

References and Notes

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Received July 17, 1975

Book Reviews*

Chemische Farbreaktionen von Pilzen. By A. MEIXNER. J. Cramer, Lehre, Germany. 1975. 286 pp. DM 29.50.

Chemical color tests have become an important aid in the identification and classification of mushrooms, because the morphological details of the fruiting bodies vary considerably and can be misleading. A group of reagents has come to be recognized as useful, including such examples as silver nitrate, phenol, picric acid, etc. The first 15 pages of this softbound volume describe the preparation and use of the test solutions; most of the remainder consists of tables, in which the color reactions of each species are listed. Alphabetical lists of scientific names and German folknames serve as indexes.

Functional Group Determination of Olefinic and Acetylenic Unsaturation. By K. MÜLLER (BASF). Translated by M. R. F. ASHWORTH. Academic Press, London. 1975. xii + 334 pp. £9.20 (\$24.25).

This book is based on the author's long experience with the subject in an industrial laboratory. Its scope is not so broad as the title implies, for, as the author states in this preface, it is limited to chemical methods, and most spectroscopic and chromatographic methods are excluded. In Part I, determination of the double bond, chapters are devoted to qualitative identification, paper and thin-layer chromatography, hydrogenation, addition of halogen, reaction with peroxy compounds, addition of mercury salts, ozonolysis, other additions, hydrolytic cleavage, oxidative cleavage, polarography, and methods for conjugated double bonds. Part II, determination of the triple bond, is parallel but necessarily somewhat shorter. The longest chapter is devoted to reactions with metal salts (copper, silver, and mercury). The chapters contain critical discussions, tables, procedures, and bibliographies. Oddly, there is an author index, but no subject index.

The Infrared Spectra of Complex Molecules. Volume I. Third Edition. By L. J. BELLAMY (Explosives Research and Development Establishment, Waltham Abbey). Wiley/Halsted, New York, N.Y. 1975. xix + 433 pp. \$24.00.

The appearance of a new edition of a book that has become an old friend to so many is especially welcome. Its many users understand that the molecules dealt with are ordinary organic com-

pounds, and not really so "complex" in that context. The first two editions were perhaps the most widely quoted infrared references to be found in organic research articles.

This edition is fully revised, but it still retains the basic orientation of setting out the known facts; the complementary book, Volume 2, titled "Advances in Infrared Group Frequencies", published in 1968, emphasizes the explanation of these facts. The new Volume I brings the knowledge of the field up to date with selected bibliographies and incorporates much new information. The author notes that "very few new group frequencies have emerged over the past fifteen years", and that emphasis has shifted to structural and chemical problems other than simple identification of specific groups. The chapters themselves remain the same, however, except for the elimination of the one on origins of group frequencies, a subject belonging more properly in Volume 2. As in past editions, there is a large amount of discussion that includes critical analysis and generalization. A compound index supplements the subject index.

Organic Nitrates. Edited by P. NEEDLEMAN. Springer-Verlag, New York, N.Y. 1975. xii + 196 pp. \$41.80.

The title of this book is somewhat misleading for it is concerned primarily with pharmacology of alkyl nitrates (it is Volume 40 in the series "Handbook of Experimental Pharmacology"). After a short but interesting chapter in historical background, an even shorter chapter (9 pp) covers the chemistry of alkyl nitrates, and another chapter covers analytical methods. The remaining 80% of the book is devoted to pharmacology, physiology, biochemistry, and clinical use of alkyl nitrates, which have been used to alleviate angina pectoris since that use was discovered in 1857 by Sir Lauder Brunton. It is most helpful that the bibliographies at the end of each chapter include the luxury of giving the title of each citation. The book is provided with a subject and an author index.

Potassium in Tropical Crops and Soils. International Potash Institute, P.O. Box 41, CH-3048 Worblaufen-Bern. 1974. 603 pp. Sfr42.00.

This volume is the Proceedings of the Tenth Colloquium of the Institute, held in Abidjan, Ivory Coast, in 1973. The papers, which are accounts of original research, are mostly in French. The emphasis is more agricultural than chemical, but the book should be of interest to fertilizer chemists.

* Unsigned book reviews are by the Book Review Editor.

Annual Review of Materials Science. Volume 5. Edited by R. A. HUGGINS. Annual Reviews Inc., Palo Alto, Calif. 1975. 418 pp. \$15.00.

