Book Reviews*

Methods of Biochemical Analysis. Volume 30. Edited by D. Glick (Stanford University Medical Center). John Wiley & Sons, Inc.: New York. 1984. vii + 377 pp. $84.00. ISBN 0-471-80276-X.

Volume 30 consists of six chapters, all following a general plan, as stated in the Preface, that promises "a discussion of the background and previous work, a critical evaluation of the various approaches, and a presentation of the procedural details of the method or methods recommended by the author" in such a way that they "will furnish the laboratory worker with the complete information required to carry out the analysis". The authors who contributed to the chapters are all invited "scientists who either have originated the methods they discuss or have had intimate personal experience with them".

Definitely, each chapter has lived up to its words.

The first chapter, the longest of them all, as it takes up about a third of the book, is titled The pH Jump: Probing of Macromolecules and Solutions by a Laser-Induced Ultrashort Proton Pulse—Theory and Applications in Biochemistry, written by M. Gutman. It describes the new, high-resolution laser-induced proton pulse method of measuring diffusion-controlled reactions of a proton with its environment, solvent, and solutes. Various aspects of this fast photochemical reaction are detailed, as is obvious from the headings of the sections (in that order): Introduction; methodology and instrumentation; kinetics of proton dissociation; detection of the proton by its reaction with the excited anion of the proton emitter; the reaction of the proton with a molecular proton detector; kinetics of protonation of high-molecular-weight structures; proton transfer on the surface of macromolecular structure; the effect of buffer on the dynamics of the proton cycle; and concluding remarks. There is a small section of appendix, and another on the abbreviations. Throughout this chapter, figures and diagrams are placed at the appropriate locations with a clear description to go with each.

The second chapter, Laser Photolysis in Biochemistry, by S. S. Chan and R. H. Austin, is closely related to the first one. It consists of eight sections (in that order): introduction; the pulsed lasers; signal acquisition techniques; cryogenic techniques; large perturbation techniques; the triplet-state probes; intrinsic photoactivations; and summary. This chapter is more suitable to those who are not already familiar with this technique, for it gives a more in-depth description of the technique. Detailed discussions on the applications of the technique in obtaining kinetic data are concentrated on three areas of biological systems: heme proteins that have photolabile ligands; proteins and DNA with use of triplet probes; and special proteins that are photochemically active.

The third chapter, Density Gradient Electrophoresis of Mammalian Cells, by A. Tulp, describes a simple, low-cost method of separating mammalian cells by density-gradient electrophoresis using a column. After a brief introduction and a short section on the history of electrophoresis, the theory and principles of the method are described, followed by a long section describing the method, interspersed with clear illustrations and evaluation of the apparatus and techniques. Finally, a section on the applications of this method on lymphoid and hemopoietic cells, together with some other cell types is presented. A variation of this technique, isoelectric focussing of cells in density gradients, is also presented with a table of application results wrapping up the whole chapter.

The next chapter, Quantitation of Lipid Transfer Activity, by J. R. Wetterau and D. B. Zilversmit, is concerned with quantitating the lipid transfer activity of a protein. The introduction section consists of a list of purified lipid transfer proteins, followed by a section on general considerations for assaying transfer and/or exchange activities. The next section describes various separation assays, followed by a section on spectroscopic assays. The final two sections are concerned with the factors that might affect the assay.

Chapter five, by O. Barzu, Measurement of Oxygen Consumption by the Spectrophotometric Oxyhemoglobin Method, described the use of oxyhemoglobin method for measuring oxygen consumption in biological systems. After expounding the principles and the techniques involved, a section on the applications, evaluating the advantage of this method over other analytical procedures, follows.

The final chapter, group-authored by R. L. Berger, T. R. Clem, V. A. Harden, and B. W. Mangum, is titled Historical Development and Newer Means of Temperature Measurement in Biochemistry. It consists of seven sections, namely: introduction; history of thermometry; temperature scales and standards; methods of measuring temperature; modern electronic methods of sensor measurements; recent applications of modern temperature measurement methods in biochemistry; and conclusions and forecasts. This is an interesting review on the development of thermometry, with emphasis on the modern electronic device and the application of the modern temperature detection methods in biological studies.

Chapters 2 to 6 take up pretty much about 45 pages each. Following the tradition of the series, the chapters are all written by authoritative scientists in their specialized areas, and they follow a general plan as stated before. The reviews are all superbly presented.

Chow-Eng Low, *National Cheng Kung University, Taiwan*

Coal Liquefaction Products. Volume 1. NMR Spectroscopic Characterization and Product Processes. Edited by Harry D. Schultz (METC/DOE, Morgantown, West Virginia). John Wiley & Sons, Inc.: New York, NY. 1983. xii + 415 pp. $65.00. ISBN 0471-89232-7.

This volume contains contributions by some very well known investigators in the area of fossil fuel research. Its nine chapters cover 212 pages. The remaining pages (51% of the book) are hydrogen NMR spectra of coal tar pitch oils, asphaltenes, and synthoil. These spectra are outdated, of poor quality, misinterpreted, and lack editorial uniformity.

Chapter 1, on coal liquefaction processes, by Dr. J. A. Kleinpeter, is a good overview of the various coal liquefaction processes. Chapter 2 discusses the hydrocarbonization liquefaction process in essentially one page and should have been eliminated or expanded upon. Chapter 3, on NMR theory, by Dr. D. Brinkman, is much too mathematical and irrelevant to the theme of the book. It would have been much better to have a chapter which defined the basic NMR concepts in terms of qualitative identification of fossil fuel spectra and techniques used to obtain quantitative NMR data, especially for pulse experiments.

Chapter 4, written by the very well known investigators Drs. C. E. Snape, W. R. Ladner, and K. D. Bartle, discusses much too concisely the structural characterization of coal extracts from proton and carbon-13 NMR data. It would be better to refer to their original papers. The structural characterization of coal tars derived by flash pyrolysis is described and reviewed in Chapter 5 quite extensively by Drs. P. J. Collin, R. J. Tyler, and M. A. Wilson. Drs. T. Yokono and H. Marsh discuss in Chapter 6 the use of NMR to study the hydrogen transfer reactions during the carbonization of coal and pitches.

Chapter 7, written by H. Schultz, discusses the analysis of coal tar pitch oils, and Chapter 8, written by H. Schultz and J. E. Graham, discusses the characterization of coal asphaltenes. Both are poorly written and poorly edited. These chapters are organized as if for a journal publication, listing, for example, extensive instrumental conditions. Table 7.1 compares the experimental aromatic hydrogen to aliphatic hydrogen ratios to the theoretical ratios of 27 pure compounds. The author states that these ratios agree when in fact five or more have large discrepancies.

These two chapters refer to four of the five appendices of spectra. Appendix 1 (Coal Tar Pitch Oil NMR Spectra) is never referred to in the text. The H spectra in Appendix 1 correspond to the oil elution fractions given in Table 7.4, and the structures shown on the spectra are the average molecular structures. However, it appears that some of the structures do not correspond to the NMR spectrum as given. In fact, there are no data in Table 7.4 on the spectrum and structure on page 318. It is the opinion of this reviewer that these spectra are irrelevant to the book since they are published elsewhere.

It is apparent that little editing or proofreading was done for these two chapters as well as Appendix 4 because of the numerous spelling errors, typographical errors, lack of numerical sequence to appendix references, and lack of an alphabetical listing of samples that exist. These factors tend to be irritating and give an unprofessional appearance.

Chapter 9, written by Drs. M. Lka, Y-P-Hsia and G. R. Gavalas, reviews the use of computers to select average molecular structure for fossil fuel materials from NMR data. This chapter should have been expanded.

The text on the cover jacket for this book states some very "glowing" accomplishments of this book which are misleading as judged by this reviewer. That this book will be used as a practical laboratory reference tool or to supply quality control information and NMR on-line (stream) analysis applications is doubtful. The book can be used as a brief survey of coal liquefaction processes and a supplement to but not as a text for

*Unsigned book reviews are by the Book Review Editor.

graduate or undergraduate courses in coal conversion and coal chemistry. It is not recommended for the experienced spectroscopist in coal liquefaction research.

D. A. Netzel, *Western Research Institute*

Spectrometric Techniques. Volume 3. Edited by George A. Vanasse (Optical Physics Division, Air Force Geophysics Laboratory). Academic Press: Orlando, FL. 1983. ci + 334 pp. $53.00. ISBN 0-12-710403-8.

This book is the third in a series of edited books containing invited chapters by various authors expert, in this case, in infrared (IR) spectrometry. Two of the five chapters are concerned with experimental studies (mostly using Fourier transform IR) of the earth's atmosphere (Murcray and Murcray) and Planetary Atmospheres (Hanel).

These chapters are particularly well written and well illustrated, although the latter starts a bit slowly. For those who have not seen it before, the composite of IR spectra of Earth, Mars, Jupiter, Saturn, and Titan is spectacular.

The last two chapters are largely theoretical and devoted to improving the resolution of spectroscopic data by Fourier techniques. The chapter by Kauppinen is lucid and very well illustrated. The chapter by Howard is heavier mathematically, but it explores in depth some useful new material.

The central chapter on pressure-modulated radiometry is a well-written discussion of a technique widely used in recent satellite programs. Overall, the book, like the rest of the series, is specialized so as to appeal only to a very limited audience. As a handy library reference to a body of up to date material, this book is most useful. My students will be referred to various chapters when their program needs that level of information. Printing and layout are excellent.

D. H. Stedman, *University of Denver*

Biosynthetic Products For Cancer Chemotherapy. Volume 5. By G. R. Pettit, G. M. Craig, and C. L. Herald (Arizona State University). Elsevier Science Publishers: Amsterdam and New York. 1985. xii + 652 pp. $159.25. ISBN 0-444-42454-7.

This is the fifth volume in the series and, in line with its predecessors, is largely a compilation of structures of natural products with references to isolation. The structures were hand-lettered for rapid printing and, while readable, are of variable aesthetic appeal. The literature coverage for this volume extends from mid-1979 to January 1983. Major continuing sections include the following: New Biosynthetic and/or Cyclotoxic Agents, Marine Animal Biosynthetic Products, and Marine Plant Biosynthetic Products. As before, this volume provides a very useful source of structures and references for those interested in the broad area of natural products chemistry and/or biology with an emphasis on cancer relevance.

