

Book Reviews

BOOKS RECEIVED

Polymeric Carbons: Carbon Fibre, Glass and Char. By G. M. JENKINS (University College, Swansea) and K. KAWAMURA (Nihon University, Japan). Cambridge University Press, New York, 1976. vii + 178 pp. \$22.50.

Interfacial Synthesis, Volume I: Fundamentals. Edited by F. MILLICH (University of Missouri, Kansas City) and C. E. CARRAHER, JR. (Wright State University). Marcel Dekker, New York, 1977. xi + 298 pp. \$?

Methods in organic and polymer synthesis involving stirring and other interface effects.

Weed Control Handbook, Volume I, 6th Edition, Principles, Including Plant Growth Regulators. Edited by J. D. FRYER and R. J. MAKEPEACE. J. B. Lippincott Co., Philadelphia, Pa. 1977. xvii + 501 pp. \$37.00.

Oxides and Oxide Films, Volume 5, The Anodic Behavior of Metals and Semiconductors Series. Edited by A. K. VIJH (Quebec). Marcel Dekker, New York, 1977. xi + 184 pp. \$26.50.

Two chapters covering anodic oxides on noble metals and gas discharge anodization.

Handbook of Analysis of Synthetic Polymers and Plastics, Ellis Horwood Series in Analytical Chemistry. By J. URBANSKI, W. CZERWINSKI, K. JANICKA, F. MAJEWSKA, and H. ZOWALL (Warsaw). Wiley/Halsted Press, New York, 1977. 494 pp. \$49.50.

Chemical and instrumental methods of analysis applied to various classes of polymers.

An Introduction to Clay Colloid Chemistry, 2nd Edition. By H. VAN OLPHE (National Academy of Sciences). Wiley/Interscience, New York, 1977. xviii + 318 pp. \$21.50.

For clay technologists, geologists, and soil scientists.

The Plastic Deformation of Simple Ionic Crystals. By M. T. SPRACKLING (Queen Elizabeth College, London). Academic Press, London, 1976. ix + 242 pp. \$20.10.

Systematic Materials Analysis, Volume IV. Edited by J. H. RICHARDSON and R. V. PETERSON (Aerospace Corp., El Segundo, Calif.). Academic Press, New York, 1978. xviii + 493 pp. \$49.50.

Continuation of a multivolume work on theory and practice of instrumental methods applied to materials analysis.

Methods in Radioimmunoassay, Toxicology, and Related Areas, Progress in Analytical Chemistry, Volume 7. Edited by I. L. SIMMONS and G. W. EWING. Plenum, New York, 1974. 183 pp. \$22.50.

Introductory chapter by Nobel prize winner Rosalyn Yalow.

Kinetik der Elektrodennprozesse. By T. ERDEY-GRÜZ (Eötvös University, Budapest). Akadémiai Kiadó, Budapest, 1975. 581 pp. \$36.00.

Phase Diagrams: Materials Science and Technology, Refractory Materials, Volume 6-IV; The Use of Phase Diagrams in Technical Materials. Edited by A. M. ALPER (GTE Sylvania, Inc.). Academic Press, New York, 1976. xvii + 309 pp. \$28.00.

Computer Simulation and Modeling: An Introduction. By R. S. LEHMAN (Franklin and Marshall College). Wiley/Halsted Press, New York, 1977. xii + 411 pp. \$19.95.

Elementary introduction for social and behavioral scientists.

Analysis of Steroid Hormone Drugs. By S. GÖRÖG and GY. SZASZ (Simmelweis University Medical School, Budapest). Elsevier, Amsterdam, 1978. 426 pp. \$59.00.

Fundamentals of structure, reactions, and therapeutic use of steroid hormones; spectroscopic and chromatographic methods of analysis.

The Bile Acids: Chemistry, Physiology and Metabolism, Volume 3: Pathophysiology. Edited by P. P. NAIR and D. KRITCHEVSKY. Plenum Press, New York, 1976. xiii + 229 pp. \$22.50.

Liquid Scintillation: Science and Technology. Edited by A. A. NOUJAIM, C. EDISS, and L. I. WEIBE (University of Alberta). Academic Press, New York, 1976. xiv + 352 pp. \$17.50.

Proceedings of the International Conference on Liquid Scintillation held at Banff Centre, Alberta, June 14-17, 1976.