The subject of materials science is an interdisciplinary one involving chemistry, physics, metallurgy, crystallography, ceramics, and aspects of engineering. Accordingly, the fifteen review papers in this typeset volume cut across several fields, and not all of them are of prime interest to chemists. However, such subjects as "Molecular Organization of Amorphous Polymers" (R. E. Robertson), "Solid-state Polymerization" (M. Nishii and K. Hayashi), "Electronic Transport in Polycrystalline Films" (R. H. Bube), and "Semiconducting Compounds of the A^{II} B^V Group" (W. Żdanowicz and L. Żdanowicz) make the book sufficiently pertinent to recommend its inclusion in a chemical library. Extensive author and subject indexes add to its usefulness.

Determination of Organic Compounds with N-Bromosuccinimide and Allied Reagents. By N. K. MATHUR and C. K. NARANG (The University of Jodhpur). Academic Press, London. 1975. ix + 166 pp. £5.20 (\$13.75).

N-Halo amides and imides react with various types of organic compounds by substitution, oxidation, and, in special cases, cleavage of peptide bonds. Since the unconsumed reagent can be titrated iodometrically, these reactions can be adapted to quantitative determination.

In order to make a book out of this rather narrow topic, the authors have had to stretch it and pad it considerably. One-fifth of the book is devoted to a review of the general chemistry of N-halo amides and imides. The remainder of the book takes up the analytical applications in great detail so as to include nearly all the pertinent data in the references cited, including tables of experimental results, and laboratory procedures. The procedures are useful, but the tables seem largely superfluous. Some tables and even figures are lifted verbatim from copyrighted journals (including this one), but no acknowledgment of permission having been received is stated.

The range of functional groups that can be determined is impressive and would not be apparent if the examples had not all been brought together this way. An author index, which does not seem likely to be of significant use in this sort of book, and a nicely detailed subject index augment the text.

Handbook of Naturally Occurring Compounds. Volume I. By T. K. DEVON (Pfizer Central Research Laboratories, England) and A. F. SCOTT (Yale University). Academic Press, New York and London. 1975. xi + 644 pp. \$32.00.

This is the first part of a three-volume catalog and is devoted to acetogenins, shikimates, and carbohydrates. It is an outgrowth of the Card Index File of Naturally Occurring Compounds initiated at the University of Sussex in 1966. It is an attempt to deal with the rapid increase in knowledge of the structures of natural products, and the consequent difficulties of maintaining current awareness and acquiring retrospective data. Annual supplementary volumes are planned.

The Handbook is said to contain "most of the known naturally occurring compounds to which structures have been assigned", excluding polymeric substances, synthetic derivatives, and degradation products. The data for each compound are assembled in 3/4 × 1 7/8 in. boxes, ten to a page, which contain the name, molecular formula, structural formula, molecular weight, optical rotation, melting point, classification number, and a literature reference ("usually the latest").

The arrangement is according to a structural/biogenetic classification, so as to bring related compounds together. Access to information on a particular compound is made easy by three indices: alphabetical; formula; and molecular weight. There are a few unhappy choices of name, such as "AMB ester" for α -methylbutyrate, but the catalog is otherwise eminently easy to use, potentially very useful, and without an equivalent.

Handbook of Reactive Chemical Hazards. By L. BREThERICK (British Petroleum Co., Ltd.). Butterworths, London. 1975. xx + 976 pp. £20.00.

This book is subtitled "An Indexed Guide to Published Data". It is a compilation of information about dangerous reactions, generally explosiveness and flammability, arranged in two sections: Class,

Group, and Topic (alphabetically); and Specific Chemicals (arranged in formula order, although identified by name). For each case, instability on storage or handling and dangerous reactions with other substances are given, along with one or more references. Many of the references are to "Letters to the Editor" in publications such as *Angewandte Chemie* and *Chemical and Engineering News*, but reviews, books, many applied journals, and some articles in fundamental journals are referred to.

The information is presented concisely and in a form easy to comprehend, and the inclusion of many case histories adds substance to the bare bones. Where information allows, an attempt is made to analyze the cause of the dangerous event. Cross references are abundant. Terminology, although not misleading, is sometimes strange; e.g., "dinitrogen pentoxide", "ruducant" (how should one pronounce it?) instead of "reductant". The arrangement by formula is a bit awkward to use, and an alphabetical index would have been helpful. Nevertheless, this is a most timely and valuable book, and one can conscientiously recommend that a copy be provided for every research laboratory, rather than just the central library. The price may seem high, but it is, after all, less than 5¢ per page, and would be repaid many times if the book prevents even one accident.

