

Book Reviews*

Kirk-Othmer Encyclopedia of Chemical Technology, Third Edition, Volumes 3 and 4. Edited by M. GRAYSON. Wiley/Interscience, New York, 1978. Vol 3: xxv + 958 pp. \$120.00. Vol. 4: xxv + 930 pp. \$120.00.

These latest volumes in the series cover in alphabetic order subjects from Antibiotics to Bleaching Agents, and from Blood to Cardiovascular Agents, respectively. The articles in each have been written by about 60 people, nearly all of whom evidently have strong credentials in industrial chemistry. In a prefatory note, the editor mentions that the usefulness of such an encyclopedia depends on accessibility "through the most common correct name for a substance". This principle has been followed with good results, and the use of *Chemical Abstracts* indexing code words, such as "benzenamine", has been avoided in favor of IUPAC and other names that communicate more effectively (Registry Numbers are provided, however).

Entries range from general topics, such as "Antifreezes and Deicing Fluids" to specific compounds such as "Benzoic Acid". Spot checking suggests that the coverage is up to date (through about 1976) and scientifically reliable. One learns, for example, that the world consumption of beer has tripled since 1974-75 (although it is not stated whether this has raised or lowered the level of the oceans), that benzidine is believed responsible for a high incidence of bladder tumors in Japanese kimono painters, and that an economic route to terephthalic acid has been developed using heat-induced disproportionation of potassium benzoate.

The overall quality of both content and production is high.

Advances in Heterocyclic Chemistry, Volume 23. Edited by A. R. KATRITZKY and A. J. BOULTON (University of East Anglia). Academic Press, New York, 1979. ix + 487 pp. \$49.50.

This volume, somewhat larger than most of its predecessors, consists of four chapters of usual length and an oversize one: Reactions of Acetylenecarboxylic Esters with Nitrogen-Containing Heterocycles, by R. M. Acheson and N. F. Elmore. The length of this chapter may be surprising in view of the fact that the subject was reviewed in this series in 1963, but the increased interest in and understanding of cycloaddition reactions have given rise to much new publication. Products of previously enigmatic reactions have been identified, and quite a number of new types of reaction have been discovered. It is interesting to note the generalization that in the cases examined so far, the presence of lone pairs of electrons in nitrogen heterocycles does not alter the course of reaction to be expected from comparison with the analogous carbocyclic compounds.

Another subject, 1,3-oxazines, has also been brought up to date since 1963, by Z. Eckstein and T. Urbanski. Chemistry of indolizines, a subject not before treated in this series, is presented as a bringing up to date of reviews published elsewhere, by F. J. Swinbourne, J. H. Hunt, and G. Klinkert. The two totally new subjects are Medium-large and Large π -Excessive Heterocumulenes, by A. G. Anastassiou and H. S. Kasmai, and Olefin Synthesis with Anils, by I. J. Fletcher and A. E. Siegrist. The former chapter takes up the subject primarily from the standpoint of physico-chemical properties and possible aromatic character, and considers rings from hetero analogues of cyclooctatetraene upwards. The latter chapter is concerned with the preparation of heterocyclic stilbenes by condensation of anils of benzaldehydes with suitably activated methyl or methylene groups, such as in 2-*p*-tolylbenzoxazole.

Sodium-NaK Engineering Handbook, Volumes III and IV. Edited by O. J. FOUST. Gordon and Breach Science Publishers Inc., New York, 1978. Vol III: xi + 335 pp. \$57.00. Vol. IV: xi + 286 pp. \$57.00.

Sodium and its alloys with potassium have become important as heat-transfer fluids for engines that must work at high temperature, and for nuclear reactors. These volumes are "intended for use by present and future designers in the Liquid Metals Fast Breeder Reactor Program". Volume III has sections that touch on certain applied aspects of sodium chemistry, hazards, handling, and instrumental monitoring. Volume IV is concerned with equipment.

Organic Electronic Spectral Data, Volume XIV, 1972. Edited by J. P. PHILLIPS, D. BATES, H. FEUER, and B. S. THYAGARAJAN. Wiley/Interscience, New York, 1978. xiii + 1166 pp. \$65.00.

In this series, a group of 137 journals is surveyed for a given year, and the data on UV-visible spectra reported in them are collected and presented in a unified form. Compounds are arranged in formula-index fashion, and for each are given the wavelengths of absorption maxima (including shoulders), molar absorptivities, solvent, and reference to the source. Each book is thus a gigantic table, which is self-indexing.

Air Pollution Reference Measurement Methods and Systems. Edited by T. SCHNEIDER, H. W. DEKONING, and L. J. BRASSER. Elsevier Scientific Publishing Co., New York and Amsterdam, 1978. vii + 168 pp. \$35.55.

This book is the Proceedings of the International Workshop on the title subject held in the Netherlands in 1977. It consists of the texts of the papers delivered, reproduced from typescript. The topics are highly applied and would seem to have appeal primarily for atmospheric scientists and technicians, as opposed to chemists.