Organic Chemistry: A Brief Survey. By R. L. BAUMGARTEN (Lehman College, CUNY). Wiley/Ronald Press, New York, 1977. viii + 475 pp. \$14.50.

Chemical and Engineering Thermodynamics. By S. I. SANDLER (University of Delaware). Wiley, New York, 1977. xviii + 587 pp. \$21.00.

Physical Chemistry: Enriching Topics for Colloid and Surface Science. Edited by H. VAN OLPHE and K. J. MYSELS. Theorex, La Jolla, Calif. 1975. xvi + 404 pp. \$? (softcover).

Sponsored in IUPAC. A collection of 22 chapters on aspects of colloid and surface science intended as a supplement to undergraduate physical chemistry courses.

Lead-Acid Batteries: A Reference and Data Book. By Indian Lead Zinc Information Centre, New Delhi. Elsevier Sequoia, Lausanne, 1977. vii + 143 pp. Approx. \$18.00.

A comprehensive reference book for lead battery users and researchers.

Fuel Cells. By ANGUS MCDUGALL (University of Manchester). Wiley/Halsted Press, New York, 1976. xii + 147 pp. \$11.95.

An introduction to the principles of direct electrochemical energy conversion for the nonspecialist.

Molybdenum in the Environment, Volume 2, The Geochemistry, Cycling, and Industrial Uses of Molybdenum. Edited by W. R. CHAPPELL and K. K. PETERSEN (Science Applications, Inc.). Marcel Dekker, New York, 1977. x + pp 317-821. \$45.00.

Second volume of the proceedings and a symposium held in Denver, June 1975.

Dithizone, Analytical Sciences Monographs, No. 5. By H. M. N. H. IRVING (University of Leeds). The Chemical Society, London, 1977. iv + 106 pp. \$14.50.

The chemistry of dithizone and its analytical applications.

Säurehydrolyse Glykosidischer Bindungen. By J. SZEJTLI (Budapest). Akadémiai Kiadó, Budapest, 1976. 399 pp. \$25.00.

Influence of structure and reaction conditions on acid hydrolysis of glucosides, disaccharides, and polysaccharides.

Molecular Basis of Motility. Edited by L. M. G. HEILMEYER, J. C. RÜEGG, and T. WIELAND. Springer-Verlag, Berlin, 1976. ix + 222 pp. \$24.60.

Proceedings of the 26th Mosbacher Colloquium devoted to molecular mechanisms of muscle function.

Progress in Vacuum Microbalance Techniques, Volume 3. Edited by C. EYRAND and M. ESCOUBES (Lyon University, France). Heyden and Sons, London, 1975. xvii + 443 pp. \$55.00.

Proceedings of the 12th Conference on Vacuum Microbalance Techniques held in Lyon in September 1974: 45 contributed papers in English and French.

Chemical Analysis of Additives in Plastics, 2nd Edition, International Series in Analytical Chemistry, Volume 46. By T. R. CROMPTON. Pergamon Press, Oxford, 1977. xii + 366 pp. \$27.50.

Discriminative Stimulus Properties of Drugs, Advances in Behavioral Biology, Volume 22. Edited by H. LAL (University of Rhode Island). Plenum Press, New York, 1977. xii + 239 pp. \$22.50.

Reviews on the chemical basis of drug action and possible prediction of therapeutic or toxic effect of new substances.

Key to Carotenoids: Lists of Natural Carotenoids. By OTTO STRAUB (Basel). Birkhäuser Verlag, Basel, 1976. 163 pp. SFr 56.00.

Nearly 100 pages of structural formulas of known carotenoids. Extensive bibliography including monographs, reviews and lectures.

Proceedings of the Symposium on Properties of High Temperature Alloys. Edited by Z. A. FOROULIS (Exxon) and F. S. PETTIT (Pratt and Whitney). The Electrochemical Society, Princeton, N.J. 1976. xii + 851 pp. \$12.00 (paperbound).

Generalized Thermodynamics—Its Philosophy and Rationale. By J. L. FINCK. Jerusalem Academic Press, Israel. 1974. 126 pp. \$?

Methods in Molecular Orbital Theory. By A. G. TURNER (University of Detroit). Prentice-Hall, Englewood Cliffs, N.J. 1974. xiii + 225 pp. \$?