Chromatography. A Laboratory Handbook of Chromatographic and Electrophoretic Methods. Third Edition. Edited by E. HEFTMANN. Van Nostrand-Reinhold Co., New York, N.Y. 1975. xxx + 969 pp. \$47.50.

It has been seven years since the second edition of this work, and fourteen years since the first. The subject has not only grown, but has diversified, so that more than ever has it become impossible for any single chemist to keep abreast of it. Most organic chemists must to some degree use chromatography, and they should be pleased that this new edition is available to serve them. It consists of 29 chapters by an international group of experts. About 40% of the book is devoted to fourteen chapters on fundamentals of the various methods, in which emphasis is given to equipment and procedure. The remaining chapters are concerned with applications and are divided according to classes of substance.

All of the chapters have been revised, and some have been completely rewritten. A number of contributors have joined the effort. The two major changes are the expansion of the chapter on alkaloids to include the entire field of pharmaceuticals, and the addition of the important subject of pesticide residues to Chapter 25. The inclusion of a glossary of abbreviations, some of which are amazing, is commendable. No statement is made as to when the coverage of the literature was, unfortunately.

This is an obviously useful reference book and should see the wide use of the earlier editions.

Photoresist: Materials and Processes. By WILLIAM S. DEFOREST (Rockwell International). McGraw-Hill Book Co., New York, N.Y. 1975. xi + 269 pp. \$16.50.

Photoresists are coatings, the solubility of which can be selectively altered by exposure to light, such that an image is produced by alteration of the surface. The most familiar example is printing by photogravure, a process in which a printing plate is prepared by exposing a suitable coated metal plate to a focussed image, washing away the unhardened parts of the coating, and etching the exposed metal to form a pitted surface that will take ink. The process originated with a British patent issued to W. H. F. Talbot in 1852, but remained of concern only to the printing industry until the 1940's, when its application to printed electric circuitry began its rapid rise.

This book emphasizes printed circuit boards. It is deeply concerned with the manifold applications of organic chemistry, particularly light-induced polymerization, to the subject, and with the practical problems associated therewith. It is extensively documented and is illustrated with many drawings and photographs; the many organic structures are commendably drawn with an accuracy that is too often neglected in a book of this kind.

Rodd's Chemistry of Carbon Compounds. Supplement to Second Edition. Volume I. Edited by M. F. ANSELL. Elsevier Scientific Publishing Co., Amsterdam. 1975. xvi + 268 pp. Dfl. 110 (about \$45.95).

The second edition of Volume I of this standard reference work

appeared ten years ago, and the accelerating growth of organic chemistry has made a new edition already justified. However, the size of a third edition and the consequence expense would be formidable, and the publishers have wisely chosen instead to issue supplements designed to keep the work abreast of the advance of the science.

This supplement is devoted to aliphatic compounds, from hydrocarbons through organometallic compounds. The chapter on unsaturated acyclic hydrocarbons was unfortunately not received on time, and a four-page bibliography, largely of review articles, appears in its place. The presentation maintains the high quality of the original work, and the usual highly detailed index is included. It is unfortunate that the chapters still contain no statement as to how recently the literature survey was terminated; one chapter carries a footnote to say that the manuscript was received in 1970, and that "references to some key reviews published subsequently have been added in proof (October 1973)". There seems to have been no hurry to put this book on the market, although it is, indeed, a welcome one.

The Sadtler Guide to the NMR Spectra of Polymers. By W. W. SIMONS and M. ZANGER. Sadtler Research Laboratories, Inc., Philadelphia, Pa., 1973. 298 pp. \$24.50.

This volume consists largely of a selected group of clearly reproduced and succinctly annotated NMR spectra of polymers. Each group of polymers (e.g., vinyl polymers, polyurethanes, etc.) is preceded by a short discussion of the general facts about the class and generalities about the NMR spectra. There is a substantial group of NMR spectra of important monomers as well. The stated objectives are "to enable the user to readily characterize specific polymers" and "to illustrate the analysis of copolymers and polymer mixtures . . .". Several indexes (alphabetical, commercial name, manufacturer, structural moiety) make the collection eminently usable.

Reviews in Macromolecular Chemistry. Volume 12. Edited by GEORGE B. BUTLER (University of Florida), KENNETH F. O'DRISCOLL (University of Waterloo), and MITCHEL SHEN (University of California). Marcel Dekker, Inc., New York, N.Y. 1975. xii + 390 pp. \$29.50.

This volume contains seven review articles which are well written and referenced. Some of the articles are a bit brief for the subject matter covered, but this brevity does not detract from utility.

