutritional research gathered to discuss the epidemiology of Third-World diarrheal disease, its interrelationship with malnutrition, and the appropriate policy for prevention, control, and research.

The book is an edited series of papers given at the conference and therefore suffers from the typical "start-stop" repetitions found in publications taken from meetings. Otherwise, the issue of diarrheal disease and its breakthrough treatment with simple cheap oral rehydration therapy, the overwhelming importance of breast-feeding in place of commercial powder milk formulas (which most Third-World mothers are incapable of preparing correctly), and continued feeding during the acute phase of diarrhea are well emphasized. Prevention of the transmission of diarrheal disease, especially through environmental improvements, is mentioned but underemphasized, especially since the UN has declared this the International Decade of Drinking Water and Sanitation.

F. DeWolfe Miller, *The University of Michigan*

Kirk-Othmer Encyclopedia of Chemical Technology. Third Edition. Volume 23. Edited by M. Grayson and D. Eckroth. John Wiley and Sons, Inc., New York. 1983. xxvi + 979 pp. $180.00.

There are 32 entries in this volume, and as usual for this work, each is a self-contained essay or review written for the professional but not necessarily expert reader. The subjects are in alphabetical order, from Thyroid and Antithyroid preparations to Vinyl polymers. Several elements (tin, titanium, tungsten, uranium, vanadium) and their compounds fall in this section. Organic subjects include toluene, triphenylmethane dyes, urea, urethanes, uric acid, and vanillin. Some topics, such as Tire cords, Tool materials, and Veterinary drugs represent the applied side of chemistry, and other subjects, such as Trademarks and copyrights, and Transportation, represent nonchemical subjects of importance to chemists. All reviews have the usual extensive bibliographies, which are well balanced between primary publications and reviews, and between fundamental literature and patents and technological journals. Errata sheets for earlier volumes come with this one; the number of corrections is quite modest.

Small Ring Heterocycles. Part 2. Azetidines, β-Lactams, Diazetidines, and Diaziridines. Edited by A. Hassner. John Wiley and Sons, Inc., New York. 1983. xi + 656 pp. $175.00.

The chemistry of four-membered heterocyclic rings was relatively neglected until the discovery of the azetidinone (β-lactam) structure in penicillin, and even long after that, the chemistry of other types of azetidines lagged behind. However, as Professor Hassner notes in his preface, the subject has been rapidly growing during the past 20 years and now fills nearly an entire book. A chapter on diazirines and diaziridines is included in the present volume because of their relationship to the diazetidines.

Azetidines are reviewed by James A. Moore and Rita S. Ayers in a chapter that could stand as a book by itself. It is a staggering compilation, with 36 tables and 487 references. Of similar magnitude is the chapter on synthesis of β-Lactams, by Gary A. Koppel. The great interest in this subject, attested to by the 302 references, is of course derivd from the pharmaceutical and biological importance of penicillins and cephalosporins. Reinhard and Henri Ulrich have contributed the chapter on four-membered rings containing two nitrogen atoms, and Harold Heine has provided the review of diazirines and diaziridines. These compounds have fascinating chemistry, but they have not been so energetically studied as their relatives having only a single nitrogen.

Easy access to information is provided by good author and subject indexes. The references themselves are mercifully set in what used to be normal form, with initials before names rather than after them, and the sequence volume, page (year) for the journal citations. Those who are prone to hiccups when reading the inverted names in many current journals will find blessed relief in this book.

The high quality of this volume is typical of the series. It would be even higher if the authors had mentioned the date at which their surveys of the literature ceased. The statement "none of the...diazetes are known to date", for example, leaves one guessing, when the date is not defined.

Introduction to Photoelectron Spectroscopy. By P. K. Ghosh (Indian Institute of Technology Kanpur). John Wiley and Sons, New York. 1983. x + 377 pp. $55.00.