Techniques Involving Extreme Environment, Nondestructive Techniques, Computer Methods in Metals Research, and Data Analysis, Techniques of Metals Research, Volume VII, Part 2. Edited by R. F. BUNSHAH (UCLA). Wiley/Interscience, New York. 1976. xii + pp 529–943. \$44.00.

Atmosphere and Ocean; Our Fluid Environments. By J. G. HARVEY (University of East Anglia). Crane, Russak & Co., New York. 1976. 143 pp. \$13.50 (\$8.95 paperback).

A unified introduction to meteorology and physical oceanography. Lavishly illustrated.

Solid State Photochemistry, Monographs in Modern Chemistry, Volume 8. Edited by D. GINSBERG (Haifa). Verlag Chemie International, New York. 1976. viii + 280 pp. \$38.25.

A collection of papers by the late Gerhard M. J. Schmidt and his collaborators describing a symbiotic relationship between X-ray crystallography and synthetic organic photochemistry.

Chemical Signals in Vertebrates. Edited by DIETLAND MÜLLER-SCHWARTZ and MAXWELL M. MOZELL (State University of New York, Syracuse). Plenum Press, New York. 1977. x + 609 pp. \$17.50.

This work is a collection of 32 papers presented at an interdisciplinary symposium held in June 1976, at Saratoga Springs, New York, the purpose of which was to study "the chemical nature, production, and reception of chemical signals and their modulating effects on behavior". All classes of vertebrates are considered, but the emphasis is on mammals; four chapters deal with the question of odor perception and human behavior, and one of these considers in detail the role of odor in social and sexual response.

Only about a quarter of the material is directly concerned with the chemistry of odorant secretions, the remainder consisting of mechanistic physiology, behavior studies, and ecological effects. However, chemists will find many interesting leads in the extensive bibliographies at the end of each chapter. A complete author index and an adequate subject index are also provided.

Keith T. Buck, *Northville Laboratories*

Advances in Inorganic Chemistry and Radiochemistry, Volume 21. By H. J. EMELEUS and A. G. SHARPE (Cambridge University). Academic Press, New York–San Francisco–London. 1978. ix + 301 pp. \$29.50.

This volume, like earlier ones in the same series, includes chapters on selected specialized subjects that fall into the general category of inorganic chemistry. The book contains two chapters on transition metal chemistry, two on synthetic Main Group systems, and three which can be classified loosely under the heading of "physical methods".

The chapter on "Template Reactions" by Healy and Rest (40 pp, 143 refs) provides a good survey of macrocyclic organic syntheses that employ transition metals as templates. Burdett's chapter on "A New Look at Structure and Bonding in Transition Metal Complexes" (33 pp, 73 refs) concentrates on the angular overlap method. This is a concise and easy-to-read account. The most comprehensive chapter in the book is on "Cyclophosphazenes" by Krishnamurthy, Sau, and Woods (61 pp, 499 refs). Although the literature is replete with review articles on this subject, the authors have done a creditable job in the selection of the most recent and most important work. A very specialized chapter by Hartman and Miller on "Adducts of the Mixed

Trihalides of Boron" (30 pp, 189 refs) deals with halogen redistribution reactions. The "physical methods" chapters include Cannon's review of "Reorganization Energies of Optical Electron Transfer Processes" (51 pp, 155 refs). This is a comprehensive analysis of a timely subject. The chapter entitled "Vibrational Spectra of the Binary Fluorides of the Main Group Elements" (23 pp, 152 refs) by Smyrl and Mamantiv deals with matrix isolation spectroscopy, as well as providing a compilation of experimental data. Finally, there is a chapter by Berry on "The Mossbauer Effect in Supported Microcrystallites" (31 pp, 128 refs) in which the emphasis is placed on iron oxides. All the chapters contain references up to 1976, with a few as recent as 1977 or 1978.

Although this volume lacks the impact of books that focus exclusively on one new topic, it provides a good survey of several worthwhile subjects, some of which will be of interest to the general reader.

H. R. Allcock, *The Pennsylvania State University*

pH Measurements. By C. CLARK WESTCOTT (Beckman Instruments, Inc.). Academic Press, Inc., New York. 1978. x + 172 pp. \$16.00.

Few analytical measurements occupy a more important place in the research laboratory and the quality control scheme than does the determination of pH. Commercial pH meters of the modern variety are highly sensitive, reliable, and simple to use. Nevertheless, these admirable devices are not free from the pitfalls that beset the user who is unaware of the basic nature of the measurement process.