In the article on the "Sliding Friction of Polymers", J. J. Bikerman discusses the theory and practical measurement of sliding friction. He presents a realistic view of the experimental test results obtained and the pitfalls in reporting data. Bikerman has a dim view of present thinking and states a good case for change.

"Cardo Polymers" by Vasilii V. Korshak, Svetlana V. Vinogradova, and Yacob S. Vygodshii is translated from Russian by G. K. Lapenkova. The article defines cardo polymers and systematically discusses monomers, and polymer synthesis and properties. Polymer properties are briefly listed in tables according to the monomer used. A few applications are suggested.

"Surveys on Heat-Resistant Polymers. 1. Pyrrones" by Boris Nartsissov is a good review on pyrrones since 1967. The author discusses polymer syntheses, properties, and some practical modifications. A table containing polymer type and method of preparation is presented.

The article "On the Mathematical Modeling of Emulsion Polymerization Reactors" by K. W. Min and W. H. Ray is an interesting, clear presentation and comparison of mechanistic theories of emulsion polymerization. The authors discuss the effects of particle size and kind, batch, and continuous reactors, and compare theories and experimental results. The specifics of styrene, acrylics, vinyl acetate, and others are discussed, and a detailed general model capable of handling all of the mechanisms is presented.

"Thermodynamics of Polymerization. VI. Thermodynamics of Copolymerization. Part 2" by Hideo Sawada relies on the general thermodynamic discussion of Part 1 and specifically relates this to radical and ionic polymerizations with a very brief discussion of ring opening and other types of copolymerizations. In the section on radical polymerizations, heats of copolymerization, ceiling temperature, $Q-e$ values, and the effects of temperature, solvent, and

substituent are discussed. Energetics, reactivity, and temperature effects on ionic copolymerizations are also presented.

"Photopolymerizations" by S. S. Labana is a clearly written and easy to read review. The topics covered are light sources, the various initiation mechanisms of radical polymerizations, and ionic, solid state, cycloaddition, and graft photopolymerizations.

The final paper, "Polymeric Equations of State" by John G. Curro, reviews a special case of the polymeric equation of state where "the stress field is hydrostatic and time-dependent effects are neglected". "In this review, the various equilibrium theoretical equations of state which have been developed for polymer crystals, liquid, and glasses, are examined and compared with experimental observations". It is well written and the author realistically achieves his stated goals without getting the reader overwhelmed with formidable looking equations.

Kenneth Abate, *Celanese Coatings and Specialties Company*

Surface and Defect Properties of Solids. Volume 3. Senior Reporters: M. W. ROBERTS and J. M. THOMAS. The Chemical Society, London. 1974. viii + 201 pp. £6.50.

This volume like its predecessors consists of reviews of recent literature in specialized areas within the rather wide scope given by the title. The termination date for the literature surveyed in the six articles of this volume is April 1973.

Chapter 1 by J. S. Anderson and R. J. D. Tilley, Crystallographic Shear and Non-stoichiometry, covers a type of crystal defect which is not a point defect, which is not readily detected by x-ray diffraction, but which has primarily been studied by high resolution electron transmission microscopy. Chapter 2, The Geometry of Disclinations in Crystals, by W. F. Harris, reviews a kind of defect so far observed in crystals of biological origin, and, to name a few, in liquid crystals, in the vector field of spins in magnetic systems, and in polymers. Chapter 3, Stress-induced Martensitic Transformations and Twinning in Organic Molecular Crystals, by M. J. Bevis and P. S. Allan, relates primarily to a process which can be a dominant mode of plastic deformation in crystalline polymers. Chapter 4, A Simple Wavefunction for Solid and Surface Calculations, by R. A. Suthers, J. W. Linnett, and W. D. Erickson, reviews the floating spherical gaussian orbital of A. A. Frost and extends its use to solid LiH, to its surface, and to helium absorbed on the [100] and [110] surfaces. Chapter 5, Appearance Potential Spectroscopy and Related Techniques, by A. M. Bradshaw, deals primarily with soft x-ray appearance potential spectroscopy (SXAPS or APS), a recently revived technique which is surface sensitive and which is unusually simple experimentally. Chapter 6, Some Aspects of the Nature and Reactivity of Adsorbed States of Unsaturated Hydrocarbons on Metal Catalysts, by G. Webb, also includes within its scope consideration of the influence of the nature and structure of the catalyst upon catalytic behavior and the influence of the catalyst support.