To quote from the preface, "This text is intended to be useful to anyone who wants to have an idea about the subject. In particular, it should be helpful to...students of physics, chemistry, and materials science as a concise view of the subject to date...The chief purpose of this text is to provide a general impression of the field." This book, an expanded version of a 1977 text, succeeds in achieving these goals. Ghosh covers the major areas of photoelectron spectroscopy, striking a good balance between emphasis on core-level and valence-level spectroscopies. There are chapters on the chemical information about free molecules to be obtained from both techniques, on the use of photoelectron spectroscopy to study solids and surfaces, on photoionization cross sections and the quantitative aspects of photoelectron spectroscopy, on angular distributions of photoelectrons from both free and adsorbed molecules, and on experimental techniques. The writing is clear and it is apparent that Ghosh has acquired a thorough grasp of many aspects of the field. Although detail is sometimes lacking, a bibliography of 750 references provides a guide to further information. The bibliography is annotated so that it is possible to tell the subject of a reference without returning to the text. Particularly useful is a list of 28 books and conference reports and 56 review articles.

As will always be the case, it is possible to find sins of commission and omission. As examples, the core ionization energy of N_2 is not 1000 eV, as shown in Figure 1.2, but 410 eV, no units are given for Table 1.1, and the discussion of electron detectors in Chapter 2 is inadequate. These, and a number of other similar problems, are relatively minor. The main weakness of the book is that exhaustive review of the literature seems to have stopped in 1979. Three-fifths of the references are prior to 1978, one-fifth are from 1978, and only one-fifth are from 1979–1982. As a result there is little or no coverage of many current topics; for instance, surface structure of adsorbates is given only 2 pages.

On the whole, I believe this is a book that I will be pleased to have on my shelves. Although it is not encyclopedic, it will provide an introduction to a wide variety of problems in photoelectron spectroscopy, and thanks to its extensive references it will point the way toward further information (even though not always to the most recent information).

T. Darrah Thomas, *Oregon State University*

Information Theoretic Indices for Characterization of Chemical Structures. By D. Bonchev (Higher School of Chemical Technology, Bulgaria). Research Studies Press (John Wiley & Sons), New York. 1983. xiv + 249 pp. $54.95.

This book is concerned with the use of information theory and topological indices for several chemical applications. It contains six chapters. The first two chapters introduce the readers to the information theoretic approach. The third chapter deals with the atomic information indices, while the fourth and fifth chapters discuss information indices pertinent to molecules. The last chapter contains several applications of these indices to isomer discrimination, aromaticity, synthetic strategies, specificity of chemical reactions, and structure–property correlations. This book is well written with a number of very interesting applications, ranging from isotopic abundance to thermodynamic properties of molecules. The use of information indices in chemistry goes back to H. Wiener, who introduced an information theoretic index now well known as the Wiener index. In recent years the number of these indices has grown exponentially. D. Rouvray, one of the authorities in this field, points out that there are some 50 indices at present. Thus, a comprehensive volume summarizing the various topological indices would be quite valuable. This book has described several of these topological and information theoretic indices. The author has provided comparative tables of some of these indices (e.g., pp 156–157). However, he has not given a critical analysis of various indices and has not stated for what purpose these different indices are best suited. For example, the six indices in Tables 10 and 11 do not predict the same correlation, and hence, it is not clear looking at these tables which of those indices is more suitable for a given physical property. If there is a criticism on some of

these topological indices, it would be that the basis for the correlation of the indices with the physical properties of the system under consideration is not entirely clear. In that sense, some of these indices are empirical. Nevertheless, this is an excellent book on this topic. This book would be valuable for research workers in several areas, such as chemical graph theory, drug design, synthetic strategies, QSAR, chemical dynamics, etc. There is no doubt that this book would invite new workers to this topic and promote further research in these areas.

K. Balasubramanian, *Arizona State University*

Biochemical Systematics and Evolution. By A. Ferguson (Queen's University, Belfast). John Wiley and Sons, New York. 1980. ix + 194 pp. $42.95.

This could be a useful book for biologists who want to apply simple biochemical techniques—especially starch-gel electrophoresis—to studies in the area of population and systematic biology. It may also be used by teachers of introductory biology at the secondary college level as an aid in devising simple but effective laboratory exercises. The biochemistry discussed is at a rudimentary level, and no prior experience in that field is assumed.