The author of this small volume has attempted to remedy this situation, and he has succeeded to a considerable degree. His presentation is simplified to such an extent as to offer valuable guidance to the technician uninstructed in solution theory. At the same time, he presents much useful information, not readily available elsewhere, on the performance of pH meters, trouble shooting, and the care of electrodes. The chapters on the pH meter, applications to difficult samples (such as distilled water, soils, viscous or dry media, and samples at elevated temperatures and pressures) are easily the best. The isopotential pH, a mystery to most users of pH equipment, is given careful consideration. The reviewer fears, however, that the reader may assume that the meter will compensate for any lack of attention to temperature control on his part.

The volume is not without its shortcomings. The chapters on theory are oversimplified to the point of imprecision. The experimental pH is, of course, an operational quantity, not exactly defined by $-\log a_{\text{H}}$; indeed, the meaning of the latter quantity in nonaqueous and mixed solvents should have been elaborated more thoroughly than has been done. Although emf is assigned positive and negative signs throughout the book, no cell scheme appears. One can conclude from the context, however, that the "reference left" convention was used, consistent with the labeling of most pH meters. Thus the cell emf is given the same sign as the potential of the indicator electrode.

The problem of the liquid-junction error is commendably emphasized, but from the discussion it is easy to conclude that this error is a function only of junction design. The important quantity, the residual liquid-junction potential, is barely mentioned. An appendix consisting of seven tables is included and there is a glossary of 58 terms. This is a useful feature, and it is regrettable that more care was not exercised in formulating some of the entries. For example, under "ionic mobility" one finds "Defined similarly to the mobility of nonelectrolytic particles, viz., as the speed that the ion obtains in a given solvent when influenced by unit power". There is no entry for "nonelectrolytic particles".

The book is attractively printed and bound. It should be a considerable aid to all who suffer doubts as to the accuracy of their pH measurements.

Roger G. Bates, *University of Florida*

Micellization, Solubilization, and Microemulsions, Volumes 1 and 2. Edited by K. L. MITTAL (IBM). Plenum Press, New York. 1977. Vol. 1: xxxi + 487 pp. \$45.00. Vol. 2: xv + 945 pp. \$45.00.

These two volumes contain 45 papers given at the International Symposium on Micellization and Solubilizations, held in Albany, New York, in August 1976, together with six additional papers. They represent a major contribution to the study of micelles and microemulsions, as shown by the frequency with which papers from these volumes are currently cited as leading references.

There is something in these volumes for everyone who is interested in the chemistry and physics of the colloidal species which are formed

by the aggregation of amphiphilic solutes, and the papers provide valuable starting points for those who are moving into this rapidly expanding field.

In Volume 1, the first part includes general papers on the structures of micelles generated by synthetic and biological surfactants together with a retrospective and prospective discussion by G. S. Hartley who did so much of the pioneering work in this area.

The second part covers theoretical and experimental treatments of the sizes and shapes of micelles in aqueous solution. Various models are discussed, especially with regard to the variation of micellar shape with changing surfactant concentration and the kinetics of micelle formation and the exchange of monomers between solvent and micelle. This section of the symposium excited considerable interest and the related part contains fifteen papers.

The third part considers the question of micellization in nonaqueous solution, especially with regard to the structures of the aggregates in these solutions. There is general agreement that micellization in water can be described in terms of a sharp change with formation of micelles above a critical micelle concentration, but there is less certainty with regard to nonaqueous solutions and various models for aggregation are critically discussed.

Much of the second volume is devoted to micellar effects upon reactions in aqueous and nonaqueous solutions. The fourth and fifth parts include an extensive discussion of the factors involved in rate enhancements by both nonfunctional and functional surfactants with consideration of thermal, photochemical, and radiation-induced reactions.

Microemulsions, including their effects upon reactivity, are discussed in the sixth part and part seven includes general papers covering such diverse topics as membrane transport and the properties of bilayers.

Each volume includes discussions by participants in the symposium and there is a list of contributors which reads like a "Who's Who" of micellar chemistry. These two volumes illustrate, more than any other publication, the vitality of the field and its multidisciplinary importance. The papers illustrate the way in which modern experimental methods are complementing the classical methods of colloid chemistry and the dovetailing of theory and experiment in the very complex subject of micellization. These two volumes will be of great importance in the development of the chemistry of micellar and related systems.