The Analytical Chemistry of Synthetic Dyes. Edited by K. VENKATARAMAN. Wiley/Interscience, New York, 1977. xxiv + 591 pp. \$42.50.

Synthetic dyes have been with us for over a century, and the subject has grown to a state of great complexity, with an exotically varied range of structures. It has also become an area of great industrial importance and competition, a circumstance that has led to extreme secretiveness. The Editor points out in the introduction that some manufacturers are not above selling dyes under false names, and may be completely uncooperative in giving information on identity or formulation that may be essential to the user. The need for methods for identifying dyes and substances with which they may be mixed, and even structure determination, is thus great.

This book claims to be the most comprehensive work on the subject published so far, and the claim appears to be justified. The twenty chapters cover chromatography, spectroscopy of all sorts, chemical degradation, and a variety of specialized applications, such as analysis of hair dyes, ecological and toxicological monitoring, identification of pigments, analysis of food, drug, and cosmetic colors, etc. There is much in the book that is of more general application for both identification and structure determination. The chapters are thoroughly documented, and there is a good subject index.

Solar Power and Fuels. Edited by J. R. BOLTON. Academic Press, New York, 1977. xvi + 254 pp. \$13.50.

The Proceedings of conferences do not generally make exciting reading, but this volume may be one of the exceptions. The number of papers presented has been kept down to eight plenary lectures; they originate from a wide selection of countries. The general theme is photochemical reactions leading to fuels or to electrical energy. Most of the papers are on specific phenomena, but one is a survey of the overall subject of photochemical conversion and storage of solar energy (the late Gabriel Stein), and one is addressed to the feasibility of solving the world's energy problems by photosynthetic means (David O. Hall). Edited versions of the discussions following the papers are included, and there is even a decent subject index.

Organic Syntheses, Volume 58. Edited by the late W. A. SHEPPARD. John Wiley & Sons, New York, 1979. xxv + 216 + 24 pp. \$14.00.

This series is still vigorously alive after 58 years because it has evolved to meet changing needs. An unusual feature of the present volume is the presence of three appreciations: James Bryant Conant, Louis F. Fieser, and Edward P. Hamilton. The biographies of the first two encapsule much of the development of organic chemistry in the United States. Edward Hamilton's connection with organic chemistry was in the publishing of it, and his career fostered the creation and growth not only of "Organic Syntheses", but also "Organic Reactions and Biochemical Preparations".

The main content of this volume consists of 29 checked preparations. A sizable group of them involve use of boron or silicon com-

* Unsigned book reviews are by the Book Review Editor.

pounds to direct syntheses. There are also several preparations concerned with reduced sulfur compounds, and a substantial group of preparations utilizing organometallic compounds.

Ketones predominate in the classes of compounds prepared, but there are halogen compounds, heterocyclics, macrocyclic compounds, etc. As in recent volumes, a group of submitted preparations yet to be checked is presented in equation form at the end.

Chemistry of the Environment. By R. A. BAILEY, H. M. CLARKE, J. P. FERRIS, S. KRAUSE, and R. L. STRONG (Rensselaer Polytechnic Institute). Academic Press, New York. 1979. x + 575 pp. \$26.00.

This is both a textbook and a reference book. It is designed for a course for upper-level undergraduates and graduate students, but it is so well provided with references, to both primary and secondary sources, and with tables, graphs, and equations, that it can serve as a convenient first-stage reference.

In seventeen chapters, energy, the atmosphere, fuels, detergents, pesticides, photochemistry, insect hormones and pheromones, polymers, water, trace elements, and nuclear chemistry are treated. In nearly all cases, the fundamental chemistry or physics is presented with appropriate rigor, and this is therefore not a book for the scientifically naive. On the other hand, some of the fundamental science might perhaps have been left out, such as a discussion of the principles of aromatic substitution, for those with the scientific sophistication necessary to understand much of the book should already know such subjects.

The text reads well, and is not verbose. Little space is wasted on pictures. The subject index is substantial. The book seems very well suited for serious teaching, either to others or to oneself.

Iminium Salts in Organic Chemistry. Part 2. Edited by H. BÖHME and H. G. VIEHE. Wiley/Interscience, New York. 1979. xii + 838 pp. \$68.50.

This is part of Volume 9 of the "Advances in Organic Chemistry" series. It appears two years after Part 1 and like it is composed of contributed chapters, largely by European authors (but including one Japanese group and one Soviet group). Even more than Part 1, it treats the concept of iminium salts broadly, so as to embrace all manner of derivatives of carboxylic acids having C-N⁺ double bonds, such as amidinium salts and *N*-acylpyridinium salts, and even includes a chapter on orthoamides.