Introduced in this volume is a new section: Total Synthetic Approaches to Naturally Occuring Antineoplastic and/or Cyclotoxic Agents. This section seems somewhat less useful than the others, except as a starting point for references to the original literature. Each synthesis is presented in a brief flow chart format which consists of three or four key intermediates with the number of steps between each and an overall yield. No reagents are given. A quick scan showed that some of the references are incomplete. For example, only two of the three pre-1983 quadrone syntheses are listed. Also references to model studies or syntheses of related compounds are not given. In sum, while the synthesis section is less useful, the book continues to provide a valuable compilation of structures of important natural products and references to their isolation.

Dennis P. Curran, *University of Pittsburgh*

Comprehensive Chemical Kinetics. Volume 19: Simple Processes at the Gas-Solid Interface. Volume 21: Reactions of Solids and Gases. Edited by C. H. Bamford, C. F. H. Tipper, and R. G. Compton (University of Liverpool). Elsevier Science Publishers: Amsterdam and New York. 1984. Volume 19: XII + 432 pp. $140.50. ISBN 0-444-42287-0. Volume 21: XIV + 238 pp. $82.75. ISBN 0-444-42288-9.

The wide interest in gas–solid kinetics is reflected in these two volumes. They form part of the four-volume section on heterogeneous reactions in the extensive "Comprehensive Chemical Kinetics" set. These two volumes present a sound review of the present state of solid surface reaction kinetics, in several separate review papers.

Volume 19, on the Gas–Solid Interface, contains three long papers. The first is excellent, on the kinetics of adsorption, desorption, and diffusion at metal surface, by Morris, Bowker, and King. The experimental techniques and their interpretation are well treated, both as an introduction to the methods and up-to-date evaluations, with over 700 references through 1981. Tables summarizing systems and gas–surface spectra from the literature make this a valuable review. The final two papers deal respectively with adsorption, desorption, and migration on semiconductor surfaces, by Boyce and Foxon, and radiation effects, by Cummingham. Again, both are comprehensive and up to date.

Volume 21, Reactions of Solids with Gases, contains three reviews. First, metal oxidation theory is examined by Fromhold and Fromhold. The review is highly theoretical. Second, a too-short look is given by Koga and Harrison on reactions of solids with gases other than oxygen. Finally, Brennan deals with heterogeneous catalysis of atomisation and recombination reactions. This is a very good summary of both theory and experiment of one of the simplest and important surface processes. The inclusion of more recent work since 1975 would have strengthened this very clear presentation. This review is direct and instructive.

Overall, the six review papers comprising these two volumes form a valuable reference. They are typically British in word and format and provide a good current summary of gas–solid reaction kinetics. Heterogeneous reactions as such, and this area in particular, deserve a separate identification, and these two volumes meet that need in a worthy fashion.

Arthur L. Draper, *Texas Tech University*

Peptide and Protein Reviews. Volume 4. Edited by M. T. W. Hearn (St. Vincent's School of Medical Research, Melbourne). Marcel Dekker, Inc.: New York and Basel. 1984. viii + 255 pp. $52.50. ISBN 0-8247-7292-X.

This relatively new series devotes each volume to a specific topic. The five articles in this volume are concerned with X-ray crystallographic studies on specific proteins. The titles are as follows: Structure-function relationships among nicotinamide-adenine dinucleotide dependent oxidoreductases (Birktoft and Banaszak); Experimental approaches in the study of crystalline cytosolic aspartate aminotransferase (Hyde, Rogers, Briley, Arnone, Metzler, and Metzler); Heme enzyme structure and function (Poulos and Finzel); Molecular enzymology of seleno-glutathione peroxidase (Ladenstein); The structure and function of neuraminidase (Colman). Each of the reviews attempts to relate crystallographic studies with substrate (and coenzyme) binding and enzymic mechanisms. Present knowledge of glutathione peroxidase and neuraminidase is not as detailed as on some of the other groups of enzymes. A wealth of information is reviewed on the structure and mechanism of the aminotransferase. The review on heme enzymes is primarily devoted to cytochrome *c* peroxidase where high resolution studies are far more advanced than on other heme enzymes. The value of each volume would be greatly enhanced if a detailed table of contents was included for each review. An index would also be useful. Nevertheless, these reviews will be helpful to those teaching or working in these expanding fields.

Emil L. Smith, *University of California, Los Angeles*

Electron-Molecule Interactions and Their Applications. Volume 2. Edited by L. G. Christophorou (Oak Ridge National Laboratory). Academic Press, Orlando, FL. 1984. xiii + 678 pp. $85.00. ISBN 0-12-174402-7.

The book contains a wealth of data which will be useful to many people in chemistry and physics.

Electron-transfer reactions receive a lot of attention these days, and Chapter 1 is devoted to them. The understanding of electron-transfer reactions requires a more basic grasp of electron behavior than most chemists and physicists possess. Attention must be focussed on the electron itself. This book is an excellent introduction to the type of information needed.

Chapter 3, Electron motion in low and high pressure gases, describes interactions of electrons with individual molecules in considerable detail. There is a brief discussion of changes that occur when the gas density is increased to the region where an electron interacts with more than one molecule at a time. One shortcoming of the book, shared by many publications in chemistry and physics, is that the wavelength λ of an electron is not adequately differentiated from $\lambda/2\pi = \lambda\!\!\!^{-}$. On page 154 is a statement that multiple-scattering processes occur when the electron mean free path is approximately equal to the wavelength of thermal energy electrons (Legler model). However, it is not λ but $\lambda\!\!\!^{-}$ that provides an approximate correlation, as indicated by equations on page 156. The era of ignoring the "constant parameter" 2π is past. In predicting gas density effects, ignoring the factor 2π causes a gross error.

The quantity λ for particles is called the de Broglie wavelength. A name is needed for $\lambda\!\!\!^{-}$ which can apply to both particles and electromagnetic waves. A wave or a cycle corresponds to the argument of a sine or cosine passing through 2π radians. The wavelength λ corresponds to a cyclic or periodic motion of 2π radians, so $\lambda\!\!\!^{-} = \lambda/2\pi$ corresponds to a motion of 1 radian. An appropriate name for $\lambda\!\!\!^{-}$ would be the *radianlength*. Impact parameters of low-energy electrons correlate with the radianlength. The name "reduced wavelength" has sometimes been used for $\lambda\!\!\!^{-}$, but that does not asist the visualization of the quantity, as radianlength does.

Chapter 4 contains a comparison of electron behavior in liquids to that in gases. Electron diffusion (mobility) in liquids is very sensitive to liquid

structure. Chapter 4 offers to a general readership some of the fascination of electron behavior in dense media. The physicist authors are forgiven for missing the point that electrons do not behave in liquid methane as they do in "other linear hydrocarbons" because methane is not a linear hydrocarbon. Methane molecules are spherelike.

The graphs sometimes display complete units, for example, molecule/cm^3 or $(V \cdot cm^2)$/molecule, and sometimes incomplete units, such as cm^{-3} or $V \cdot cm^2$. The unit of quantity, molecule or mole, is required for unambiguous labeling.

Chaper 5 contains a useful collection of practical applications of the knowledge of electron behavior in materials.

Chapter 6 contains a 141-page table of electron affinities that is valuable by itself.

The book is certain to be added to most chemistry libraries and to the bookshelves in many laboratories.

Gordon R. Freeman, *University of Alberta*

Progress in Inorganic Chemistry. Volume 32. Edited by Stephen J. Lippard (Massachusetts Institute of Technology). John Wiley & Sons: New York. 1984. 714 pp. $85.00. ISBN 0471-87994-0.

This series is highly regarded for its comprehensive reviews in specific research areas of Inorganic Chemistry. This volume contains six chapters covering a broad range of topics. The first chapter, The Stereodynamics of Metal Complexes of Sulfur-, Selenium-, and Tellurium-Containing Ligands, by E. W. Abel, K. G. Orrell, and S. K. Bhargava, deals with the use of dynamic NMR spectroscopy to elucidate the structure and fluxional behavior of S, Se, and Te compounds. The review is fairly encyclopedic with regard to the literature up to 1983. Inversion barriers are compiled for a wide variety of coordinated and free chalcogen ligands. In discussing the stereochemistry of inversion, the authors state that inversion at a prochiral group ER_2 bonded to a chiral center CXYZ produces an enantiomer. This is only true if inversion also occurs at the chiral center.

The second chapter, Five-Coordinated Structures, by R. R. Holmes, continues with the theme of dynamic structures. The problem of five-coordination in chemistry has received a great deal of attention since the seminal review of Muetterties and Schunn (*Quart. Rev.*, **1966**, *24*, 245) on the subject. This chapter presents the current status of the field and gives a wealth of X-ray structural information.

In the third chapter, Homo- and Heteronuclear Cluster Compounds of Gold, by K. P. Hall and D. M. P. Mingos, the rapidly expanding area of gold clusters is surveyed. Although the subject matter necessitates extensive use of X-ray structural data, the authors have kept this to a minimum. Emphasis is placed on bonding models for these compounds.

The fourth chapter, Electrides, Negatively Charged Metal Ions, and Related Phenomena, by J. L. Dye, presents a very readable account of these interesting species. The historical perspective on the development of this chemistry is well done and the emphasis on energetics early in the chapter is very helpful.

The fifth chapter, Long-Range Electron Transfer in Peptides and Proteins, by Stephen S. Isied, is dedicated to Henry Taube. This is an appropriate tribute to Professor Taube in recognition of the role of electron transfer in biological processes. The chapter begins with a review of electron transfer theory and then presents recent experimental results.

The last chapter, The Polyhedral Metallaboranes, Part I. Metallaborane Clusters with Seven Vertices and Fewer, by J. D. Kennedy, is again encyclopedic in nature. The structures are appropriately presented within the *styx* and *pileo*, *closo*, *nido* ... nomenclature. This is a long chapter reflecting the activity in the area of synthetic metallaborane chemistry.

Although all the chapters in this edition are well done, I would single out Chapters 3, 4, and 5 as being particularly well suited for advanced courses in Inorganic Chemistry as recommended reading on these topics.

Brian E. Hanson, *Virginia Polytechnic Institute & State University*

Gas Phase Ion Chemistry. Volume 3. Ions and Light. Edited by M. T. Bowers (University of California, Santa Barbara). Academic Press: Orlando, FL. 1984. xiv + 453 pp. $85.95. ISBN 0-12-120803-6.