Clifford A. Bunton, *University of California at Santa Barbara*

Transition Metal Organometallics in Organic Synthesis. Volume 2. Edited by H. ALPER (University of Ottawa). Academic Press, New York. 1978. xi + 188 pp. \$19.00.

This book is part of a two-volume work which contains a total of six chapters covering diverse aspects of the organometallic chemistry/synthetic organic chemistry interface. Volume 2 begins with a review by Nicholas, Nestle, and Seyferth on the potential utility of metal alkyne and cobalt alkylidene ($\equiv\text{CR}$) complexes in organic synthesis. Typical applications discussed include the complexation of alkynes as a means of triple bond protection and/or propargyl group activation. A variety of acetylene insertion reactions and side-chain and catalytic reactions of alkylidene-cobalt nonacarbonyl complexes are also detailed. The second chapter, by Jaouen, emphasizes applications of easily prepared (arene)Cr(CO)₃ complexes in organic syntheses, although other types of arene (and aryl) complexes are dealt with as well. Many useful, recently developed transformations are summarized for the first time. These include side-chain reactions of arene complexes which occur with unusual mildness and/or stereospecificity, and the attack of carbon nucleophiles upon complexed arene rings. The third chapter is written by Alper and has the somewhat overwhelming title "Oxidation, Reduction, Rearrangement, and Other Synthetically Useful Processes". Rather than being a catch-all, however, this article reads as a succinct, subjective, and idea-provoking summary of reaction types not covered in the other chapters in this series.

This book leaves one with the feeling that much fruitful prospecting remains to be done in the application of transition metal reagents to organic synthesis. Although not sufficiently broad for textbook use, it most certainly merits purchase by chemistry libraries, where it will be avidly browsed, and by any researchers whose interests overlap with the topics covered. The chapters are referenced into 1977, and the book, befitting its short length, is modestly priced.

John A. Gladysz, *University of California*

Inorganic Chemistry of the Transition Elements. Volume 5. Senior Reporter: B. F. G. JOHNSON (University of Cambridge). The Chemical Society, London. 1977. xvi + 524 pp. £29.00.

Volume 5 of the Specialist Periodical Reports on the chemistry of the transition elements covers the period from October 1974 to September 1975. The format and chapter headings of the current volume are the same as those of previous volumes in the series. The chapters and reporters are (1) "The Early Transition Metals" (subgroups IV and V by F. L. Bowden; subgroup VI plus Tc and Re by K. R. Grundy and B. E. Reichert); (2) "Elements of the First Transitional Period" (Mn and Fe by R. Davis; Co, Ni, and Cu by D. M. Johns and C. A. McAuliffe); (3) "The Noble Metals" (Ru, Os, Rh, and Ir by J. Evans; Pd, Pt, Ag, and Au by D. Clack); (4) "Zinc, Cadmium and Mercury" (by J. A. S. Howell and P. Wyeth); (5) "Scandium, Yttrium, the Lanthanides, and the Actinides" (by J. A. McCleverty).

The general arrangement of each chapter is to treat each of the elements separately and to further subdivide these reports according to the periodic group of the donor atoms. Several of the chapters have special sections devoted to particularly active areas of research such as the separate headings for "cluster" compounds in Chapter 3 and the section on the bioinorganic (not bioorganic as labeled on p 435) chemistry of Zn, Cd and Hg. The references are conveniently arranged at the bottom of each page; however, one major change in this volume is that the authors have abandoned attempts to be totally comprehensive in their literature coverage. The compilation of references to various physical studies and the bibliography of recent reviews appended to each chapter are particularly valuable assets of this series.

John R. Doyle, *University of Iowa*

Fundamentals of Chemical Relaxation. By H. STREHLOW and W. KNOCHE. Verlag Chemie International, Inc., New York. 1977. x + 133 pp. \$30.30.