Much of this area has been developed by H. Brederick and his co-workers over the last three decades, and it is appropriate that the first chapter should be an overview of the chemistry of carboxamide salts. One of his former students, W. Kantlehner, has contributed no less than seven chapters detailing the enormous amount of research on formamide and its derivatives that developed largely out of the efforts of the Stuttgart school.

The chapters are comprehensive and thorough, and have been brought as nearly up to date as feasible by the inclusion of addenda covering publications through 1977. An author index is included (quite an accomplishment for a book so large and detailed), and the subject index (12 pp) is adequate. This book covers an area of organic chemistry whose importance and potential are not so generally appreciated as they should be, and it deserves a wide audience.

Quantitative Organic Analysis Via Functional Groups. 4th Edition. By S. SIGGIA (University of Massachusetts) and J. G. HANNA (Connecticut Agricultural Experiment Station). Wiley/Interscience, New York. 1979. xii + 883 pp. \$45.95.

In these days of ascendant instrumentation, there is a tendency to overlook wet chemical methods for analysis. They nevertheless thrive, because they may have advantages in precision, selectivity, speed, or economy, and may be essential in situations where a costly instrument cannot be justified for only occasional use. The vitality in the field may be judged by the fact that the original edition of this work, published in 1949, had only 152 pages.

This edition shows extensive revision as well as expansion. Discussion of the various methods is broader, and now presents a more integrated picture, not only in comparisons between methods, but in terms of chronological development. Arrangement is by functional group, as before, and then by type of reaction. Actual working procedures are included, so that the book can be used independently of a reference library. A new subject is the use of differential reaction rates to determine components having the same functional group.

Twenty-two different functional group classifications are discussed in as many chapters, and four shorter chapters take up certain tech-

niques and approaches. Although such breadth is impressive, some functional groups have inevitably had to be passed over (azides, for example). Both the table of contents and the index are reasonably detailed, and it is thus easy to find out what is included. Literature citations are given at the foot of each page, a nicety that is fast disappearing in modern scientific publishing.

The Physics of Liquid and Solid Helium. Part II. Edited by K. H. BENNEMANN and J. B. KETTERSON. Wiley/Interscience, New York. 1978. vii + 750 pp. \$65.00.

This book contains theoretical and experimental studies on the properties of condensed helium with emphasis on ³He and ³He-⁴He solutions.

Thiazole and Its Derivatives. Part One. Edited by J. V. METZGER. Wiley/Interscience, New York. 1979. xiv + 612 pp. \$80.00.

This is Volume 34 in the series Chemistry of Heterocyclic Compounds. Nine of the eleven contributors are from the University of Aix-Marseille and two from the University of Bologna. There are noticeable traces of the origin of the text from writers not native to English, but they do not detract from clarity and ready readability. They have produced a book that upholds the reputation of this series for thoroughness and excellence.

This volume begins with a photograph of A. Hantzsch and a short tribute to his pioneer researches in thiazole chemistry. The five chapters are devoted to properties and reactions of simple thiazoles, general synthetic methods, chemistry of alkyl and aralkyl thiazoles, carboxylic acids, aldehydes, and ketones of thiazole, and halo and nitro thiazoles. Part Two is planned to cover other functional derivatives and Part Three will include mesoionic thiazoles, cyanine dyes, and selenazoles.

This book is characterized by especially extensive tables, in which all known derivatives are inventoried, reactions are tabulated with yields and conditions, spectrographic properties are compared, etc. When completed, the three parts will constitute a truly definitive treatment. However, for those whose interests do not extend beyond Part One, it is separately (and thoroughly) indexed.

Organic Reaction Mechanisms, 1977. Edited by A. C. KNIPE and W. E. WATTS. Wiley/Interscience, New York. 1979. 741 pp. \$115.00.

The task of the 14 contributors to this volume, to distill the year's results in the area to a degree of concentration to allow them to be squeezed between one set of covers, has not been getting easier, yet most of them are veterans of previous volumes. The new editors continue the quality of the series, with the same distribution of subjects (compound types or reaction types) among the chapters. With extraordinary succinctness, the mechanistic conclusions and some of the arguments in support of them are set forth. Although one can often gain what is wanted from the information presented, the aim appears to be primarily to inform the reader with sufficient precision that he need not waste time consulting original papers that are not highly germane to his interests. One can either browse in a suitably headed section (e.g., "addition reactions"), or consult the author and subject indexes. It is bound to save hours of library time for the mechanism chemist.

Chemistry and Physics of Carbon. Volume 14. Edited by PHILIP L. WALKER, JR., and PETER A. THROWER (Pennsylvania State University). Marcel Dekker, Inc., New York. 1978. ix + 320 pp. \$34.75.

The most recent volume in this excellent interdisciplinary series contains three comprehensive reviews which will be of general interest to researchers in this diversified field.