This is the third volume of an excellent series devoted to gas phase ion chemistry. The emphasis in this book is on ions and light. There are ten separate chapters, each written by a different set of authors who are world leaders in their subdisciplines. Two broad subdivisions exist with respect to the topic ions and light. In the first, the chemistry or structure of ions is probed by subjecting them to radiation, often supplied by a laser. The second broad subdivision involves measuring the light emitted by an excited ion to characterize the structure of the ion or the chemistry which led to its formation. Six chapters fall into the first category, while four fall into the latter.

The specific research areas covered in the book are ion–molecule reaction dynamics, photodissociation of ions, electron photodetachment from molecular anions, radiative and radiationless transitions of open-shell cations, and the spectroscopy and structure of the hydrogen molecular ion. For the first three research areas multiple chapters are included which provide the reader different perspectives on recent research advances and accomplishments. The final two research areas are more sharply focused and they each are comprised of only one chapter. Except for the last chapter on the hydrogen molecular ion where an extensive theoretical treatment is outlined, the dominate thrust of the chapters is on experimental methodology and results.

This is an excellent survey of modern research in gas phase ion chemistry. It is highly recommended for experienced researchers, as well as others who wish a general introduction to the field.

William L. Hase, *Wayne State University*

Structure-Property Relationships in Polymers. By Raymond B. Seymour (College of Science and Technology, University of Southern Mississippi) and Charles E. Carraher, Jr. (College of Science and Engineering, Wright State University). Plenum Press: New York and London. 1984. XIII + 232 pp. $22.50. ISBN 0-306-41650-6.

It is unclear what sort of audience this book is intended for. The treatment is much too superficial for a graduate level (or indeed an advanced undergraduate level) course in polymer science. Perhaps it would be Technology, for a technician in industry without previous acquaintance with the polymer field. Certainly the chapters on specific classes of polymers (Chapter 12, Polyolefins; Chapter 13, Polymeric Hydrocarbons with Pendant Groups; Chapter 14, Alyphtatic Polymers with Heteroatom Chains; Chapter 15, High Performance Polymers; and Chapter 16, Selection of Polymers for Special Applications) contain a great deal of useful technical information.

Unfortunately, the introductory chapters, 1–9, while they treat most of the principles necessary for the understanding of polymer physics, do so in a manner which is not only superficial but, at times, misleading as well. Examples abound and only two will be quoted here. On p 24 is a discussion of the viscosity of a molten polymer in relation to its glass transition temperature, it is stated that, <<ltThe cooperative segmental motion in polymer molecules can be considered as a crankshaft motion of six atoms in the polymer chain". In the same discussion, a few sentences further on, it is stated that, "... the Arrhenius equation is not particularly useful at temperatures above Tg + 100K." The second example comes from the chapter on electric properties of polymers, p 78. "The dielectric constant... is low for nonpolar molecules... which cannot store much energy".

Because of these and many other such misstatements, the book cannot be recommended as a text at any level. It does treat an important aspect of polymer science and contains a compilation of information which is not easy to obtain from a single source. It may thus prove valuable for certain technological purposes.

W. J. MacKnight, *University of Massachusetts—Amherst*

Multiphoton Ionization of Atoms: Quantum Electronics; Principles and Applications. Edited by S. L. Chin and P. Lambropoulos. Academic Press, Inc.: Orlando, FL. 1984. 272 pp. $59.00. ISBN 0-12-172780-7.

This book is a collection of invited review chapters on subfields related to the multiphoton ionization (MPI) of atoms. Following a brief historical overview of MPI (Chapter 1), an excellent chapter by Mainfray and Manus provides a qualitative basis which puts the remaining chapters in perspective. Their section touches briefly on most of the topics covered in the book including nonresonant ionization, intermediate resonance effects, laser field coherence in multiphoton excitation, and quantum interference phenomena. Roughly speaking, the first part of the book (Chapters 2–7) deals with single-electron excitations and the latter part with multiple electron excitations in MPI. The focus of the discussion in Chapter 2 is on alkali and rare gas atoms, and these common threads help to bind the first half of the book together. Chapters 3 and 4 review the theoretical formalisms which are currently used to describe atom MPI, including both perturbative and nonperturbative approaches. There is sufficient qualitative insight to gain a great deal from these Chapters even for the nonmathematically inclined. Again, the examples are drawn from the alkali and rare gas atoms so that comparisons with experiment mesh well with Chapter 2. From the physical chemist's point of view it would, however, be useful to have a more detailed discussion of the rate equation limit of a density matrix treatment (e.g., J. Ackerhalt and J. Eberly, *Phys. Rev. A*, **14**, 1705 (1976)) and its regime of validity. Naturally, this is not so important in atomic systems where the densities of states are small and photodissociation plays no role. The brief discussions on dynamical effects on MPI line shapes and ionization probabilities are insufficient introductions for a chemical audience.

Chapters 5 and 6 deal primarily with the angular and energy distributions of emitted photoelectrons, respectively, rather than the ionization probability and spectroscopy. These are topics just beginning to be

explored in molecular systems and, in principle, contain a great deal of insight into excited state electronic structure. Both Chapters draw experimental examples from the alkali and noble gas atoms and employ theoretical treatments which make it clear what can be learned from such studies. It seems, however, that some discussion of the influence of ponderomotive forces on photoelectron energy distributions (e.g., M. H. Mittleman, "Introduction to the Theory of Laser-Atom Interactions", Plenum, New York, 1982) would be appropriate in Chapter 6. Strictly speaking, Chapter 7, which details "free–free" transitions, is a digression from the subject of MPI. It is, nonetheless, a worthwhile exposition whose purpose in context is clear and fits well with the discussion of above threshold ionization in Chapter 6.

The final three Chapters, 8 through 10, review the less well understood territory of multielectron excitation in MPI. Chapter 8 by Lambropoulos and Zoller covers MPI through autoionizing states and is principally theoretical, owing in part to the paucity of data in this area. Some time is devoted to a discussion of the modification of configuration interaction by strong fields, a topic of chemical interest. The authors point out explicitly the connection to the work of Lau and Rhodes which investigates strong laser fields as catalysts (cf. A. M. F. Lau and C. K. Rhodes, *Phys. Rev. A*, **16**, 2392 (1977)).

Chapters 9 and 10 review experimental studies of MPI which document the breakdown of a single-electron excitation picture. The work is principally on alkaline earth atoms where singly and doubly charged ions have been observed. These Chapters are quite limited in scope, largely due to the state of the field.

Overall, this collection fulfills its professed aim as a pedagogical introduction to the physics of MPI of atoms. A good blend of topics conveys both the maturity and continuing excitement of the field at present. The organization is superb, and the Chapters strike a good balance between being self-contained and interrelated. As an experimentalist, I found the book to be eminently readable and suspect that the more theoretically inclined would find it to be equally so.

The selection of topics and treatment of them is oriented toward the physics community. Still, many of the analogous molecular phenomena are beginning to be studied and physical chemists could benefit from the general material. It is important to bear in mind that large densities of states, intramolecular dephasing, and photochemical pathways have profound effects on multiphoton ionization as a spectroscopic tool in molecular systems which are not touched upon in this book.

Lewis Rothberg, *AT&T Bell Laboratories*

Advances in Heterocyclic Chemistry. Volume 37. Edited by A. R. Katritzky. Academic Press: Orlando, FL. 1984. ix + 368 pp. $85.00. ISBN 0-12-020637-4.

This volume begins with a review of the little-known pyrrolizines (pyrrolopyrroles), by W. Flitsch and G. Jones. The parent compound was not synthesized until 1964, but pyrrolizines have begun to assume some importance as synthetic intermediates, in view of the occurrence of the ring system in natural products. Another subject not reviewed comprehensively before is that of the Δ^2-1,2,3-triazolines, most of which are known as the result of a cycloaddition reaction between azides and alkenes, or diazoalkanes and imines. P. K. Kadaba, B. Stanovorik, and M. Tisler have now filled the gap. A supplementary chapter by P. K. Kadaba extends the review to the Δ^3 and Δ^4 analogues.

Arene oxides have become the object of intense interest because of their role in carcinogenesis. It is therefore not suprising that a chapter to bring their chemistry up to date appears here; this chapter is by G. S. Shirwaiker and M. V. Bhatt. Electrochemistry of heterocycles was given an overall treatment in Volume 36; we now have a review, by J. E. Toomey, of electrochemical synthesis of pyridines and modification of pyridines.

The reviews cover the literature through 1982 and into 1983. There is the usual cumulative index to chapter titles for the series.

Thiophene and its Derivatives. Part 1. Volume 44 of The Chemistry of Heterocyclic Compounds. Edited by Salo Gronowitz. Overall editorship by A. Weissberger and E. C. Taylor. John Wiley and Sons: New York. 1985. xii + 840 pp. $205.00. ISBN 0-471-38120-9.

It was in 1952 that the previous volume on thiophenes appeared in this series. It covered the literature up to 1950 and was entirely the work of one author, H. D. Hartough. The present editor has had to cope with a vastly larger amount of information, largely as a result of availability of thiophene by the cheap commercial process from sulfur and butane developed by the Socony-Vacuum Oil Co. in the 1940's. He has written the first chapter, on preparation of thiophene, by himself, and has recruited thirteen other specialists to complete the eleven chapters in this volume. They concentrate on the literature since 1950 and cover material published through 1982.

There is a short chapter on theoretical calculations, by A. Henriksson-Enflo. Naturally occurring thiophenes are reviewed in two chapters, by F. Bohlmann and C. Zdero, and by G. D. Galpern. Pharmacologically active thiophene derivatives are treated by J. B. Press. Reactions of thiophenes are subdivided into several chapters: reduction and desulfurization, by L. I. Belen'kii and Ya. L. Goldfarb; reactions at sulfur, and radical reactions of thiophenes, by A. E. A. Porter; cycloaddition reactions, by P. H. Benders, D. N. Reinhoudt, and W. P. Trompenaars; and photochemical reactions, by A. Lablache-Combier. Thiophene oxides, sesquioxides, and dioxides are treated by themselves in a chapter by M. S. Raasch, but some additional information on them appears in other chapters. Although at least one other Part is to come, this volume is self-contained, with its own author and subject indexes.