The principal theme of the book is electrophoresis and its many applications, something that will doubtless continue to be of immense usefulness for a long time to come. For the systematic biologist, the ease with which certain polymorphic characters can be unequivocally determined on a simple starch gel verges on the marvelous. The author is himself experienced in this area and writes with the zeal of a confirmed advocate.

The book suffers from a degree of unevenness, switching as it does from detailed chapters on such topics as the polymorphism of phosphoglucose mutase in muscle extracts from Atlantic eels as demonstrated on starch gels at pH 8.6 to very general chapters describing immunology, biochemistry, and evolution. In the one case it is more like a handbook for fishery biologists and in the other an introductory textbook of biology. Some readers may find this approach effective, but I had trouble making the connection between the particular and the general. This is not a book for chemists.

R. F. Doolittle, *University of California, San Diego*

Macrocyclic Polyether Syntheses. By George W. Gokel and Stephen H. Korzeniowski. Springer-Verlag, Berlin, Heidelberg, and New York. 1982. 410 pp. $115.00.

The chemistry of crown ethers and cryptands has mushroomed during the past decade and now encompasses such diverse areas as chemical catalysis and facilitated transport in biological systems. This book is a comprehensive compilation of macrocyclic polyether syntheses that have appeared in the literature through 1981. A brief historical introduction and discussion of nomenclature comprise the first chapter, while the second chapter describes the "template effect" which facilitates polyether synthesis under conditions of normal dilution. The subsequent six chapters describe synthetic strategies to particular classes of macrocycles and include comprehensive information on the following types of macrocycles: oxygen macrocycles, azacrowns, crown esters and polyether lactones, miscellaneous macrocycles, open-chained equivalents of crown ethers, cryptands, and related polycycles.

This book is well written, with a heavy orientation toward the organic chemist. The descriptions of experimental and synthetic strategies to each class of macrocycle will be particularly useful. The book also includes 89 tables, which are arranged according to the type or sub-type of macrocycle, and include structures, some physical data, yields, and references. These will be valuable to any chemist needing to prepare macrocyclic polyethers. The only possible drawback to this book is the omission of substantive discussion pertaining to applications of these interesting molecules. This, however, is easily understandable in view of the breadth this field now encompasses.

Grant A. Krafft, *Syracuse University*

Inorganic Chemistry: Principles of Structure and Reactivity. By J. E. Huheey (University of Maryland). Harper and Row, New York, NY. 1983. xvi + 936 + A-110 pp. $33.95.

The third edition lives up to the standard of excellence set forth in the first two editions. Several organizational changes were made, which include the following: (i) a comprehensive chapter (131 pages) entitled Bonding Models in Inorganic Chemistry, formed from the two chapters in the second edition that covered ionic bonding, nature of solid, covalent bonding—theory and energetics—as well as measurements of the charge distribution in molecules; and (ii) a short chapter entitled the Solid State.

The treatment and coverage given to nonaqueous solvents, acid–base theory, and coordination chemistry continue to be outstanding, and recent advances in the latter two areas have been incorporated into this edition. Some other noteworthy and timely additions include limited presentations on conductivity in ionic solids, photochemistry of coordination compounds, the angular overlap model, acid rain, and Latimer diagrams. Added emphasis has been given on organometallic catalysis, hydrometallurgy, and inorganic chemistry in biological systems. Additional stereoviews have also been included in the appendix. Also, students will appreciate the change to non-glare paper.

While new and timely topics have been included in this edition, it is disappointing that an expansion of the descriptive material for both non-metals and transition metals was not realized. This could have been done without resorting to an encyclopedic type text. A more complete coverage of (1) symmetry and symmetry operations and (2) the solid state—semiconductor theory and application—would have been in order. Also, it was difficult to see how the organizational changes discussed earlier represent a better approach to these topics than was given in the second edition.

James Huheey's book is an exciting and modern presentation of inorganic chemistry, particularly as seen from a bonding and structural viewpoint and I recommend it highly.

Gary L. Gard, *Portland State University*

Excited State Lifetime Measurements. By J. N. Demas (University of Virginia). Academic Press, New York, NY. 1983. vii + 273 pp. $45.00.