The first contribution by G. R. Millward and D. A. Jefferson is a timely discussion of the applications of high-resolution transmission electron microscopy in the determination of the ultrastructure of carbonaceous materials. Although the direct observations of ordering of graphitic layer planes in carbons is now relatively commonplace, the quantitative interpretation of lattice images can be fraught with difficulties and pitfalls. This chapter ably demonstrates how instrumental factors, such as defocus and spherical aberration, and also multiple scattering in thick specimens, can affect the reliability of the images for representing the actual structure of the material.

The conditions which promote the deposition of filamentous carbon as a result of the decomposition of gaseous hydrocarbons on hot metal surfaces are discussed in the next chapter by R. T. K. Baker and P.

S. Harris. Notwithstanding some persuasive mechanistic models, the specific catalytic effects of the metal substrate in propagating the growth of often bizarre forms of carbon are still not generally understood and the details of the catalyzed hydrocarbon decomposition reactions remain unclear. Nevertheless, this article provides a stimulating summary of recent work in this area enlivened with a collection of spectacular micrographs obtained by controlled atmosphere electron microscopy, a powerful technique developed by the authors.

The final chapter is a critical well-documented review by J. LaHaye and G. Prado of mechanisms of formation of carbon blacks by pyrolysis and partial combustion of hydrocarbons. Other topics discussed include carbon formation in plasmas, in laser beams, and during liquid fuel droplet combustion. In each case the nucleation and growth of solid carbon particles is preceded by the formation of large polyaromatic molecules which condense into liquid microdroplets. The details of these processes, however, remain controversial in spite of much detailed study. The authors have attempted to make their review as up to date as possible by including an appendix of recent (up to 1977) developments in this rapidly growing area.

The book as a whole is authoritative yet very readable and is highly recommended for all members of the carbon community.

Douglas W. McKee, *General Electric Company*

Critical Scattering Theory. An Introduction. By JERZY KOCINSKI (Warsaw Technical University) and LESZEK WOJTCZAK (University of Lodz). Elsevier Scientific Publishing Co., New York. 1978. x + 227 pp. \$43.55.

This book introduces the theory of scattering from critical systems, from the viewpoint of writers whose major interests are in X ray and neutron scattering from magnetic systems. After a historical review of the classical theory of critical opalescence, the volume discusses thermodynamic fluctuations, scattering cross-sections, mean field and scaling techniques for calculating static and dynamic correlation functions, and the description of critical effects in terms of static and dynamic susceptibilities. There is also a brief presentation of experimental data on scattering from monocrystals.

One might ask whether another book on the general topics of scattering and critical phenomena is really necessary. This volume does focus on magnetic rather than on fluid systems. Furthermore, the Eastern European authors treat problems from a very different standpoint than an American/Western European author might. Correlation functions are only introduced well into the volume, as a convenient technique for doing scattering calculations. Zwanzig-Mori projection operators and mode-mode coupling descriptions are not mentioned. A derivation of the fluctuation-dissipation theorem assumes that fluctuations always decay exponentially with time, ignoring the substantial body of work on "long-time tails" of correlation functions. The authors' use of the Onsager regression hypothesis, "a spontaneous fluctuation may be regarded as resulting from the action of an external field", is as much concerned with the form of the fictitious field as with the temporal behavior of the induced fluctuations.

Despite these novel aspects, the reviewer cannot recommend this volume. For a work prepared by knowledgeable researchers, there are a remarkable number of misleading or erroneous statements, especially in the discussions of fluid systems. In particular, the volume asserts (p 100) that the position operators of a pair of particles do not commute and cannot be measured simultaneously. The authors insist that the decay of large fluctuations is irreversible, not only statistically, but for individual fluctuations. The "phenomenological" description of the Brillouin doublet in a fluid quotes as the Bragg condition $\lambda_s \cos \theta = n\lambda$, $n = 1, 2, \dots, \lambda_s$ and λ being the wavelengths of the sound wave and of the scattered light. For scattering from a continuum (as opposed to a crystal), Bragg condition actually requires $n = 1$; the authors' parting note that "observation only yields the peaks corresponding to $n = 1$ " misses the point. Thermodynamic fluctuations in small regions of space have long been analyzed by treating a region as a subsystem in a reservoir. The authors claim that one can compute "the mean dimensions of such a subsystem" without specifying the strength of interactions with neighboring subsystems. Their calculation assumes implicitly that the partition function of a system of N_1 spins is independent of N_1 ; it assumes explicitly that the particular value of the average magnetization per lattice site "is confined to the interval determined by the quantum values of magnetic moment". The above paragraph is by no means exhaustive.

Finally, the volume contains numerous simple grammatical errors,

primarily involving the use of the definite and indefinite articles. For authors writing in a foreign language, this is entirely understandable. However, in a volume costing in excess of \$40 one might have expected that a publisher's editorial staff would have corrected any such deficiencies.