As is usual in this series, structural formulas are well drawn, and literature citations are profuse. The extensive tables of compounds that are a general feature of this series are promised for a forthcoming Part.

Activation of Saturated Hydrocarbons by Transition Metal Complexes. By A. E. Shilov (Institute of Chemical Physics of the USSR Academy of Sciences). D. Reidel Publishing: Dordrecht, Holland; and Hingham, MA. 1984. x + 203 pp. $39.00. ISBN 90-277-1628-5.

This monograph is a comprehensive review of alkane C–H activation chemistry, written by one of the pioneers in the area of transition metal mediated reactions of saturated hydrocarbons. Given the recent breakthroughs in stoichiometric C–H activation by low-valent soluble transition-metal complexes, this book offers a timely and useful perspective on this burgeoning field of organometallic research.

Coverage is substantially broader than the title suggests and includes a cursory survey of C–H activation by non-metallic compounds, including superacids, atoms and radicals, carbenes, and peroxides (15 references). Alkane activation on metal and oxide surfaces and reactions with metal atoms and ions is also covered briefly (29 references). The bulk of the text reviews metal-mediated homogeneous oxidation of alkanes (131 references), the reactions of transition metals with compounds containing "activated" C–H bonds (52 references), and finally the activation of completely saturated hydrocarbons by low and medium oxidation state complexes (57 references).

The author's own work on the reactions of alkanes with platinum complexes is rather extensively reviewed, although the contributions of other research groups are not underemphasized. While some more detail on intramolecular C–H activation, alkane dehydrogenation, and other aspects of the science would have been desirable, overall, coverage is broad and relatively complete. The literature is reviewed through the middle of 1983 and includes reference to the initial reports of alkane oxidative addition reactions from the groups of Bergman and Graham. Useful summary discussion of thermodynamic and mechanistic considerations is included.

The book is reasonably readable, apparently written in English rather than translated from the Russian, and is thankfully typeset. It will obviously be of interest to those active in alkane activation research and anyone wishing to place this important aspect of transition metal organometallic chemistry in its appropriate historical context.

Jeffrey M. Stryker, *Indiana University*

Amino Acids, Peptides and Proteins. Volume 15. Specialist Periodical Reports. Senior Reporter: J. H. Jones. The Royal Society of Chemistry: London. 1984. xxiii + 464 pp. $140.00. ISBN 0-85186-134-1.

This volume covers papers that appeared during 1982. As in previous volumes, the Senior Reporter has been assisted by many (24) reporters committed to recording the voluminous literature in the field. The annual efforts of these dedicated reviewers are a vast resource that serves investigators, as the literature reveals, in almost any specialty relating to amino acids, peptides, and proteins. It is therefore regretable that the Chapter on Chemical Structure and Biological Activity has been dropped because of space limitations. Still, the increase in the number of citations from the previous 1500 to the present 4500 is overwhelming. Since a subject index is not provided (and is probably prohibitively expensive because of the large number of entries), the authors very wisely follow the same format year after year. This facilitates locating specific areas of interest and assessing progress in a given field. Chapter 1 deals with amino acids; Chapter 2 with structural investigations of peptides and proteins, including isolation, characterization, chemical modification, X-ray studies, conformation in solution, and protein interactions: Chapter 3 with peptide synthesis; Chapter 4 with peptides having structural features not typical of proteins; and Chapter 5 with metal complexes of amino acids peptides and proteins. This volume features a large number of biolgical investigations reflecting the increasing interest of biologists in peptides and proteins. Another trend of this series has been "away from the further development of potential-energy functions and toward empirical methods of secondary structure prediction". Although their discussion is brief, the reviewers have emphasized the significance and

practicality of applying the empirical rules of Chou and Fasman, Kyte and Doolittle, and Hopp and Woods to the prediction of the three-dimensional structure of proteins. They also present many examples where the predictions are based on information obtained from cDNA sequencing. We have benefited much from reading this volume and have come away with much useful information in our fields of which we had not been aware. With the rapid increase in publication it is impossible for one to keep up with all relevant literature in one's own field. It is most useful to have available a volume such as this that gives one a second chance for catching up. Anyone interested in peptides and proteins should have available this excellent series of volumes.

Sidney Udenfriend and Johannes Meienhofer, *Roche Institute of Molecular Biology*

Ultrafast Phenomena. Volume IV. Edited by D. A. Auston (AT&T Bell Laboratories, Murray Hill, NJ) and K. B. Eisenthal (Columbia University, New York, NY). Springer-Verlag: Heidelberg and New York. 1984. xvi + 509 pp. $29.00. ISBN 0-387-13834-X.

This is Volume 4 in a series previously titled "Picosecond Phenomena". The change in title is occasioned by the advance of the field to include femtosecond techniques. The volume is very timely, since it appeared less than nine months after the symposium on which it is based. It includes 135 long abstracts of average length 3.5 pages. The topics covered include generation and measurement techniques; solid state physics and nonlinear optics; coherent pulse propagation; stimulated scattering; transient laser photochemistry; molecular energy redistribution, transfer, and relaxation; electronics and opto-electronics; and photochemistry and photophysics of proteins, chlorophyll, visual pigments, and other biological systems. The general level of the contributions is high, and they do whet the appetite to read the more complete reports published elsewhere, to which they provide a useful introduction.

Donald G. Truhlar, *University of Minnesota*

Electron Spectroscopy: Theory, Techniques and Applications. Volume 5. Edited by C. R. Brundle (IBM Research) and A. D. Baker (Queens College). Academic Press: Orlando, FL. 1984. xii + 378 pp. $75.00. ISBN 0-12-137805-5.

Although the subjects of the three articles comprising this volume differ widely, they have in common their emphasis on the study of valence levels (as opposed to core levels) with electron spectroscopy (in one case the related technique of Penning ionization spectroscopy).

The application of UV photoelectron spectroscopy to conformational problems in gas-phase molecules is the subject of the chapter by Brown and Jørgensen (122 pages). After a brief simplified treatment of the origin of the splitting between two bands as a result of the interaction between two orbitals, and of the form of the dependence of this splitting on the dihedral angle, the authors embark on a discussion of the individual cases, which they group into those involving n–n, π–π, n–σ, and σ conjugation. Although some readers may find this "cataloging" boring, there is little doubt that the work constitutes an excellent reference for future work. The reader is also made aware of the limitations of UPS as a conformational tool, but the case is also made that the accuracy of this method is comparable to that of electron diffraction.

The emission of photoelectrons into the gas phase from liquids and solutions upon irradiation by UV photons is the subject of the chapter by Delahay (74 pages). Although the title of the article (photoelectron emission spectroscopy) is general enough, the author subsequently uses it to describe only one of the two experiments he discusses, namely the measurement of photoelectron yield as a function of photon energy. This method is emphasized by Delahay in part because it is applicable to more systems than the technique of measuring the number distribution of photoelectrons according to their kinetic energy (essentially, UPS), since the latter is restricted at present to systems with sufficiently low vapor pressure ($\lesssim 10^{-3}$ torr). This limitation unfortunately rules out aqueous solutions. There is emphasis in this work on free energy (of emission) relationships, and some correlation with gas-phase data is discussed, such as the correlation between the threshold ionization energies of anions and their gas-phase electron affinities. Despite the impressive accomplishments, in which Delahay himself played a major role, it is clear that the field is still very much a developing one. Future reviews, I feel, will undoubtedly emphasize the change in ionization energies with phase to a greater extent than the present one. Furthermore, the use of synchrotron radiation to study liquids should have a powerful impact on the field and should help bridge the existing gap between the valence and core level results.

The experimental and theoretical aspects of the ionization that results from the collision of a metastable atom, most commonly a rare-gas atom, with an atom or molecule (Penning ionization and related processes) are the subject of the third and last review in this volume (177 pages and nearly 650 references!). The author (Yencha) takes mostly a phenomenological approach, but he also includes tables of useful numerical data. The physics of the collision process is discussed, as is the interface between Penning ionization and electron spectroscopy, and between PI and optical spectroscopy. There is also a brief treatment of the use of PI as a surface tool. Although the author admits that the field of Penning ionization is a "mature" one, he predicts continued growth brought about, for example, by the use of lasers to state-select the excited states of rare-gas atoms. The high surface sensitivity of PI augers well, he feels, for its future use in the study of adsorbed and condensed species.

M. Salim Banna, *Vanderbilt University*

Comprehensive Treatise of Electrochemistry. Volume 9. Electrodics. Edited by E. Yeager, T. O'M. Bockris, B. E. Conway, and S. Sarangapam. Plenum Press: New York. 1984. xvii + 451 pp. $65.00. ISBN 0-306-415704.

This volume is the latest member in a continuing series that is intended to provide a substantial review of a broad span of topics in both pure and applied electrochemistry. Volume 9 attempts to cover so-called "traditional" methods for studying electrochemical interfaces. Most of the chapters are concerned with kinetic techniques. The coverage is thorough in this respect; the chapters on a.c. techniques by Sluyters-Rehbach and Sluyters and on rotating disk methods by Filinovsky and Pleskov constitute valuable reviews on the theory and practice of these important methods. A chapter by Epelboin, Gabrielli, and Keddam covers the more general area of non-steady-state techniques. This latter chapter is definitely not for the beginner, although valuable insight into the general virtures of, and interrelationships between, the myriad of electrochemical perturbation methods can be gleaned in the occassional gaps between the technical and algebraic verbage. There is a chapter by Angestein-Kozlowska on the practical matter of preparing "clean" systems, with special reference to noble metal electrodes and aqueous media. A prefacing overview chapter by Sarangapani and Yeager on electrochemical kinetic methods is very short but does contain useful explanations on the relationships between steady state and non-steady state methods.

The strength of this volume is in the thoroughness by which some of these techniques are described. Practicing electrochemical kinetic devotees will find the book valuable. The growing number of organic, and particularly inorganic, chemists wishing to make electrochemical rate measurements may also find the book useful. However, the latter group wishing an answer to the crucial question "how do I pick a technique that yields trustworthy electrochemical rate parameters on demand" will have difficulty in finding a simple answer here.

The other limitation of this book is that, although claiming to be a comprehensive survey of traditional methods, it falls short of that ideal. The final two chapters, on thin-layer techniques by Woodard and Reilley and on tracer methods by Kazarinov and Andreev, concern approaches used primarily to evaluate surface composition. Unfortunately, other techniques, such as differential capacitance and potential-step and -sweep methods commonly employed to measure adsorption are conspicuous by their absence. Although such nonuniformity of coverage is probably inevitable when assembling such multiauthor volumes, a more balanced overall survey of techniques might have been expected.