Begun as a series of research group lectures, this book is an accessible, practical introduction to the spectrum of methods available for quantitative determination of the lifetimes of electronically excited states. The author begins with a survey of applications of lifetime measurements, touching upon quantitative analysis, fluorescence labeling in macromolecular science, condensed-phase photophysics, and solar energy conversion. Though brief, this section is well referenced. It is followed by a short discussion of methods, which concentrates on time-resolved luminescence, but also considers conventional as well as picosecond laser pump-probe techniques. This section's stated purpose is to supply a physical basis for the discussion of mathematical methods for data reduction that follows. In places, however, it digresses to present almost as much detail as contained in the more specialized experimental chapters at the end of the book. The section on data reduction and mathematical modeling begins from the point of view of very simple systems: single-component first-order decay, Stern–Volmer kinetics, and multicomponent decays. Considered next are more complex cases including serial decay and Forster energy transfer with real, finite excitation profiles. A comprehensive discussion of least-squares methods follows beginning with linearizable functions, then turning to nonlinear least-squares methods. This section is particularly well done, clearly explaining the principles by which the various commonly used methods work, and pointing out possible pitfalls. A good portion of this book is devoted to the special problems that arise when the excitation pulse width is comparable to the lifetime of the system. The topic is introduced in terms of convolution integrals. The real-time response of various detection systems is considered, and then several deconvolution methods are discussed, including phase plane, the method of moments, Laplace and Fourier transform, and nonlinear least-squares (iterative reconvolution). The book concludes with more detail on experimental instrumentation and special error sources. With its good collection of references (more than 200, 30% of which are 1980–1983) and its appendices, which contain computer programs (BASIC) for nonlinear least-squares and phase-plane deconvolution, this book offers a well-balanced introduction to the general problem of obtaining and interpreting excited-state lifetimes.

Edward R. Grant, *Cornell University*

Electron Spin Resonance. Volume 7. By P. B. Ayscough (University of Leeds). The Royal Society of Chemistry, Burlington House, London. 1982. xvi + 431 pp. $61.00.

This seventh volume of "Electron Spin Resonance" reviews literature published between December 1979 to May 1981. Thirteen chapters are included. The title of the chapters reflect the topics covered. There is no subject index; an author index is helpful.

The first chapter gives quite an extensive review of Applications of ESR in Polymer Chemistry (by Hill, O'Donnell, and Pomery). The major portions are organized under the following headings: Polymer Degradation and Polymerization-Homogeneous Chain Growth. Useful suggestions and ideas are given, making this chapter quite helpful to the non-expert. A. Hudson has reviewed Theoretical Aspects of ESR and the topic Triplets and Biradicals. A. L. Porte is responsible for a chapter on Transition-metal Ions which is packed with references. Also, an interesting review on advances in Experimental Techniques is included. New books and conference proceedings are given with comment. M. C. R. Symons' chapter is written in a "user friendly" manner and should perhaps have been titled ESR of atoms and small molecules, an area that Symons has enjoyed for years. This contributor is not afraid to state his

personal perferences (e.g., Gauss instead of milli Tesla) and discuss areas of endeavor where his theories have predicted the wrong results. The topics covered range widely, from spin trapping in biological reactions to ESR spectra of gas-phase radicals. The two complimentary chapters on organic radicals, Structure by B. C. Gilbert and Kinetics and Mechanisms of their Reactions by P. B. Ayscough, are a "must" on the reading list for physical organic free-radical chemists. Organic Radicals in Solids (by T. J. Kemp) is also interesting. The area of Spin Labels is presented in three chapters: Synthetic Macromolecules (by A. T. Bullock), Biopolymers (by B. H. Robinson), and Biomembranes (by C.-S. Lai). The reviews seem quite extensive and well-referenced. The last two chapters are on Metalloproteins by N. J. Blackburn and Applications of ESR in Medicine by N. J. F. Dodd.

In summary, this book is quite a readable review of ESR literature for this period. The contributors should be thanked for providing such good reviews for ESR practitioners like myself.