Robert L. Burwell, Jr., *Northwestern University*

The Infrared Spectra of Minerals. Edited by V. C. FARMER (Department of Spectrochemistry, The Macaulay Institute for Soil Research, Aberdeen). Mineralogical Society, London. 1974. x + 539 pp. £16.00 (\$38.00).

This thoroughly excellent and complete book on the infrared spectra of minerals is destined to become the definitive text on this subject for inorganic chemists, mineralogists, analytical chemists, and spectroscopists. The editor has done an admirable job of engaging thirteen renowned experts (editor included) to present comprehensive reviews of the use of vibrational spectroscopy in mineral chemistry in twenty-one chapters. The book is almost unique with regard to subject matter since the characterization of natural minerals has been presented only sparsely in previous publications. The chapters are skillfully cross-referenced and integrated, unusual in a book of this type. Most of them have exceptionally good reference lists, and some include supplementary bibliographies.

The authors of the chapters wisely assume that the reader has a working knowledge of the theory and practice of vibrational spectroscopy. This allows them to concentrate on subject matter especially relevant to the spectroscopy of minerals. The chapters dealing with the theory of interaction of infrared radiation with crystals, symmetry and crystal vibrations, dynamics of crystal lattices, and order-disorder effects are concise and lucid. They provide an excellent introduction to vibrational spectroscopy of the

solid state. The method of "Quasi-isotopic substitution", using spectra of solid solutions to assist in making band assignments (Chapter 5) is particularly intriguing. The editor has developed correlation tables for site symmetry to crystal symmetry in order to simplify vibrational analysis of crystals. These are presented in an appendix. However, these reviewers did not find them as easy to use as those given by Fateley et al., whose work is acknowledged by the editor as having stimulated his own tables.

Highly practical discussions of the applications of infrared spectroscopy to oxides, borates, carbonates, phosphates, sulfates and oxy-anions of groups V and VI are each separate chapters. Four chapters on silicates (from the simplest orthosilicates to chain, ribbon, ring, layer, and finally three-dimensional structures) are the best review of these materials to be found anywhere. They could be a separate book. A pragmatic approach to deciphering a complex problem is described in chapters on the analysis of cements, ceramics, and glasses.

Unfortunately, the chapter on Raman spectroscopy of minerals only covers the literature to 1970, giving little indication of the real impact this tool is making in the characterization of inorganics. The information available from Raman spectra is elucidated in many of the chapters on specific groups of minerals, however, so the concise explanation of the Raman effect which is presented is quite useful.

The editor expresses the hope that this book "will lead to more general use of infrared and Raman spectroscopy in mineral chemistry". There seems little doubt of that. The book should be a required reference text in every laboratory concerned with structural analysis and identification of inorganic materials.

Jeanette G. Grasselli, Mary Ann S. Hazle
The Standard Oil Company (Ohio)

Chemistry and the Technological Backlash. By JAMES L. PYLE (Miami University). Prentice-Hall, Inc., Englewood Cliffs, N.J. 1974. xiii + 354 pp. \$11.95 cloth, \$7.25 paper.

The author believes that "a new relationship is developing in man's attitude toward the management of technological development". The benefits of technology have always been clear, but until recently its drawbacks have not been sufficiently recognized. However, such recognition shows danger of being unbalanced, and overreaction by the public and its elected representatives is a real possibility. According to Professor Pyle, "the backlash of technology has resulted in its failure to understand the complexities of biological and other systems on both large scale and at the molecular levels. By learning more about the chemistry of the system, it is usually possible to follow through with the proper adjustments in the technological application".

In the belief that a "sensitivity to these problems is necessary in the training of new chemists", the author has written the volume under review here "as a resource and supplementary book to any of the several basic texts". Intended for a relatively wide audience—the nonscience major, the chemistry major, or even the advanced high school student—this student-oriented book is as timely as today's newspaper headlines and is literally packed with data on almost every conceivable technological problem. To describe each topic in sufficient detail for the student with minimal background would obviously require an unwieldy book many times the length of this one, and Professor Pyle's book will obviously require considerable supplementing from other sources. Indeed, it has been criticized elsewhere on this basis (see, for example, *J. Chem. Educ.*, 51, A453 (1974)). However, with its readable style, broad coverage, extensive suggested reading sections, glossary, and other features useful to students, the book may prove useful in providing the reader with a bird's eye view of an area of concern to the scientifically literate citizen.

George B. Kauffman, *California State University, Fresno*

Chemistry and the Needs of Society. Special Publication No. 26. The Chemical Society, London. 1974. 249 pp. £3.00 (\$8.00) paper.