Nevertheless, the book is a useful addition to the growing list of specialist review volumes and monographs concerned with electrochemical methods.

Michael J. Weaver, *Purdue University*

Biochemistry of Steroid Hormones. Second Edition. Edited by H. L. J. Makin (The London Hospital Medical College). Blackwell Scientific Publications: Palo Alto, CA. 1984. xii + 714 pp. $125.00. ISBN 0-632-000986-1.

The first edition of this book, published in 1975, was intended as a basic steroid biochemistry textbook for B.S. students. The objective of this new, second edition is not only to update the subject matter covered but also to expand it to a reference-book format, with in-depth discussions of original research findings and a much-expanded bibliography at the end of each chapter.

The emphasis of this book is heavily devoted to the biochemistry of the synthesis and degradation of steroids. In this regard, one finds an excellent treatise on the biosynthesis and metabolism of cholesterol as well as steroid hormones and their regulation. Unique to this book is the inclusion of a pleasantly readable chapter on the structure and nomenclature. To make it a well-rounded steroid biochemistry reference text, five of a total of seventeen chapters are devoted to steroid hormone endocrinology and physiology with references to key clinical studies; two chapters are included to cover methodologies in steroid assays; and an excellent chapter on vitamin D, a new steroid hormone, has been added. However, coverage of the biochemical mechanism of action of steroid hormones is unfortunately superficial. Another minor drawback is the

wordiness one finds in a few chapters. References to original research are at times uncritical. As a whole, however, the book should be of value as a reference text not only to undergraduate level as well as graduate level students in biochemistry but also to researchers in endocrinology and metabolism with peripheral interest in steroid hormones. The greatly expanded reference sections are a valuable asset.

Timothy M. Chan, *Institute for Toxicology, University of Southern California*

How to Edit a Scientific Journal. By Claude T. Bishop. ISI Press: 3501 Market St., Philadelphia, PA. 1984. xii + 138 pp. $14.95. ISBN 0-89495-034-7.

At first glance one would think that there would not be much of an audience for a book with this title. However, as Bishop points out, there are probably 30 000 to 90 000 "scientific journals" in this world, and 4000 to 8000 significant ones, so that, when associate editors, advisory boards, and even interested authors and referees are included, there are a sizable number of scientists involved with the publication process. After a brief introduction to the origins and development of the scientific literature, Bishop takes up, in pithy exposition, the qualities of a good editor, editorial boards, the peer review process, referees, ethics, and advice on some of the administrative details of the publishing process. The book is written with a light touch, replete with interesting cartoons, stories, and photos (my own favorite is the photo, presumably sent in by a disgruntled reader, that demonstrates the particular "strength" of the journal by showing how stacks of it could be used as an automobile jack stand). I certainly recommend the book to new editors and those who must select editors for a journal. Authors, referees, and readers might also find interesting material here and even sympathize with the life and problems of an editor. The poem, "The Editor's Passport", that introduces the volume, alone might suffice for the latter purpose.

Allen J. Bard, *The University of Texas at Austin*

Reactions of Small Transient Species. Edited by A. Fontijn (Rensselaer Polytechnic) and the late M. A. A. Clyne (Queen Mary College, London). Academic Press: London, 1983. x + 478 pp. $89.00. ISBN 0-12-262040-2.

This fine collection of review articles has a unifying theme of how energy influences reactions. Included in "small transient species" are electronically excited atoms, vibrationally and electronically excited molecules, and positive and negative ions. Two introductory chapters discuss the influence of temperature on bimolecular reactions (Fontijn and Zelner) and on unimolecular and termolecular reactions (Luther and Troe). Subsequent chapters review the reactions of vibrationally excited molecules (Wolfrum), of electronically excited atoms (Breckenridge), and of electronically excited diatomic molecules (Slanger). The final two chapters cover the influence of low-temperature and translational and internal energy on ion–molecule reactions (Adams and Smith; Lindinger and Smith), with emphasis on drift tube techniques. The coverage is appropriate for both new graduate students and experienced research workers; experimental techniques and results are interspersed with theoretical models and results. The references go through 1982, with a few in 1983. This is a useful supplement to a more general kinetics text.

Kyle D. Bayes, *University of California, Los Angeles*

Surface and Colloid Science. Volume 13. Edited by E. Matijevič (Clarkson University) and R. J. Good (SUNY at Buffalo). Plenum Press: New York. 1984. viii + 297 pp. $45.00. ISBN 0-306-41322-1.

This volume is another good contribution to a valuable series. It contains six full articles and an extended footnote by R. Good. The chapters are diverse—a problem noted by the editors since the volume is assembled as contributions arrive. Volume 13 contains articles which cover topics which are probably of interest more to the specialist in the subdisciplines of surface and interface science. Specific comments about each chapter are therefore required. The first chapter, by the late A. Watanabe, on the electrochemistry of oil–water interfaces, is a physical-chemical view of the potential differences at the interface, electrocapillarity, interfacial binding, electrocapillary emulsification, coalescence of droplets, and potential distributions of membrane systems. Its documentation with a preponderance of old literature may reflect the lack of recent progress in the area. The second chapter, on the kinetic theory of flotation of small particles by a group of Russian authors, gives a good summary of kinetic models and recent developments published in sometimes difficult-to-access Russian journals. It is of particular value to those working in small-particle separation. Chapter 3, by van Oss, covers the unique area of specifically impermeable precipitate membranes. It gives a too-brief coverage of the phenomena associated with precipitation in porous structures and the resulting properties. These phenomena are more pervasive than generally known, and this article should be read by a broad spectrum of scientists from electrochemists to biologists. Chapter 4, by Mann, gives a mathematical description of dynamic surface tension and capillary waves. It is definitely not for nonspecialists. Chapter 5, by Mann, on computer oriented numerical analysis, gives a personalized mathematical view. It is worthy reading for all experimentalists. The last major article, by Wilson, discusses advances in mercury intrusion porosimetry. This is recommended for all involved with porous materials. The last chapter by Good, is a plea for a "conventional choice" of interior surface contact angle.

In general, the book covers several quite diverse topics which will be of interest to the specialist in specific but generally not well reviewed areas. It fulfills the editors' aims to treat novel systems and phenomena critically and is a valuable reference source. Its diversity of subject matter and advanced level of coverage restricts its general appeal.

David L. Cocke, *Texas A&M University*

Organometallic Compounds and Living Organisms. By J. S. Thayer (University of Cincinnati). Academic Press, Inc.: Oriando and New York. 1984. xii + 273 pp. $49.50.

This monograph is a review of the biological effects of organometallic compounds of Pb, Hg, Sn, and several other metals, as well as the analogous chemistry of organometalloids, including P, As, B, Si, Se, and Te. Indeed, the coverage of metalloids is so pervasive that it is curious that metalloids are not mentioned in the title. The book is organized in 10 chapters whose titles are the following: (1) Historical Aspects; (2) Medicinal and Pharmaceutical Applications; (3) Toxicology of Organometallic Compounds; (4) Applications to Biochemical Investigations; (5) Organometallic Compounds and Microorganisms; (6) Organometallic Compounds and Fungi and Algae; (7) Organometallic Compounds and Plants; (8) Organometallic Compounds and Animals; (9) Biological Alterations of Metal–Carbon Bonds; and (10) Organometallic Compounds and the Environment.

The style and content of the book is perhaps best illustrated by quoting two consecutive sentences. "Methylmercuric chloride also blocked the synthesis of proteins in nervous system tissues and RNA synthesis by brain neurons. A worker exposed to the monosodium salt of methylarsonic acid suffered from severe peripheral neuropathy." As a reference monograph it is useful as it contains 2612 citations, including Chemical or Biological Abstracts references, dating through 1983; in many cases only the abstract reference is listed. There are also many useful tables. The book has three separate indexes, namely chemical substances, organisms, and subject, but it has no author index. These indexes seem complete. As an example, the passage quoted above can be found listed under nervous system, RNA, mercuric chloride methyl, and arsenic acid methyl monosodium salt. The book seems to have very few errors.

The author states that this book has two purposes: to provide a convenient reference source and to bring together divergent research efforts. In order to meet these goals the coverage must be broad and complete, as is this effort. The book thus provides a valuable reference and starting point for workers in this area. The author is less successful in pointing out general trends and highlighting areas which need further work, although this is achieved in part.

Roger E. Cramer, *University of Hawaii*

Chemistry Experiments for Instrumental Methods. By Donald T. Sawyer (University of California at Riverside), William R. Heineman (University of Cincinnati), and Janice M. Beebe (Frostburg State College). John Wiley & Sons, Inc.: New York. 1984. xv + 427 pp. $16.95. ISBN 0-471-89303-X.

There are few examples of comprehensive manuals that are suitable for use in today's modern upper-level undergraduate instrumental analysis laboratory course. This laboratory manual, which is derived from an earlier version coauthored by Donald T. Sawyer and the late Charles N. Reilley, is a commendable example. It is designed to supplement the lecture textbook used in an instrumental analysis course by providing practical, well-tested exercises with most of the common instrumental methods. It contains a veritable wealth of experiments of varying length and complexity.

This manual is divided into three major sections. The first section is concerned with electrochemical techniques and covers potentiometric and conductometric methods and electrochemical techniques based on controlled-potential and controlled-current. It features timely experiments with ion-selective electrodes, differential pulse polarography, anodic stripping voltammetry, and immobilized enzyme electrodes. The second section is devoted to methods based on electromagnetic radiation and is divided into chapters that are concerned primarily with the traditional topics of UV–vis, infrared, fluorescence, atomic absorption and emission, and NMR spectroscopies. Experiments with ^{13}C NMR and ESR are also provided. The last section describes experiments with separation techniques and includes several exercises with gas chromatography and high-performance liquid chromatography. In addition, at least one ex-

periment is provided for each of the following methods: exclusion chromatography, ion-exchange chromatography, liquid–solid column chromatography, thin-layer chromatography, and electrophoresis.