Edward G. Janzen, *University of Guelph*

The Anomeric Effect and Related Stereoelectronic Effects at Oxygen. By A. J. Kirby (University of Cambridge). Springer-Verlag, Berlin. 1983. 149 pp. $51.00.

Organic chemists and biochemists who profess an interest in stereochemistry (but whose only formal contact with the "anomeric effect" occurred in their brief study of sugar conformations in undergraduate chemistry courses) are in for a treat. This small monograph examines the anomeric effect in its broadest sense, encompassing stereoelectronic effects of nonbonded electron pairs on molecular structure and reactivity.

In the first section, numerous examples of anomeric effects on structure and conformation are presented without accompanying explanation. Rationalization of the stereoelectronic basis of the anomeric effect on ground-state properties of molecules is presented in the second section. The final section examines the corresponding stereoelectronic effects of nonbonded electron pairs on transition states and, hence, upon reactivity of molecules. A comparison of the canonical and hybridized (localized) molecular orbital descriptions of the $n-\sigma^*_{C-X}$ interaction in gauche $RO-CH_2-X$ is presented in a brief appendix.

The book is highly readable; the style of writing is lively and interesting throughout. The author presents a solid case for the existence of the anomeric effect and explores its ramifications on chemical reactivity as well as on more familiar thermodynamic equilibria. The treatment is not highly theoretical; references to the results of electron-density measurements by X-ray diffraction techniques and of ab initio molecular orbital calculations are presented but discussed only briefly. Emphasis rests instead on more qualitative explanations of phenomenological manifestations of the anomeric effect and are presented in language which organic chemists will find understandable and unimposing. A total of 360 journal articles are cited in the bibliography, the most recent of which appeared in 1981.

As the fifteenth volume in Springer-Verlag's "Reactivity and Structure Concepts in Organic Chemistry" series, this short monograph upholds the tradition of excellence established by earlier volumes in the series. This book will be of interest to advanced students of organic chemistry and biochemistry as well as to persons interested in gaining a more general understanding of stereoelectronic effects on structure and reactivity. I highly recommend it.

Alan P. Marchand, *North Texas State University*

Houben/Weyl Methoden der Organischen Chemie: Erweiterungs-und Folgebände zur vierten Auflage. Band E1: Organische Phosphor-Verbindungen I. Band E2: Organische Phosphor-Verbindungen II. Edited by M. Regitz (Kaiserslautern). Series Editors: K. H. Buchel (Leverkusen), J. Falbe (Oberhausen), H. Hagemann (Leverkeusen), M. Hanack (Tubingen), D. Klamann (Hamburg), R. Kreher (Lubeck), H. Kropf (Hamburg), and M. Regitz (Kaiserslautern). Georg Thieme Verlag Stuttgart, Stuttgart and New York. 1982. Band E1: xxxviii + 972 pp. DM 980. Band E2: iii + 1156 pp. DM 1100.

My initial reflex reaction is to praise highly and recommend (to libraries!) this new volume of "Houben-Weyl", partly for the sake of historical continuity and partly for the enormous effort that has been devoted to the particular subject of Organophosphorus Compounds.

The literature pertaining to this subject has been classified and organized according to an idiosyncratic scheme which is common to both volumes E1 and E2. The first volume explains the scheme, discusses spectroscopy, and plunges right into the main classes: P(I), P(III)-coordination 1, P(III)-coordination 2, P(III)-coordination 3, P(IV)-onium salts, P(V)-coordination 3, and *parts of* P(V)-coordination 4, subclasses (a) Phosphorus-ylide and (b) λ^5 Phosphorine.

The second volume completes the coverage of class P(V)-coordination 4 with subclasses (c) *tert*-phosphane oxide, -sulfide, -selenide, -imide, (d) Phosphinic acid and Derivatives, (e) Phosphonic acid and Derivatives, and (f) Phosphoric acid Derivatives. Then on to P(V)-coordination 5 and P(VI) compounds. The main classes have subdivision α, β,... etc., based on specific structural features and then on the typical decimal classification of this Handbook. There are references to specific papers at the bottom of each page (repeated in subsequent pages) and a four-page bibliography of review articles at the end of the book [probably it is not representative of the overall accuracy that on p 911 of Volume E2, the name of one of the authors is omitted from the reference—I. Ugi, D. Marquarding, H. Klusacek, P. Gillespie, and F. Ramirez, "Berry Pseudorotation and Turnstile Rotation", *Acc. Chem. Res.*, **4**, 288 (1971)]. The bibliography is selective, not comprehensive.