G. D. J. Phillies, *The University of Michigan*

Natural Products and the Protection of Plants: Proceedings of a Study Week of the Pontifical Academy of Sciences, October, 1976. Edited by G. B. MARINI-BETTOLO (Universita Cattolica del Sacro Cuore, Rome). Pontificia Academia Scientiarum, Citta del Vaticano, Rome. 1977. (limited edition). xlv + 846 pp. Elsevier Scientific Publishing Co. Amsterdam. 1978. xxi + 846 pp. \$112.25. In English.

"Studies on the biochemistry of host plant, pest and pathogen, the recognition of sophisticated chemicals which play a unique part in insect behaviour and other developments of this kind have led to a particularly attractive strategy for pest control which involves the use not only of these naturally occurring molecules but also of some of their structural analogues."

This quotation from the concluding section of the book provides an indication of the scope and emphasis of the title symposium, which brought together 33 scientists from 9 countries, including leading researchers in overlapping fields of biology and chemistry encompassing plants, insects, and plant pathogens.

Most of the participants presented papers and these are grouped in sections dealing with products active on plant pests, arthropod control through natural products, products involved in plant-parasite interaction, and natural products in the protection of plants. Review articles and reports of current research are featured, and these in general are accompanied by short useful bibliographies. The range of topics is broad, and includes the chemistry and physiology of insect hormones, juvenile hormone analogues, compounds possessing anti-JH activity, pheromones, arthropod protective substances, pyrethrin analogues, *Bacillus thuringiensis* endotoxin, insect viruses, phyto-toxins, phytoalexins, and antifeedants, as well as miscellaneous other metabolites associated with resistance of plants to disease and to insect attack.

The concluding section contains a short summary drawn up on the final day of the symposium, which broadly assesses the present status and the potential of such natural agents for crop protection and identifies some problems which merit future research.

The articles are by and large authoritative, up to date, and well written.

The diverse affiliations of the participants in the symposium, academic, industrial, governmental and international, provided a range of perspectives on the difficult problems associated with development and registration of novel pest control agents. Economic factors unfortunately have tended to discourage the development of agents possessing high specificity for a particular target organism.

The value of a small high-level scientific symposium of this nature is derived in large part from the informal exchanges following each presentation, and this undoubtedly prompted the publisher's decision to reproduce verbatim much of the discussion. The latter, in fact, accounts for about 25% of the 846 pages, and while it is certainly informative and adds zest to the book, readers may feel that some judicious pruning here would have been beneficial.

The spacious layout of the volume makes it a pleasure to read. A number of minor errors throughout the text, particularly in the discussion sections, do not detract from its readability.

Because of pressures for increasing world production of food and fiber, and because of the manifold problems associated with wide use of broad spectrum pesticides, this Study Week and the publication which emanated from it are timely and will be of interest and value to chemists, biologists, and agronomists concerned with these problems.

George M. Strunz, *Canadian Forestry Service*

Aromatic and Heteroaromatic Chemistry. Volume 6. Senior Reporters: H. SUSCHITZKY and O. METH-COHN (University of Salford). The Chemical Society, London. 1978. xii + 326 pp. \$56.00.

This sixth specialist report covers the literature abstracted from Volumes 85 and 86 of *Chemical Abstracts*. As indicated in the introduction, aromatics, antiaromatics and even nonaromatics are included—the only criterion being that the rings be fully conjugated. Changes in the size and lay-out of the chapters have been inaugurated with this volume with the aim to reduce production costs. However, at \$56.00 it is still expensive and it must be up to the individual to

decide whether the report or constant attention to the contents of *Chemical Abstracts* is more desirable.

With the exception of a chapter on "Six-membered Homocycles" which was not completed in time for inclusion in this volume, all completely conjugated systems, both homocyclic and heterocyclic, appear. The reporting is competent although inevitably its necessarily concise nature makes for difficult reading. The only error found by this reviewer in a fairly extensive perusal appears on page 12 where "tricyclodecanepentene (41)" should be replaced by "tricyclodecapentaene".

An author index is included. In order to make up for the lack of a subject index, which would be impractical in any event, the contents have been arranged primarily by ring size. Further subdivisions are made into ring composition, thus making easier a search for an individual type of ring system. There then follow chapters on electrophilic, nucleophilic, free radical, and carbene substitutions. Lastly appear three chapters on naturally occurring aromatic systems. Thus the focus in this arrangement is on the ring systems and their reactions. It follows then that it would be more difficult for the reader to systematize information on methods of synthesis of the rings.

In summary, this book is directed toward the specialist in the fields of aromatic and heteroaromatic chemistry. Others seeking information in these fields would be better served by the numerous reports on current advances. It should be noted that this volume includes many references to such review articles.

G. Dana Johnson, *Kansas State University*

The Chemistry of Gold. By RICHARD J. PUDDEPHATT (University of Western Ontario, Canada). Monograph 16 in the series: "Topics in Inorganic and General Chemistry". Elsevier Scientific Publishing Co., Amsterdam. 1978. x + 274 pp. \$49.75.