Every chapter in this manual is prefaced by a general discussion of the fundamental principles which emcompass the methods that are covered in that chapter. Each experiment includes sections which describe the theory relevant to that experiment, the procedure to be followed, the apparatus and chemicals that are required, and suggestions on treatment of the data. Pertinent references to textbooks, monographs, and, in some cases, the research literature are supplied with each experiment. The authors have also included a list of questions designed to probe the student's understanding of the instrumental technique that was investigated in the experiment. Safety warnings are provided when appropriate.

In addition to the experiments that are detailed in the manual, an appendix gives literature citations to numerous instrumental analysis experiments in the *Journal of Chemical Education*. These citations are arranged topically to parallel related subjects in the main body of the book. The authors suggest that these experiments be used as special research projects. A second appendix contains fifteen tables of reference data. These tables list information on equilibrium and formation constants, electrode potentials, and the spectral properties of various materials.

The authors did not include experiments for and coverage of subjects like mass spectrometry and the common X-ray methods of analysis. The omission of these important topics is the only significant deficiency of this manual and only affects its scope. Overall, this is an excellent laboratory manual which will prove invaluable to the instrumental analysis instructor who is striving to provide his or her students with "hands-on" experience with modern analytical instrumentation, and it is highly recommended.

Charles L. Hussey, *The University of Mississippi*

Chemical Analysis. Volume 74. Auger Electron Spectroscopy. By M. Thompson and M. D. Baker (University of Toronto), A. Christie (Vacuum Generators Scientific Ltd.), and J. F. Tyson (University of Technology Loughborough, Leicestershire). John Wiley & Sons: New York. 1985. viii + 394 pp. $75.00. ISBN 0471-04377-X.

This book provides a well-written introduction to Auger Electron Spectroscopy (AES). Although the use of AES by chemists has been somewhat limited, this situation is rapidly changing as chemical methods are increasingly applied to the studies of surfaces, interfaces, and new materials. A helpful feature of this book is the attempt by the authors to bridge the "terminology gap" separating chemists from much of the descriptive AES literature. Chemists will find this to be a very readable book.

Organizationally, the text begins with an introduction to the Auger process, placed in the broader context of electron spectroscopies. Succeeding chapters cover the experimental techniques employed: gas-phase AES, chemical applications, and applications to metallurgy and materials science. The last chapter is an extremely useful comparison of the various methods available for surface analysis. Here, the advantages and limitations of AES are discussed vis-à-vis other commonly employed surface analysis techniques. Accompanying each chapter is an extensive set of references; major reviews are cited throughout the text.

The scope of this book and its presentation are such that it should serve the chemical community both as a comprehensive introduction to AES and as a valuable reference source for primary literature.

Arthur B. Ellis, *University of Wisconsin—Madison*

The Impact of Protein Chemistry on the Biomedical Sciences. Edited by Alan N. Schecter, Ann Dean (NIH), and Robert F. Goldberger (Columbia University). Academic Press Inc.: New York. 1984. XXXII + 405 pp. $55.00. ISBN 0-12-622780-2.

This book is a collection of 27 articles presented at a symposium in honor of Dr. Christian B. Anfinsen's 65th birthday and is a fine testament to his accomplishments and influence in protein chemistry that culminated in a Nobel Prize (Chemistry) in 1972. All of the contributors are current or past members of Dr. Anfinsen's research group at the Laboratory of Chemical Biology of the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases. In their presentations the authors have emphasized the historical and personal aspects of the development of their research careers and convey the role Dr. Anfinsen played in their development. All of the papers, although covering many divergent topics, are oriented toward this goal and are consistent with the underlying theme of Dr. Anfinsen's research: the role of protein structure on biological function.

The book is organized into five major parts. Part 1, Research in Perspective, contains two chapters dealing with an historical perspective of biomedical research and basic research as an investment in the future. The former provides a brief description of Dr. Anfinsen's education, early research at Harvard University, and career at NIH, while the latter chapter provides a description of the Office of Science and Technology Policy and the activities that set federal research goals and policy. This was an interesting but all too brief account of government decision making and its effects on biomedical research.

Part 2, Protein Chemistry, contains eight chapters covering the topics of muscle contraction, serum albumin, hydrogen exchange rates and protein structure, protein folding, chemical synthesis of cyclic peptides, affinity labeling, and the structural basis for biological function.

Part 3, Immunology, contains seven chapters covering molecular evolution, antibody combining sites, protein conformation and function, antigenic determinants and synthetic vaccines, model antigens auto-immunity, and antibodies in drug therapy.

Part 4, Metabolism and Endocrinology, consists of six chapters dealing with lipoproteins, cyclonucleotide regulation, human chorionic gonadotropin, adenylate cyclase, and hormone receptors.

Part 5, Genetics, consists of four chapters covering embryonic development, molecular regulation in muscle development, interferon, and parathyroid hormone.

As one may expect from a multiauthored text, there is a great deal of variation in style and content of each chapter. However, the book is successful in maintaining the general theme of protein structure and function. Each chapter begins with a brief description of the author's relationship with Dr. Anfinsen and his influence on his/her development as a scientist. The author then proceeds to review research projects in his/her laboratories since their association with Dr. Anfinsen.

Since this book covers such a diverse range of topics, it is sometimes difficult to comprehend all that is presented since space limitations do not allow the necessary introduction to topics outside of one's field of expertise. The book does provides a good, general statement on the current state of protein chemistry and direction for future research.

For an expert in any of the major fields that are covered this book probably will not provide any really new information since experimental details are not discussed and each chapter functions more as a brief review of the topic. I do recommend this book to beginning graduate students and scientists wishing to obtain a good general overview of research in protein chemistry. Generally, each chapter is well-referenced and therefore provides a good introduction to a specific area of research, providing newcomers to the area with ample lead references.

James J. Knittel, *Rutgers University College of Pharmacy*

Starch: Chemistry and Technology. 2nd Edition. Edited by R. L. Whistler (Purdue University), J. N. BeMiller (Southern Illinois University), and E. F. Paschall (Corn Products). Academic Press: Orlando. 1984. xxiii + 689 pp. $75.00. ISBN 0-12-746270-8.

The first edition of this treatise was published in two volumes in 1965–1966. Many changes have occurred in the chemistry and technology of starch since then. This comprehensive, detailed, clearly written second edition brings readers to the forefront of knowledge currently available in this area. The 23 chapters are authored by well-known, highly qualified experts. While most of the authors are from the United States, the research and technology of starch is comprehensively covered on a world-wide basis.

The first two chapters introduce readers to the history and future expectations in the use of starch and to the economics and future of the starch industry. This is followed by a detailed treatment of the genetics and physiology of starch development. Two chapters are devoted to the action of enzymes in the hydrolysis and synthesis of starch and in the formation of linear, branched, and cyclic oligosaccharides, whose separation, properties and potential uses are described. The structure and properties of starch are covered in four chapters detailing current concepts and understanding of the molecular structure of starch, the organization of the starch granule, the fractionation of starch, and the gelatinization of starch and properties of starch pastes. The production and uses of starch derivatives and chemicals produced from starch are discussed in two chapters. Six chapters are devoted to the production and uses of such starches as corn, sorghum, tapioca, arrowroot, sago, potato, wheat, rice, and acid-modified starches. Four chapters describe the uses of starches in the paper industry, in foods, in prepared adhesives, and in the production of glucose- and fructose-containing sweeteners. The final two chapters are devoted to the industrial microscopy of starches and to a presentation of light and scanning electron photomicrographs of selected starches. The chapters are well-documented with references linking current research with earlier work undergirding understandings within the field.

This is the most comprehensive, up-to-date treatise available in this area. The presentation and usefulness has been strengthened by combining both volumes into a single one in this second edition. This monograph should be read by anyone needing or desiring an understanding of current concept and practices concerning the structure, chemistry, properties, production, and uses of starches and their derivatives. It is

highly recommended and should be in the laboratory, office, or library of chemists, chemical engineers, food scientists, and technical sales or service personnel working with starch/starch derivatives.

D. R. Lineback, *North Carolina State University*

Surfactants. Edited by Th. F. Tadros. Academic Press: London and Orlando, FL. 1984. ix + 342 pp. $30.00. ISBN-0-12-682180-1.

An inspection of any issue of CA Selects on Colloids (Physicochemical Aspects) will show that a great majority of abstracted papers deal with surfactants. For two reasons these compounds must represent one of the most thoroughly investigated family of chemicals in recent times. One is the interest in a variety of applications in every conceivable industry and the other is the use of solutions of surface active agents for quantitative studies in thermodynamics.

This volume contains a series of chapters based on lectures given at "a residential school" that was held at Bristol University in England during 1983. The thirteen topics are as follows: (1) Introduction, in which R. H. Ottewill essentially offers certain definitions of surfactant systems: (2) Thermodynamics of Surfactant Solutions (A Couper); (3) Phase Equilibria and Mesophases in Surfactant Systems (R. G. Laughlin); (4) Structural Aspects of Surfactant Micellar Systems (B. Lindman); (5) Microemulsions (J. Th. G. Overbeek, P. L. de Bruyn, F. Verhoeckx); (6) The Microstructure and the Rheology of Surfactant and Related Systems (J. W. Goodwin); (7) Adsorption at the Air/Liquid, Liquid/Liquid and Solid/Liquid Interfaces (R. Aveyard); (8) Emulsions and Foams (B. Vincent); (9) Suspensions (Th. F. Tadros); (10) Wetting (T. D. Blake); (11) Surfactants in Enhanced Oil Recovery (E. L. Neustadter); (12) Macromolecular Surfactants (R I. Hancock); and (13) Some Applications of Surfactants in Biological Systems (Th. F. Tadros).

In view of the fact that the material was intended for instructional purposes, little depth is expected in the coverage of individual topics. However, the chapters are well written by knowledgeable contributors.

As is frequently the case in any such volume, there are omissions, although these depend on the interest of the reader. In the opinion of the reviewer one such omission is the neglect to discuss the precipitation of surfactant "soaps". For example, most anionic surface active agents form sparingly soluble salts with divalent or trivalent cations. Such precipitates occur in surfactant solutions when natural waters are used in many applications because of their contents of Mg^{2+}, Ca^{2+}, Fe(III), Al(III), and other ionic species, which alter the composition and properties of surfactant solutions. Furthermore, "soaps" find many uses, which depend on their particle size, shape, charge, etc. It is true that the formation of insoluble surfactant salts has not been a subject of extensive studies, but this fact does not diminish its importance.