This book is intended as an introduction to the methodology, theory, and application of chemical relaxation methods. Both of the authors have made important contributions to the field of chemical relaxation and are eminently qualified to write such a book. The first chapter gives a brief introduction to the subject. Chapter 2 presents a discussion of the experimental methods, with a careful consideration of the attributes and shortcomings of the various techniques. Especially valuable is the comparison of chemical relaxation with other fast reaction techniques. The third chapter discusses the information that can be obtained from chemical relaxation measurements. An introduction to the methodology for calculating relaxation times and amplitudes is given, although only relatively simple mechanisms are considered. The final chapter presents the results obtained in selected applications of relaxation methods: protolytic reactions, metal ion complexes, an allosteric enzyme, and micelle formation. Several useful appendices are included dealing with the theory of diffusion-controlled reactions, relaxation detection with pH indicators, the properties of sound waves, data processing, and the application of matrix algebra to calculating relaxation spectra.

While this book is introductory in scope, a large amount of information is packed into a small number of pages. The overall approach is quite mathematical without a great deal of descriptive text. The book is well written and provides an excellent introduction for someone willing to work carefully through the text and the problems sprinkled throughout. Unfortunately the exorbitant price of this book, over \$30 for 125 pages, will greatly restrict the audience.

Gordon G. Hammes, *Cornell University*

Isotopes in Organic Chemistry. Volume 1. Isotopes in Molecular Rearrangements. Edited by E. BUNCCEL and C. C. LEE. Elsevier Scientific Publishing Co., Amsterdam and New York. 1975. xvi + 301 pp. \$58.00.

A series of volumes edited by Buncel and Lee has undertaken the presentation of our most important approaches to elucidating reaction mechanisms, namely, the isotope label and the isotope effect. In the intriguing foreword to this first volume, Lars Melander has stated as the basic justification for the series "the stimulus for further research that may be provided". We are promised that each of the succeeding volumes will have a central theme to link together the various chapters; the theme of the second volume is "Isotopes in Hydrogen Transfer Processes" and that of the third is "Carbon-13 in Organic Chemistry". Even further into the future of this open-ended project, yet a second

volume on Isotopes in Molecular Rearrangements is being planned.

We can anticipate, therefore, ultimate coverage of almost every aspect of the use of isotopes as labels, and of isotope effects as mechanistic probes and criteria to be achieved in the course of this evolving series. Such an enterprise falls into the category of the ACS publication *Accounts of Chemical Research* focused on a single broad topic. It should serve as a record of the development of thoughts and ideas, as well as a chronicle of accomplishment to inspire further explorations and applications of theory.

How well does this initial volume succeed? We cannot, for instance, inquire into the completeness of the literature coverage since this is not your typical monograph format. Rather, in the traditions of *Accounts of Chemical Research* the chapters are less concerned with historical development than with a treatment which rapidly brings the subject to a discussion of its current status in the interests of a research-minded readership.

Thus, N. C. Deno has compiled an exemplary chapter on deuterium labeling in carbonium ion rearrangements, encompassing some of his own work, while drawing strongly on the techniques and results which have emerged from the many classical studies of the subject. W. R. Dolbier, Jr. has carried out his assignment on isotope effects in pericyclic reactions in similar fashion, a chapter which will be frequently consulted by researchers seeking guidance in the design of "crucial" experiments. J. L. Holmes's chapter on the elucidation of mass spectral fragmentation mechanisms by isotope labeling is unavoidably encumbered by the history of the subject. While it differs in this regard from the rest, it is still a valuable and well-organized survey of a very extensive literature. On the other hand, the disquisition on isotopes in carbanion rearrangements by D. H. Hunter in some ways is a continuation of Dolbier on pericyclic reaction mechanisms. The high qualities of the earlier chapter are fully sustained in Hunter's discussions of electrocyclic reactions and sigmatropic rearrangements.

Finally, J. S. Swenson has kneaded a pudding of facts and discussions organized by the title "Utilization of Deuterium Labeling in Organic Photochemical Rearrangements" which may prove to be inspirational to students who have pondered the approaches to probing photomechanisms.

The reviewer is looking forward to the promised volumes with the hope that the format as well as the high standards set by the initial volume will continue to be upheld. If so, they will indeed merit a prominent place on the shelves of the increasingly crowded chemistry libraries of both academic and industrial laboratories. Unfortunately, the gaudy cover of the volumes tends to suggest the character of student textbooks, which, clearly, they are not intended to be.

Harold Kwart, *University of Delaware*

Macromolecular Syntheses, Collective Volume 1, Edited by J. A. MOORE (Rensselaer Polytechnic Institute). John Wiley & Sons, Inc., New York, 1977. xxv + 710 pp. \$29.50.