The universal appeal of gold for such mundane purposes as jewelry, coinage, hoarding, etc., has unfortunately diverted attention from its more fundamental properties as an interesting chemical element. In a rather compact book, Professor Puddephatt has neatly described the various physical and chemical facets of gold compounds starting with the simple binary compounds of gold and proceeding through a lucid description of the various inorganic complexes of gold(I, II, III, and V), as well as the more recent studies of organogold(I and III) complexes. Stoichiometric compounds with gold-metal bonds, including clusters, are also included. Studies of reaction mechanisms in gold chemistry are in their infancy and heretofore have mostly been carried out with organogold(III) complexes which often share a common mechanistic pathway with the analogous chemistry of the more extensive organoplatinum complexes. The book concludes with spectroscopic studies, quantitative analysis, and applications of gold complexes. Overall, the treatment of gold chemistry is definitive and extensive, and this book should appeal to inorganic and organometallic chemists interested in expanding vistas. It is a suitable companion to "Gold Usage" by W. S. Rapson (Academic Press, 1978) which presents an account of the metal.

Jay K. Kochi, *Indiana University*

Isotopes in Organic Chemistry. Volume 4. Tritium in Organic Chemistry. Edited by E. BUNCEL (Queen's University, Kingston, Ontario) and C. C. LEE (University of Saskatchewan, Saskatoon, Saskatchewan). Elsevier Scientific Publishing Co., Amsterdam-Oxford-New York. 1978. xvi + 300 pp. \$66.75.

The book contains four chapters. Chapter 1 discusses tritium nuclear magnetic resonance spectroscopy and its usefulness as an analytical tool in biochemistry, in reaction mechanisms, and in studies of radiation decomposition. Chapter 2 discusses the use of tritium and deuterium in photochemical electrophilic substitution in benzene, naphthalene, anthracenes, phenanthrene, and miscellaneous compounds. Chapter 3 discusses energetic reactions of energetic tritium atoms, especially those formed by the nuclear recoil methods, with organic molecules. This is basically a study in chemical kinetics by emphasizing the radioactivity of tritium as a built-in tracer to follow the reaction products. Chapter 4 discusses stereospecific synthesis of tritium-labeled organic compounds using chemical and biological methods. This chapter covers isotope exchange reactions and recoil labeling, reduced nicotinamide nucleotides, simple alcohols, carbohydrates by methods not involving glycolysis, and a large variety of biological compounds. It is carefully written with an adequate amount of references.

The volume as a whole is a valuable review on this subject and

it would be considered useful to lecturers, students, and research workers in the field.

Mohamed E. Nasr, *College of Pharmacy
The University of Michigan*

Gmelin Handbuch der Anorganischen Chemie. 8 Auflage. Band 18. Nickel-Organische Verbindungen. Register für Teile 1 und 2. Prepared by Gmelin Institute for Inorganic Chemistry. Springer-Verlag, Berlin-Heidelberg-New York. 1975. 129 pp. \$99.00.

This volume is an index to the Gmelin coverage of organonickel compounds. The compounds are arranged in an empirical formula index according to the conventions of the Chemical Abstracts HAIC Index. The ligands are sequenced in the index in order of increasing carbon content without considering the nature of metal ligand bonding. It is a very useful index and should greatly simplify the location of compounds in the indexed volumes. A typical citing for the compound π -C₃H₅Ni(CO)(P(C₆H₁₁))₃ Br is

C₃H₅ C₁₈H₁₃P CO Br II, S. 44,7,4

From this citing the compound can immediately be located in Teil II (of Band 18).

John H. Nelson, *University of Nevada, Reno*

Cyclodextrin Chemistry. By M. L. BENDER and M. KOMIYAMA (Northwestern University). Springer-Verlag, Berlin-Heidelberg-New York. 1978. x + 96 pp. \$22.00.

This is Volume 6 in the series "Reactivity and Structure Concepts in Organic Chemistry". There are 14 figures, 37 tables, 9 chapters, 307 references, and author and subject indexes.

This book is about the cyclodextrins: their properties, chemistry, and their development as models of enzymes. After a brief introductory chapter, the source, nomenclature, structure, and properties of cyclodextrins are discussed in Chapter II. Chapter III deals with inclusion complex formation including complex detection, determination of dissociation constants, and the nature of the binding forces of the complex. Chapter IV serves as an introduction to the catalytic properties of cyclodextrins and the application of these properties to various reactions. Several other interesting and practical uses of cyclodextrins based on inclusion complex formation, such as solubilization of drugs for injections, are described. Chapters V, VI, and VII cover covalent catalysis, noncovalent catalysis, and asymmetric catalysis by cyclodextrins, respectively. Chapter VIII describes efforts to improve the catalytic properties of cyclodextrins through chemical modification studies. The short concluding chapter (IX) summarizes the authors' perceptions of the role of "prior complexing of reactants followed by reaction" in future chemistry.