Egon Matijević, *Clarkson University*

Asymmetric Synthesis. Volume 3. Stereodifferentiating Addition Reactions. Part B. Edited by James D. Morrison (University of New Hampshire). Academic Press: New York. 1984. xiv + 578 pp. $84.50 (Priced in a set @ $71.50). ISBN 0-12-507703-3.

This is the third volume in what is presently a five-volume series on asymmetric synthesis. The book contains eight chapters, all written by leading authorities in their respective fields and titled as follows: Stereoselective Alkylation Reactions of Chiral Metal Enolates (D. A. Evans); The Aldol Reaction (C. H. Heathcock); Asymmetric Synthesis via Chiral Oxazolines (K. A. Lutomski and A. I. Meyers); Alkylation of Chiral Hydrazones (D. Enders); Olefin Cyclization Processes That Form Carbon–Carbon Bonds (P. A. Bartlett); Olefin Cyclization Processes That Form Carbon–Heteroatom Bonds (P. A. Bartlett); Asymmetric Cycloaddition Reactions (L. A. Paquette); Chirality Transfer via Sigmatropic Rearrangements (R. K. Hill).

Each article is well organized and informative. Rather than simply presenting an exhaustive compilation of all the data in a particular area, each author has striven to delineate the crucial factors which influence the degree and nature of the asymmetric induction. In many instances data from numerous sources have been tabulated in order to reveal developing trends. The free use of such tables in conjunction with the well-conceived graphics eases the reader through large amounts of information. The result is a volume of comprehensive review articles that reads as a textbook.

The textbook-like nature of the volume is further enhanced by a logical presentation of chapters. The first two chapters combine to present a complete story on the asymmetric reactions of oxygen enolates. While this area of research, particularly the aldol reaction, has been the focus of numerous other reviews, the presence of these two well-written articles in one volume is valuable. In accord with the central role of oxygen enolates in synthetic chemistry the first two chapters encompass over one-third the book. Chapters three and four discuss the closely related azaenolates with each chapter devoted to the discussion of a particular chiral auxiliary. It is especially rewarding to see a complete record of Meyers' work on chiral oxazolines in one review article. Chapters five and six concentrate on the stereochemistry of ring formation via olefin cyclizations. The chapter dealing with heterocycle formation is particularly timely considering the current interest in this topic. The final duet of chapters addresses the use of concerted processes in asymmetric synthesis. Not surprisingly, the chapter on cycloaddition reactions stresses the asymmetric Diels–Alder reaction, while chirality transfer via the Claisen rearrangement dominates the chapter on sigmatropic rearrangements. With the continuing surge of interest in concerted processes of all descriptions these two articles may be a harbinger to a complete volume on asymmetric concerted reactions.

All the articles cover the literature through the end of 1982. The few 1983 references that do appear usually emanate from the authors' own laboratories. While the intense activity in the field of asymmetric synthesis dictates that a volume of this nature will never be "current", the pedagogical tone of the articles within will ensure the value of this volume for a long time to come. This book, as well as the others in the series, is a necessity for any chemist remotely involved in the study of asymmetric reactions. For those experienced in the field the articles should serve to cement their current understanding of the area. For the beginners this book is an eminently readable digest which will guide them to the current frontiers in asymmetric synthesis.

Patrick G. McDougal, *Georgia Institute of Technology*

Electron–Molecule Collisions. Edited by Isao Shimamura (RIKEN, The Institute of Physical and Chemical Research, Saitama, Japan) and Kazuo Takayanagi (The Institute of Space and Astronautical Science, Tokyo, Japan). Plenum Press Publishers: New York and London. 1984. xiii + 570 pp. $85.00. ISBN 0-306-41531-3.

This volume contains a series of papers written by several authors covering a range of phenomena occurring in electron–molecule collisions. The volumes begins with a discussion of many of the essential concepts and approximations which arise in current studies of electron–molecule collisions. In the introductory chapter, Takayanagi presents a coherent and appropriate discussion of these topics which can be read by anyone with a knowledge of elementary quantum mechanics. The more advanced concepts and techniques are conveniently introduced as they are needed in later chapters. The next chapter gives a detailed account of rotational excitation of molecules by slow electrons with an emphasis on the relevant physical concepts. Chapter 3 concentrates on resonant vibrational excitation, and Chapter 4 gives an excellent review of the dissociative processes which arise through electron collisions. Chapter 5 deals mainly with the many important uses of electron–molecule collisions as a spectroscopic tool for investigating the electronic structure of simple molecules. The final two chapters review the up-to-date experimental and theoretical techniques which are used to study electron–molecule collision cross sections.

The chapters are all written by authors who are knowledgeable on the various topics and have generally made very important contributions to their fields. The discussions are uniformly very readable and unburdened by unnecessary details. Throughout, the chapters reflect a refreshing blend of review of current progress with a discussion of the underlying concepts. The chapters are self-contained and can be read by anyone with a basic knowledge of collision theory. The references are very extensive and current. Even though the chapters are written by different authors, the style is quite uniform and crisp throughout. Along with a review of the progress in the field in each chapter, the authors identify many of the important problems which remain poorly understood or unresolved. The book will be very useful to researchers in the field.

Vincent McKoy, *California Institute of Technology*

Structural Inorganic Chemistry. By A. F. Wells (University of Connecticut). Oxford University Press: New York. 1984. xxxi + 1382 pp. $98.00. ISBN 0-19-855370-6.

This volume represents the fifth edition of a classic contribution to the inorganic chemistry literature. Like the previous four editions, the fifth edition is a necessary addition to all library collections, and it should be present on the shelves of all who teach inorganic chemistry.

As in the previous volume, the present book is divided into two parts. Part I provides a general outline of structural material including chapters on Symmetry, Polyhedra and Nets, Sphere Packings, Tetrahedral and Octahedral Structures, Simple AX_n Structures, and Bonds in Molecules and Crystals. For the most part these chapters appear to be taken directly from the fourth edition; however, some updating and minor revisions have been made. As before, the figures are especially well done, and to those attempting to integrate more solid-state topics into undergraduate course work these figures will be of great utility.

Part II provides a heroic outline of structural data for inorganic compounds organized according to periodic groups. As in the past, the

presentation is very well done. Without careful examination it might appear that revisions in Part II are not numerous. However, nearly every section has been updated in text and many new entries and references appear in the tables. The literature appears to be surveyed through 1981, and in the Preface the author states that the text provides "a reasonable picture of the subject at the end of the eighth decade of the twentieth century". This is certainly true. There is no doubt that an expert in the chemistry summarized in a given chapter will probably find omissions of recent advances which would be nice to see included. However, serious omissions which distort the impact of a given area have not been detected. One general area which is not covered in any detail is structural organometallic chemistry, but that material is adequately treated in other collected volumes and textbooks.

Overall this text is well written and free of errors, and it will continue to be a most valued resource for chemists and physicists working with inorganic materials.

R. T. Paine, *University of New Mexico*

Ring-Opening Polymerization. Edited by K. J. Ivin (Department of Chemistry, The Queen's University, Belfast) and T. Saegusa (Department of Synthetic Chemistry, Kyoto University). Elsevier Applied Science Publishers: New York and London. 1984. 3 volumes; 1260 pp. $277.75. ISBN 0-85334-237-7.

Although I have had the opportunity to see some of this book's chapters before publication, I have read the entire book during a flight from Cleveland to Freiburg. After I saw the price, however, $277.75 for three volumes containing 1227 pages, I could not write this review for almost two more months.

I had the same feeling as many years ago when I was reading the French edition of Alexandre Dumas, and although I would have loved to have my own copy, I could not purchase it, not only because of the cost but also because it was not available in that country. This time the book is available, but the price is immense.

This book is the first comprehensive one presenting the entire field of ring-opening polymerization, a branch of polymer chemistry which has developed extremely fast and has become, within a short time, a mature and well-established domain of active research. Almost each chapter of this book could be expanded into a book by itself, and good examples are Olefin Metathesis by one of the coeditors, K. J. Ivin, (Academic Press, 1983), and Poly(tetrahydrofuran) by P. Dreyfuss (Gordon and Breach, 1982). Additional evidence for the maturity of this field are the two international symposia: one on Cationic Polymerization and Related Processes and the other on Ring Opening Polymerization which have discussed most of the topics of this field at regular periods of time.

This book has been awaited by everyone active in this field. For the polymer chemists who are not active in this area it represents an excellent standard reference book. But what does it mean for the next generation of polymer chemists? It could easily become a textbook for an advanced course in ring-opening polymerization, as I have intended to use it. But the way in which it is priced represents the same sort of book as the French one I mentioned above. It is going to be owned by reviewers, industrial libraries, and a certain number of academic libraries. I would strongly recommend the Publishers to endeavor to produce at least a paperback edition.