This two-volume set is indeed a formidable treatise on organic compounds of phosphorus and, on the whole, it lives up to the sterling reputation and great tradition of Houben-Weyl. More specifically, its value hinges on the question: how up-to-date is it, and how thorough is the coverage? The "Erscheinugstermin" is given as November/December, 1982. The latest review in the bibliography appeared in 1982. In the page references most of the latest references are to articles which appeared in 1979, although I spotted some papers in 1980 and 1981. The reader will save much effort consulting this source, but I would rely on it only through 1979. I cannot generalize on the coverage, but in most topics it seems excellent to me. Fourteen authors have contributed to Volume E1 and nine to Volume E2; the main Editor, M. Regitz, has done an outstanding job in achieving a consistent style. The uninitiated reader will benefit a great deal if he approaches any of the subjects by first consulting these volumes. The specialist will undoubtedly be more critical and demanding. As an example, I consulted section (α10) Phosphodiesters (pp 498–598) for a survey of methods for the synthesis of phosphodiesters, in particular those applicable to two different complex alcohols. I did not find a logical progression, along mechanistic or structural lines, in the presentation of strategies to solve this problem, and several published methods were not mentioned. However, on the whole, I found this section quite useful and the literature references invaluable.

Fausto Ramirez, *State University of New York at Stony Brook*

Colloid and Interface Chemistry. By Robert D. Vold and Marjorie J. Vold (University of Southern California). Addison-Wesley Publishing Company, Inc. Advanced Book Program/World Science Division, Reading, Massachusetts. 1983. XXV + 694 pp. $110.00.

Robert and Marjorie Vold have devoted their lives to the study of colloids and interfaces. This monumental book brings together the richness of their experience and the beauty of their scholarship and pedagogy. The discussions cover the various interfaces, thin films, and colloidal phenomena, as well as the properties of macromolecular systems, micelles, and membranes. Principal emphasis is on theory and basic concepts. Nevertheless, experimental techniques, data, and applications are indicated throughout.

Although the authors deal with many difficult subjects and challenging problems, their writing style is pleasantly informal. However, there are few wasted words and the volume is packed tightly with important and interesting material.

The Subject Index of only 8 pages seems much too limited for a book of this size filled with valuable and varied information. However, the Contents section with many subheadings for each of the 19 chapters compensates in part for the brevity of the index.

In the Introduction, a detailed outline (chapters and sections) is presented for a possible course in Colloid and Interface Chemistry. The course is thoughtfully designed for seniors and graduate students who are well prepared in physical chemistry, physics, and mathematics. In addition, at the end of each chapter there are stimulating questions and problems as well as appropriate references to the literature. The latter include carefully selected seminal papers in many fields.

Not unexpectedly there are some minor errors and inconsistencies in the first edition of a work of this size. Undoubtedly these will be corrected in a subsequent edition. More importantly, there are errors of omission. The basic monolayer-transfer studies of Blodgett and Langmuir are almost completely ignored (one brief reference) although the technique has been used in numerous ways to shed light on thin and thick film structure and behavior. Equally conspicuous is the omission of a general reference to "Physical Chemistry of Surface Films" by W. D. Harkins, which contains basic contributions of the Harkins school to many of the fields under discussion.

Electron microscopy has proved to be such a powerful tool in the study of colloids, surfaces, and thin films that more attention might be given the results of such studies. Radiotracer techniques in adsorption studies are also given little space. The preparation and properties of liposomes, an important subject in surface and membrane chemistry, is apparently omitted.

In spite of these relatively minor defects, the Vold and Vold volume will be a valuable addition to the library of students and researchers

interested in the physics and chemistry of surfaces. The book should be on the desk of everyone actively working in the broad field of colloids and interfaces.