"Macromolecular Syntheses" does for polymer chemistry what "Organic Syntheses" does for organic chemistry—only the need for the series is very much greater. To quote from page xv of the book, "... great difficulty is often encountered in duplicating even the most carefully described polymer synthesis. This arises from the fact that minute changes in the purity of the starting materials and the reagents or changes in experimental conditions often have a profound effect on the polymeric product . . . which may differ in molecular weight, molecular weight distribution, stereochemistry, branching, and even composition". This book, and the continuing series, successfully attempts to overcome these special difficulties of polymer science—difficulties of which those just entering the field may not be aware. It does this by giving the complete details of syntheses and characterization procedures, using concise and well-drawn figures where necessary. The importance of having these procedures independently verified cannot be overstressed. The reviewer can attest to having unsuccessfully checked a well-established industrial procedure several times before extensive conversation with the submitter revealed that a specific order of addition of the catalyst components (taken for granted by the submitter) was necessary for reproducibility.

The format of the procedures is similar to that of "Organic Syntheses" and includes valuable comments from the checkers. A Methods of Preparation section occasionally turns into a mini-review of leading references, a practice which, if generally followed, would make the series much more useful to readers unfamiliar with a given process or polymer. This volume contains over 150 syntheses which cover an enormous range of polymer classes and polymerization techniques, including novel cases of immediate interest to only a handful of academic chemists to well-established examples used routinely in industry. Surprisingly, a majority of the procedures were submitted by industrial chemists, a fact which speaks well for the broad appeal this book should have. In fact, it is recommended that a copy of this volume be available to every practicing polymer chemist either personally or in his institute's library. This book is of importance to both organic and polymer educators as an excellent source of experiments for undergraduate and graduate synthesis courses. Incorporation of some of these experiments would provide a valuable and unique experience in the field in which so many chemists eventually participate.

A final observation is that the book is just enjoyable to read. On leafing through it slowly and reading carefully occasional syntheses, one becomes aware of the flavors of polymer chemistry, something of its historical development, and an appreciation for the breadth and depth of the field. Even those who call themselves polymer scientists need this awareness renewed occasionally, and for those who are not polymer chemists, this book is an educational experience as well as a valuable reference of detailed procedures.

Lon J. Mathias, *Auburn University*

Polymer Syntheses, Volume II, By S. R. SANDLER and W. KARO. Academic Press, New York, 1977. xi + 400 pp. \$39.50.

This volume is the second in a series of three which will provide coverage in depth of approximately 30–35 classes of polymers. The ten chapters of Volume II include: urea, melamine, benzoguanimine–aldehyde resins; phenol–aldehyde condensations; epoxy resins; silicon resins; alkyd resins; polyacetals and poly(vinyl acetals); poly(vinyl ethers); poly(*N*-vinylpyrrolidone); polymerization of acrylic acids and related compounds; and poly(vinyl chloride).

The subjects chosen indicate a strong industrial emphasis and cover many of the economically important areas of polymer chemistry. The extensive incorporation of patent information (half the references are patents) is combined with authoritative interpretation and integration to give comprehensive reviews. Most chapters provide a broad historical background of the development of the polymer family, and several also include tables of general application, annual production, and markets.

The stated purpose of the series is to provide detailed laboratory instructions for the various polymer preparations. The instructions are concise and appear to be readily reproducible. Of major importance are the discussions of changes in polymer properties with changes in polymerization technique and conditions. Characterization parameters, polymerization rate constants, and molecular weight–viscosity relationships, to name a few examples, make the book valuable as a specific reference for the chosen topics.

Despite the fact that the latest references are from 1974, the book is highly recommended to anyone working with one of the families of polymers covered. Moreover, the series will provide an excellent introduction to the polymer industry for those starting their careers. For academic polymer chemists, incorporation of the information and representative experiments into courses would broaden their students' acquaintance with the industry, an acquaintance students and academicians in general would do well to cultivate more actively. This volume, along with the other two in the series, will make a valuable addition to corporate and campus libraries. Realistically, incorporation into personal collections will, despite the quality and completeness of the coverage, be limited by the choice of subjects and the absence of the most recent contributions. The book will find greatest value as a collection of relatively comprehensive reviews containing a great many experimental procedures.

Lon J. Mathias, *Auburn University*