The entire 3-volume set is very well structured, thanks to the two editors (Ivin and Saegusa) who could select an excellent team of 23 experts in this field, as contributors. The first chapter was prepared by the two editors and introduces the reader to the mechanistic and thermodynamic aspects of the ring-opening polymerization. The second chapter (Hall and Snow) discusses the ring-opening polymerization of carbocyclic monomers via carbon–carbon bond cleavage, while the third one (by Ivin) presents the ring-opening polymerization of cycloalkanes and bicycloalkanes via double bond cleavage (i.e., metathesis polymerization). The polymerization of cyclic ethers, one of the oldest polymerization reactions, is presented by Inoue and Aida in the fourth chapter. There I would advise those readers who are not very familiar with this field to avoid using Figure 4.3 from page 207, Vol. 1, if they want to understand the ^{1}H NMR spectrum which explains the ion-pair-macroester interconversion in the polymerization of tetrahydrofuran, and use Figure 1 from *Macromolecules*, **10**, 269 (1977). Apparently this important paper is missing from the list of references used in this chapter, although a review article listed in ref 1 of this chapter, *Adv. Polym. Sci.*, **37** (1980), presents this figure on page 88, Figure 13a, where it discusses the same subject. Chapter 5 (Sumitomo and Okada) presents the polymerization of sugar anhydrides and related bicyclic acetals. R. C. Schulz, Hellermann, and Nienburg have discussed the polymerization of cyclic compounds containing two or more oxygen atoms in the ring (Chapter 6) and have pointed out very clearly the real situation in the polymerization of 1,3-dioxolane. The last chapter of the first volume (Chapter 7) presents the polymerization of lactones (Jones, Lenz, and Luecke). The second volume discusses the polymerization of *N*-carboxyanhydrides (Imanishi), sulfur-containing heterocycles (Sigwalt and Spassky), cyclic amines (Goethals), cyclic 1,3-oxaza compounds (Kobayashi and Saegusa), lactams and cyclic imides (Sekiguchi), cyclic compounds containing phosphorus in the ring (Lapienis and Penczek), and cyclic siloxanes (Wright). The third volume contains an author and subject index. In all cases the standard of presentation is high, and because of such a large number of contributors, obviously some overlap does exist, but I am not against it. I might consider that even additional overlap by adding some more chapters could be useful. One single chapter discussing, for example, different classes of intitiators and their mechanisms of initiation could be added. It could be useful to have an entire chapter dedicated to radical ring-opening polymerization and one to photo- and thermal-cationic initiators, since these topics are both very new. It could also be interesting to have a chapter on sequential copolymers. Although not much was known at the time the book was written, something could be mentioned about the cationic ring-opening polymerization in the presence of alcohols which, in the meantime, has become known as the "activated monomer" mechanism. The book is missing a very elegant piece of work, i.e., the synthesis of 2,5-poly-THF diyls via the anionic and cationic transformation of fully epoxidized *cis*-1,4-polybutadiene [*J. Am. Chem. Soc.*, *102*, 7981 (1980)]. Fortunately, it can be obtained from a short recent review published in "Cationic Polymerization and Related Processes", E. G. Goethals, Ed., Academic Press, 1984, p 411. The very few printing mistakes (in two cases even carbons with five valences) do not decrease the excellent quality of this book, and I perfectly agree with what the editors say in the last paragraph of their preface: "We believe that there is still much to be discovered in this area of polymer chemistry and we hope that those who read this book will find stimulation for further work". Indeed this is the case (it can be readily observed by reading, for example, the proceedings of the last IUPAC meeting on "Cationic Polymerization and Related Processes", E. J. Goethals, Ed., Academic Press, 1984); and this is why I hope for a paperback edition, at least for the benefit of our students.

Virgil Percec, *Case Western Reserve University*

Books on Applied Chemistry

Cosmetic and Drug Preservation. Principles and Practice. Cosmetic Science and Technology Series. Volume 1. Edited by Jon J. Kabara. Marcel Dekker: New York and Basel. 1984. xvi + 765 pp. $99.75. ISBN 0-8247-7104-4.

In 29 chapters and two appendices, the chemistry formulation, toxicology, regulation, etc., of preserving cosmetics from deterioration by microorganisms are discussed. Substantial subject index.

The Cosmetic Industry: Scientific and Regulatory Foundations. Cosmetic Science and Technology Series. Volume 2. Edited by Norman F. Estrin. Marcel Dekker: New York and Basel. 1984. xv + 709 pp. $95.00. ISBN 0-8247-7105-2.

The 40 contributed chapters in this volume are designed to be a practical guide "for individuals with scientific and regulatory responsibilities in the cosmetic industry", and they include such titles as How and When to Recall, The Cosmetic Ingredient Review, and Alternatives to Animal Research. Substantial subject index.

Handbook of U.S. Colorants for Foods, Drugs, and Cosmetics. Second Edition. By Daniel M. Marmion. John Wiley and Sons: New York. 1984. xiv + 466 pp. $50.00. ISBN 0-471-09312-2.

This book is said to be current through January 1984, and it gives general background, currently permitted colorants (USA), their properties, use, identification, analysis, etc. Substantial subject index.

Food: The Chemistry of its Components. By T. P. Coultate. The Royal Society of Chemistry: London. 1984. vi + 197 pp. $5.95. ISBN 0-85186-483-X.

This little book presents the subject at a level requiring familiarity with introductory organic chemistry. Its eight chapters deal with carbohydrates, lipids, proteins, vitamins, flavors, colors, and preservatives and provide a good orientation for those who are not specialists in the subject. Lists of further readings are included, but not specific citations. Subject index.

Analysis of Foods and Beverages: Modern Techniques. Edited by George Charalambous. Academic Press: Orlando, FL. 1984. xviii + 652 pp. $82.00. ISBN 0-12-169160-8.

The 19 contributed chapters in this book cover the subject comprehensively from sample preparation to automated multisample analysis, including application of a wide variety of spectroscopic methods. The dry but important science that makes up the bulk of this book is leavened

by a chapter on sensory analysis, which deals with, among other aspects, the challenge of describing the sensory attributes of foods. Chemists will be interested to learn that there are three general methods: the introspective methods; the group method; and the repertory grid method. Space does not allow their elucidation here, but aspiring authors of menus for restaurants of pretension may find themselves well repaid by pursuit of the subject.

New Journal: Food Additives and Contaminants. Edited by R. Walker (University of Surrey). Taylor and Francis, Ltd.: Basingstoke, Hants RG24 OPR, U.K. Monthly. Annual Subscription $74.00.

Vol. 1, No. 1, contains ten articles and 71 pp.

Biophysical Methods in Food Research. Critical Reports on Applied Chemistry. Volume 5. Edited by H. W.-S. Chan. Blackwood Scientific Publications: Palo Alto. 1984. ix + 204 pp. $39.00. ISBN 0-632-1212-9.

There are four chapters in this book: Thermoanalytical methods in food research (D. J. Wright); Optical Methods as applied to biopolymer solutions (V. J. Morris); Spectroscopic methods: Nuclear magnetic Resonance and photoacoustic spectroscopy (P. S. Belton); and Rheological methods (S. B. Ross-Murphy). The authors are all from the United Kingdom. The subject is of major importance in quality control in the food industry. Subject index.

Organic Chemicals from Biomass. Edited by Donald L. Wise. Benjamin/Cummings Publishing Co.: Menlo Park, CA. 1983. xiv + 465 pp. $41.95. ISBN 0-8053-9040-5.

This book consists of 12 contributed chapters, the first of which is an overview dealing with particularly important compounds and with major classes, such as dyes, pesticides, etc. The main thrust of the book is in the area of fermentation, and indeed, three chapters are concerned with genetic engineering. Other chapters deal with such important subjects as olefins and alcohols from peat, production of liquid fuels, and the general economics of conversion of biomass to chemicals. Extensive index.

The Electrochemistry of Biomass and Derived Materials. ACS Monograph 183. By H. L. Chum and M. M. Baizer. American Chemical Society: Washington, D.C. 1985. xiv + 314 pp. $89.95. ISBN 0-8412-0868-9.

This monograph deals comprehensively in nine chapters with the subject of electrochemical conversion of plant material to needed organic chemicals. Two introductory chapters set the subject in perspective and provide a general description of techniques and scope. The later chapters take up specific types of substances: carbon dioxide, alcohols, acids, phenols, etc. Two chapters deal with carbohydrates and lignins, one is devoted to photoelectrochemistry, and the last chapter is devoted to notable past achievements and to "challenging problems". Subject index.

Progress in Biomass Conversion. Volumes 4 and 5. Edited by David A. Tillman and Edwin C. Jahn. Academic Press: Orlando, FL. Volume 4: 1983. xii + 308 pp. $32.00. ISBN 0-12-535904-7. Volume 5: 1984. xiv + 284 pp. $49.00. ISBN 0-12-535905-5.

The ten contributed chapters in Volume 4 are much concerned with wood chemistry, from paper pulping and combustion to utilization of lignin. There are some delicate euphemisms to be found here and there, such as "bovine waste" (which makes a less than satisfactory expletive). Volume 5 has eight chapters, which are also heavily slanted toward wood and production of energy from it. One deals with the seemingly esoteric subject of Alaskan driftwood. Each volume has its own subject index.

Encyclopedia of Glass, Ceramics, Clay and Cement. Encyclopedia Reprint Series. Edited by Martin Grayson. John Wiley and Sons: New York. 1985. xxvii + 925 pp. $89.95. ISBN 0-471-81931-X.

A reprint from the "Encyclopedia of Chemical Technology" of selected chapters in somewhat condensed form.

Lubricants and Related Products. Synthesis, Properties, Applications, International Standards. By Dieter Klamann. Verlag Chemie International: Deerfield Beach, FL. 1984. xii + 489 pp. $43.60. ISBN 0-89573-177-0.

This book derives its reason for being from the estimate that about 30% of the energy produced is lost to friction. It presents concisely the state of knowledge of lubrication today and deals with methods of use, synthetic lubricants (there are even structural formulas), additives, etc., ending with environmental protection and toxicology.

Automated Stream Analysis for Process Control. Volume 2. Edited by Dan P. Manka. Academic Press: Orlando, FL. 1984. xiv + 205 pp. $59.00. ISBN 0-12-469002-5.

Describes "the engineering approach to the design of a process-control systems and the interfacing of the analytical results with computers or printouts".

Mass Transfer In Engineering Practice. By Aksel L. Lydersen. John Wiley and Sons: New York. 1985. xiii + 321 pp. $24.95. ISBN 0-471-10462-0.

This is a text intended "to provide a short refresher course for practicing engineers in each of the more common unit operations."

Recent Advances in the Engineering Analysis of Chemical Reacting Systems. Edited by L. K. Doraiswamy. Halsted Press, distributed by John Wiley and Sons: New York. 1984. xii + 611 pp. $49.95. ISBN 0-470-20026-X.

This is a collection of 26 papers selected to show the present state of the relatively recent and rapidly growing field of chemical reaction engineering, or mathematical modeling. There is a true author index, but strangely no subject index.

Les Réacteurs Chimiques. Conception, Calcul, Mise en Oevre. By P. Trambouze, H. Van Landeghem, and J. P. Wauquier. Institut Francais du Pêtrole, Êditions Technip: Paris. 1984. xxi + 651 pp. ISBN 2-7108-0456-5.

This is a comprehensive treatise that includes the theoretical bases, the methods of calculation, and the operations of the various types of chemical reactors.

Guide to New Natural Gas Utilization Technologies. Edited by Nelson E. Hay. American Gas Association, distributed by Fairmont Press: Atlanta, GA. 1985. xii + 359 pp. $39.00. ISBN 0-915586-94-0.

The chapters of this book were written by members of the staff of the American Gas Association. The topics include not only simple burning of gas but gas powered vehicles, heat pumps and cooling systems, and fuel cells. Subject index.