Herman E. Ries, Jr., *The University of Chicago*

Encyclopedia of Shampoo Ingredients. By A. L. L. Hunting. Micelle Press, Inc., Cranford, NJ. 1983. xii + 467 pp. $75.00.

This reference volume fills a gap in the needs of the shampoo formulation chemist and will be useful to both experienced and novice shampoo formulators. It consists of 126 pages of introductory matter covering such topics as nomenclature, shampoo pricing, and copies of the ingredient labels from 438 shampoos found in a survey of the New York Tri-State area during the 12-month period from September 1980 to August 1981. This survey provides the basis for the 438 specific ingredients described in the encyclopedia. A large number of general terms are also described, such as amphoteric surfactants, foam boosters and stabilizers, pearling agents, opacifiers, and surfactants, all in alphabetic listing.

Each specific ingredient is described in a useful manner by the CTFA name, chemical formula (where possible), reason for use, safety and physical data, normal usage level, other general information, those shampoos in the survey which contained this ingredient, and an arbitrarily defined "relative important factor", which includes as input the number of shampoos which contain that ingredient and its average position in the ingredient listing.

Much of the information provided has been obtained from either supplier's literature or technical magazines and therefore must be considered from that viewpoint. Nevertheless, this encyclopedia should prove to be helpful to the formulation chemist or to anyone involved in research, development, or marketing of shampoo products and may stimulate the writing of analogous volumes for other important consumer products.

Clarence R. Robbins, *Colgate-Palmolive Co.*

Handbook of Glass Data. Part A. Silica Glass and Binary Silicate Glasses. By O. V. Mazurin, M. V. Streltsina, and T. P. Shvaiko-Shavikovskaya (Institute of Silicate Chemistry of the Academy of Sciences of the U.S.S.R.). Elsevier Scientific Publishing Co., Amsterdam, Oxford, and New York. 1983. xv + 669 pp. $149.00.

This book is the English modified version of the Russian book (properties of glasses and glass-forming melts), which first appeared in a series of volumes (Volume I–Volume IV) between 1973 and 1981. It is the first in a four-volume series. This book (Book A) covers the physical property data for both one-component (SiO_2) and binary silicate glasses. The data are classified by properties. Their sequence is as follows: glass formation; crystallization; density; thermal expansion and other thermal properties; optical properties; viscosity; elastic properties and internal friction; strength; surface tension; chemical durability; electrical properties; diffusion; and volatilization and magnetic properties. The experimental data are tabulated in chronological order, they are recorded from glasses formed by cooling the melts, and they do not contain any information on the properties of amorphous films obtained by deposition from a vapor phase. The book provides author, subject, and formula indexes. This book is going to be a timesaver and hand comprehensive reference book on physical properties of glass-forming melts and glasses for the glass experts.

Maher Y. Elsheikh, *The University of Michigan*

Vibrational Spectra and Structure. Volume 12. Edited by James R. Durig (University of South Carolina). Elsevier Science Publishers, Amsterdam and New York. 1983. xvi + 497 pp. $136.25.

This interesting volume contains worthwhile contributions from experienced experts in various branches of spectroscopy. Two of the six review articles are focused on studies of matrix-isolated molecules. The first of these, by B. I. Swanson and L. H. Jones, is quite exceptional and highly recommended for those who wish to gain current insight into the condensed-phase guest–host interactions of a variety of small molecules in inert matrices. The effects of rotation and libration of the guest molecules are specifically considered along with the bulk and local phonon modes of the host matrix. Special emphasis is placed on high-resolution infrared line-shape analysis as a function of temperature and local site symmetry.

The second article on this same topic, by R. L. Redington, is much more qualitative although somewhat broader in scope. However, it does discuss the vibrational analysis by means of explicit force field calculations. This meshes nicely with the work of Matsuura and Tasumi, also in this volume, on force fields for large molecules. This latter work stresses the group-coordinate method and illustrates the technique for a variety of chain molecules. An example computer program is also listed.

The vibrational spectroscopy of three-membered-ring compounds is covered in a rather lengthy article by Wurrey, Dewitt, and Kalasinsky. Compounds having both saturated and unsaturated substituents are included in their detailed presentation of the existing data. A more concise and explicit discussion of the basic approaches used in conformational analysis would have helped to tie this long article together.