This interesting volume makes an important contribution to the areas of enzymatic and nonenzymatic catalyses. Its publication is particularly timely in view of the current interest in cyclodextrins. This book is essential to those interested in the chemistry of cyclodextrins and models of enzymes.

John F. Sebastian, *Miami University*

Chlorine, Bromine and Iodine NMR. Physico-Chemical and Biological Applications. By B. LINDMAN and S. FORSEN (University of Lund, Sweden) (NMR Basic Principles and Progress. Volume 12. Edited by P. Diehl, E. Fluck and R. Kosfeld). Springer-Verlag, Berlin, Heidelberg and New York. 1976. xiii + 365 pp. \$39.40.

This text is a comprehensive review of the work done concerning the theory and applications of chlorine, bromine, and iodine NMR. While it is largely intended for use by those in the field of NMR spectroscopy, this volume may be of interest to the many biochemists who may find halogen NMR a useful probe in complex macromolecules.

The first half of this text is divided into five descriptive chapters, each of which deals with a single aspect of NMR, i.e., nuclear relaxation, quadrupole coupling, chemical shifts, etc. These chapters give a detailed survey of the various NMR properties which may be studied. The next four chapters cover specific applications concerning the halide ion, perchlorate ion, liquid crystals and biological systems. A final descriptive chapter concerns recent 1975-1976 applications of halogen NMR. Since the reader may need to consult primary reference material, each section has been thoroughly documented in the reference section.

The sequencing of the chapters and the organization of the material within each chapter has been well planned. Each chapter is prefaced

with a short section which offers a brief introduction to the theoretical principles used in the chapter.

Perhaps, as the NMR study of unusual nuclei continues to expand, more workers will find applications for chlorine, bromine, and iodine magnetic resonance. This volume will provide the needed survey of the early NMR studies done on these nuclei.

Richard Zadjura, *American Cyanamid Company*

Polymer Alloys: Blends, Blocks, Grafts and Interpenetrating Networks. Edited by D. KLEMPNER and K. C. FRISCH (University of Detroit). Plenum Press, New York and London. 1977. x + 491 pp. \$47.50.

This volume is a collection of the papers presented at a symposium in the Division of Organic Coatings and Plastics Chemistry of the American Chemical Society in 1977. The general motivation for the extensive activity in this area is understandably the enhancement of physical properties of the separate components. This can be accomplished to a greater or lesser degree and with due consideration of the issue of thermodynamic compatibility, by the types of systems indicated in the subtitle. Investigative efforts then will be directed toward synthesis, characterization and analysis of physical properties, and the 39 papers illustrate these three topics. Broadly speaking, the polymers covered include elastomeric and plastic, amorphous and crystallizable systems. The physical properties discussed for the one or other of these species are stress-strain relations and ultimate strength, dynamic mechanical behavior, thermal characteristics, and finally morphological aspects. Some kinetic data are also presented. Several contributions from the Soviet Union appear in short abstract form only.

By its very nature, this monograph will best serve the reader either looking for specific polymer combinations and characteristics, or wanting to gain an impression of academic, industrial, and research institutes active in the area.

Robert Simha, *Case Western Reserve University*

Progress in Inorganic Chemistry, Volume 24. Edited by STEPHEN J. LIPPARD. John Wiley & Sons, New York. 1978. 494 pp. \$35.95.

This volume, the 24th of this series, maintains the highest of standards of quality of previous volumes. The Editor deserves the thanks of chemists for bringing to them each year excellent authors who summarize important areas of research in inorganic chemistry. Comprehensive discussions with complete documentation are given; thus in this volume there are 1485 references.

The first chapter by R. H. Grubbs on the olefin metathesis reaction reads like a "who-dun-it" with an excellent account of all the various mechanisms proposed for this reaction. The mystery is finally solved by all of the experimental evidence pointing towards a nonpairwise carbene mechanism. In Chapter 2 T. J. Marks gives us only Part I of f-element organometallic chemistry. This part is an elegant discussion of the lanthanides, and we are left with the anxious desire to "tune-in" on Vol. 25 to read Part II on the actinides.

Most readers will not know that so much work has been done on the coordination chemistry of mercury(II) halides, until they read the chapter by P. A. W. Dean. The chapter by D. L. Kepert on the stereochemistry of eight-coordination contains much information and numerous figures showing the potential-energy surfaces for many of these complexes. However, the final chapter by J. A. Zubieta and J. J. Zuckerman on structural tin chemistry takes the prize for completeness of coverage (751 references). The statement is made that "tin has greatly affected the course of human history, from the Bronze Age of antiquity to the present", and the reader gets the impression that all that was ever reported during all of these centuries on the structure of tin compounds is contained in this very fine chapter.