This short volume consists of seventeen papers presented at a symposium on the given title organized by the Industrial Division of The Chemical Society and held at Imperial College, London, on April 2-5, 1974. According to the Chairman, J. W. Barrett, the

conference was "about chemical knowledge—its application to meet society's needs and the implications of the results". Most of the contributions concern technology, industrial chemistry, and the environment rather than academic chemistry per se. Although the problems are of global concern, emphasis is placed on conditions and research in the United Kingdom, which is not surprising inasmuch as most of the authors are English. The papers are organized under five main sections: (1) Resources, (2) Staying Alive, (3) Enjoying Life, (4) Keeping It Clean, and (5) Meeting the Needs—The Balance. The papers and their authors are: (1) "Carbon and Hydrogen Sources—The Supplier", P. I. Walters (17 pp); (2) "Carbon and Hydrogen Sources—The User", P. V. Youle and J. R. Stammers (19 pp); (3) "Energy from Electrochemical Reactions", A. B. Hart (13 pp); (4) "Water—An Overall Picture", H. Fish (9 pp); (5) "Protection and Preservation of Food Supplies", R. F. Crampton (2 pp); (6) "Novel Sources of Proteins", B. M. Lainé (9 pp); (7) "Promotion and Regulation of Plant Growth", D. L. Gerwitz (11 pp); (8) "Staying Alive—and Healthy", Royal Institute of Chemistry Presidential Address, F. A. Robinson (20 pp); (9) "Chemistry and Aging", C. G. Kormendy (10 pp); (10) "Flavour, Taste, and Smell", A. T. James (14 pp); (11) "Chemistry, Colour, and Communication", G. F. Duffin (12 pp); (12) "Proficiency with Polymers", C. E. Hollis (28 pp); (13) "The Biological Effects of Chemical Substances", M. W. Holdgate (18 pp); (14) "Recycling and Renovation of Water", M. N. Elliott and D. C. Sammon (10 pp); (15) "The Role of the Chemist in Keeping the Air Clean", J. S. S. Reay (12 pp); (16) "Future Economics of Industrial Innovation", K. Hansen (13 pp); and (17) "Education, Training, and Research in Universities", S. F. Edwards (10 pp). The results of the symposium and desiderata for the future are summarized in the Chairman's Concluding Remarks (3 pp).

George B. Kauffman, *California State University, Fresno*

Organometallic Reactions. Volume 5. Edited by E. I. BECKER (University of Massachusetts) and M. TSUTSUI (Texas A&M University). Wiley Interscience, New York, N.Y. 1975. x + 446 pp. \$39.95

This latest volume of "Organometallic Reactions" offers four surveys of topics in organometallic chemistry. As in the past, the editors' efforts to "provide complete chapters on selected categories of organometallic compounds" have met with only partial success. The scope of the four chapters varies from broad areas of chemistry to a single reaction type. The first chapter, "Reactions of Organothallium Compounds" (A. G. Lee), reviews the literature through 1972. It offers a good review of the preparation and properties of organothallium reagents. A good selection of experimental procedures is provided. The second chapter, "The Reaction of Bimetallic Organometallic Compounds: Organometallic Compounds with Metal-Alkali Metal Bonds" (N. S. Vyazankin, G. A. Razuvaev, and O. A. Kruglaya), provides a comprehensive review of this broad area of organometallic chemistry. The early literature is covered via reference to previous reviews. The authors have concentrated on recent work in this area. There are over 700 references covering the literature through 1973. In addition, a large selection of experimental procedures is presented. The third chapter, "The Reactions of Organometallic Compounds with Carbon Dioxide" (M. E. Volpin and I. S. Kolomnikov), emphasizes the reactions of carbon dioxide with transition metal compounds, a relatively new area. A good selection of experimental procedures is presented. The literature is covered through 1974. The fourth chapter, "Unsaturated Organoaluminum Compounds" (K. L. Hebold and J. P. Oliver), presents representative reactions of unsaturated aluminum reagents. It is not a comprehensive review and contains only a few selected experimental procedures. The literature is covered through 1973.

This volume of "Organometallic Reactions" continues to offer the practicing organometallic chemist a fine source of preparative methods and techniques. Available information is presented by means of comprehensive tables containing the appropriate literature references. Specific examples of experimental procedures are also included. Synchronization of the chapters and literature coverage still remains a problem. It should be noted that the editors have succeeded in shortening the publication time of the reviews.

George W. Kabalka, *University of Tennessee*