Finally, two of the articles are directly concerned with the technique of Raman spectroscopy in a general sense. The first, by Hirakawa and Tsuboi, is basically a (somewhat dated) review of resonance Raman spectroscopy as it applies to the calculation of excited-state geometry from ground-state frequencies and intensities. The second article on this subject, by J. Laane, is a concise discussion of Raman difference spectroscopy. Excellent sections on instrumentation and theory are presented along with a variety of applications. This article is recommended reading for those who wish to get involved in the expanding field of Raman difference spectroscopy.

Paul M. Champion, *Worcester Polytechnic Institute*

Allosteric Enzymes: Kinetic Behavior. By B. I. Kurganov (All Union Vitamin Research Institute, U.S.S.R). John Wiley and Sons, New York. 1982. 344 pp. $64.95.

This book covers the fundamental aspects of the kinetic properties of allosteric enzymes. Several books which describe the kinetics of enzyme mechanism have been published previously and include chapters on allosteric enzymes.[1-4] However, the kinetic aspects of allosterism were not fully documented. Kurganov has reviewed extensively many aspects of allosteric enzymes. The chapters include the following: (1) Introduction; (2) Features of the Kinetic behavior of allosteric enzymes; (3) Mechanisms of allosteric interactions and models of allosteric enzymes; (4) Allosteric interactions in dissociate enzyme systems; and (5) The time factor in the functioning of allosteric ligands. Chapter 5 may be useful for practical purposes, for it contains a long list of lag-period $t_{1/2}$ of many allosteric enzymes. In addition, the table of oligomeric states of allosteric enzymes is useful, but unfortunately the dissociation constants are not described. In summary, this book will be useful to enzymologists who are interested in the control of enzyme activity. Obviously, this is a specialized text for those in this particular field.

(1) Wong, J. T.-F. "Kinetics of Enzyme Mechanisms"; Acdemic Press: London, 1975.

(2) Fromm, H. J. "Initial Rate Enzyme Kinetics"; Springer-Verlag: Berlin, 1975.

(3) Segal, I. H. "Enzyme Kinetics"; John Wiley and Sons: New York, 1975.

(4) Cornish-Bowden, A. "Principles of Enzyme Kinetics"; Butterworths: London, 1976.

Tokuji Kimura, *Wayne State University*

The Chemistry of Functional Groups. Supplement D: The Chemistry of Halides, Pseudohalides, and Azides. Edited by S. Patai. John Wiley & Sons, New York. 1983. xiv + 1867 pp. $500.00.

The two fat volumes that make up this supplement complete the first round of supplements to the main work. They include 29 chapters, which belong to three of the original volumes. The subject matter is not necessarily separated according to the original division of subjects, however; in one chapter, for example, the mass spectra of azides and halides are treated together. The largest part of this supplement is nevertheless devoted to halogen compounds.

A few of the chapters are of the "recent advances" type and serve to bring up to date such topics as the photochemistry of the carbon–halogen bond, the radiation chemistry of halocarbons, etc. Many chapters take up subjects not before treated in this series, such as the organic chemistry of astatine, xenon halide halogenations, halonium ions, etc. Azides are the sole topic of two chapters, and pseudo-halogen compounds, such as cyanates, appear to be considered only in a part of one chapter, which is devoted to structural chemistry.

The subjects are covered in the customary, almost exhaustive, manner, with critical evaluation and enormous lists of references. It is unfortunate that the editor has still not required his contributors to state the date of termination of their coverage of the literature; some of them do, indeed, give this helpful information, but too many do not. The presentation is of a high standard, and the structural formulas are clearly and tidily laid out. The index (subject only) is usefully extensive, although it has a few errors, such as Hoffman where Hoffmann is required, and some compounds are irregularly named, in such a way that the reader might not find them in the place expected. As an example, the curious name "Diphenyl-2,2-dichloroethanes" appears, but there is no entry according to the alphabetical order of substituents, "1,1-dichlorodiphenylethane" or its inverted form.