I learned a great deal from this volume, and I highly recommend these volumes as a way to keep in touch with different research areas without having to cope with the voluminous amount of literature generated by inorganic chemists.

F. Basolo, *Northwestern University*

The Prostaglandins, Volume 3. Edited by PETER W. RAMWELL (Georgetown University Medical Center). Plenum Press, New York and London. 1977. xii + 359 pp. \$39.50.

The 3rd volume of this excellent series contains 10 chapters on major, biologically oriented, research areas written by experts and well documented with references up to 1975.

The first chapter by Frolich deals extensively with gas chromatography-mass spectrometry techniques in the prostaglandin area

with application to biochemical and clinical systems. This is an excellent chapter for those in the area but of little use to the chemist. The second chapter by Pong and Levine presents an excellent account of the use of radioimmunoassay in prostaglandin biosynthesis and metabolism but again of little use to the chemist.

The subsequent chapters are also up-to-date (1975) accounts of prostaglandin research in the areas indicated by the titles of the chapters: Chapter 3 (J. G. Kenimer, V. Goldberg, M. Blecher), "The Endocrine System: Interaction of Prostaglandins with Adenylyl Cyclase-Cyclic AMP Systems"; Chapter 4 (T. P. Barden), "Induction of Labor with Prostaglandins"; Chapter 5 (J. C. Rose, P. A. Kot), "Cardiovascular Responses to the Prostaglandin Precursors"; Chapter 6 (W. L. Veale, K. E. Cooper, Q. J. Pittman), "Role of Prostaglandins in Fever and Temperature Regulation"; Chapter 7 (A. A. Mathé), "Prostaglandins and the Lung"; Chapter 8 (A. Robert), "Prostaglandins and the Digestive System"; Chapter 9 (W. Flamenbaum, J. G. Kleinman), "Prostaglandins and Renal Function" or "A Trip Down the Rabbit Hole"; Chapter 10 (B. M. Jaffe, M. G. Santoro), "Prostaglandins and Cancer".

The editor (P. W. Ramwell) has succeeded again in comprising an excellent collection of research reviews in a number of PG-related biological areas of current interest. While this book appears to be a must to the library of the biological PG-researcher, very little, if any, is found to justify its recommendation to the chemist! Indeed no chemistry is presented and this is perhaps the one major criticism one can safely make from the chemist's point of view!

K. C. Nicolaou, *University of Pennsylvania*

Analytical Pyrolysis. Edited by C. E. ROLAND JONES and CARL A. CRAMERS. Elsevier Scientific Publishing Co., Amsterdam and New York. 1977. ix + 424 pp. \$39.25.

Many years ago, on my first job as an analytical chemist, I was called upon to identify several synthetic polymers. At first, the task seemed formidable, for at the time recording infrared spectrophotometers had not been developed and other techniques seemed tedious and uncertain. I was advised by a colleague to decompose the material in a flame and to observe the various odors which emanated. This proved, although highly empirical, to be quick and thoroughly reliable. Today, the empiricism is gone and analytical pyrolysis has become a highly sophisticated technique which serves not only to identify polymers, but to elucidate their structure and, in addition, provides a means for characterizing a host of other substances from microorganisms to moon rocks.

Modern pyrolytic methods of analysis encompass a wide variety of techniques and applications. Pyrolysis devices include resistance heaters, Curie point wires, Knudsen cells, and lasers. The thermal decomposition products may be variously identified and/or determined by gas chromatography, mass spectrometry, or combined GC/MS. The methods are found to be specific and reproducible and well established theories now support the experimental behavior. Pyrolysis can, in fact, be much more than a powerful analytical tool; it can be used to study reaction mechanisms, simulate thermal processes, or carry out organic syntheses.

The book reviewed here is a collection of the papers presented at the Third International Symposium on Analytical Pyrolysis, which was held in Amsterdam in September 1976. A broad spectrum of topics are covered and the papers reflect the wide applicability of the technique. Some of the fields in which several applications were reported are forensic science and pharmacology, soil chemistry and geochemistry, microbiology, biochemistry, and polymer analysis.

In matters relating to techniques, the utilization of direct mass spectrometry, especially field ionization and field desorption, constitutes a new level of sophistication in the identification of pyrolysates, and the coupling of computers to the gas chromatographs or mass spectrometers enhances data acquisition and interpretation. Several papers concerned with reproducibility and specificity provide a firm footing for the reliability of the techniques. Other papers demonstrate the extension of pyrolysis devices to include lasers.

The proceedings of the previous symposia of this series (Paris, 1966 and 1972) were published only in a fragmentary way in journals, and only a few limited reviews of pyrolysis methods have likewise been published. It is indeed unfortunate that no comprehensive text has been yet written to treat analytical pyrolysis in a systematic way. Until such a work appears this book offers the only available hard cover treatment of the subject.

C. Merritt, Jr., *U.S. Army Natick R&D Command*