

Book Reviews*

Decay Heat Removal and Natural Convection in Fast Breeder Reactors. Edited by A. K. Agrawal and J. G. Guppy. Hemisphere Publishing Corp., Washington, D.C. 1981. xvi + 423 pp. \$55.00.

This book contains the full texts of the papers presented at a specialists meeting on fast reactor fission product decay heat removal by heat transport systems operated solely by the forces of natural convection. The meeting was sponsored by the American Nuclear Society and held at Brookhaven National Laboratory, February 28 and 29, 1980. The meeting was just 1 month before the first anniversary of the TMI-2 accident (which in a fundamental sense was caused by a temporary failure to remove decay heat), so the contributors felt that their topics were particularly pertinent, even though they were concerned with decay heat removal from another type of reactor.

As one would expect (since all operating fast power reactors are cooled by liquid sodium), the 27 papers are predominantly about natural convection in liquid metal heat transport systems. The only exception is a set of three papers about gas cooled fast reactors. In all of the papers, the atmosphere furnishes the ultimate heat sink, so one finally needs to be concerned about natural convection in air. However, this is a relatively well-understood process and nearly all of the attention of the contributors is devoted to the heat transfer processes in and around the reactor core.

The contributed papers are international in scope and, to this reviewer's knowledge, deal with all of the fast breeder power reactors currently operating or under construction, design or active contemplation (with the single exception of those in Russia). The organizers of the meeting are to be commended for achieving such broad coverage.

Despite its coverage, one must admit that this is a specialists book. Several copies should be in the technical library of every organization concerned with current developments in fast reactor technology. However, except for readers who are fast reactor thermal-hydraulic specialists or have an interest in modern developments in liquid metal heat transfer, this book will probably not have much appeal.

John M. Christenson, *University of Cincinnati*

Advances in Carbohydrate Chemistry and Biochemistry. Volume 39. Edited by R. S. Tipson (Kensington, Md.) and D. Horton (The Ohio State University). Academic Press, New York. 1981. ix + 502 pp. \$55.00.

This volume is the latest in a series that covers a time span of 35 years. Traditionally this series carries in-depth reviews of specific areas of carbohydrate chemistry and biochemistry with (usually) more emphasis on chemistry than on biochemistry. It is generally considered to be an excellent authoritative source of information on carbohydrates. Volume 39 is not an exception to this rule.

As in all earlier volumes, the issue begins with a photograph and an obituary of a well-known, recently deceased, carbohydrate chemist (in this case, Karl Paul Link). This tradition is of interest, because the series probably contains, over the years, a unique body of historically important information on scholars who are well-known and who have made major contributions to the field.

Specific areas covered in this volume include Selective Removal of Protecting Groups in Carbohydrate Chemistry, Reactivity of Cyclic Acetals and Aldoses and Aldosides, Synthesis and Polymerization of Anhydro Sugars, The Chemistry of Maltose, Chemistry and Biochemistry of D- and L-Fucose, Utilization of Disaccharides and Some Other Sugars by Yeasts, and Affinity Chromatography of Macromolecular Substrates on Adsorbents Bearing Carbohydrate Ligands. The reviews found in Volume 39 are well referenced and it contains a very complete subject and author index.

In summary, Volume 39 contains the tradition of excellence established in earlier volumes of this series and is highly recommended for use by the working chemist or biochemist.

Milton S. Feather, *University of Missouri*

Spectra of Graphs. Theory and Application. By D. M. Cvetković, M. Doob, and H. Sachs. Academic Press, Inc., New York. 1980. 368 pp. \$45.00.

Graph-theoretical methods are increasingly used to solve all kinds of problems in chemistry, because they provide instant insight in many cases. In this connection, the so-called spectrum of a graph, i.e., the set of roots of its adjacency matrix, plays a central role. (For the chemist in the street: the adjacency matrix is what you write down when doing

a standard Hückel calculation, namely a matrix containing only "1" for bonded AOs or "0" otherwise, and its spectrum is the set of eigenvalues x_j which yield the orbital energies $\epsilon_j = \alpha + x_j\beta$.)

The present impressive volume, identical in all parts with the one published in East Germany, is a stunning piece of work, which presents, as far as I can see, a complete survey of everything known in this particular field of graph theory, up to 1978. The rather formidable amount of information is written up essentially as a well-organized sequence of over 150 theorems, complete with proof and discussion. In addition 160 problems and miscellaneous results, the proof of which is left to the reader, and many examples of applications are added with references to the literature. Finally, there are 50 pages of tables covering the spectra of systematically ordered graphs and 45 pages of references.

Make no mistake, this is not a book about the application of graph theory in chemistry, although examples taken from this field are abundant (e.g., Hückel theory). It is a mathematical book about a particular, albeit important, aspect of graph theory, and it assumes that the reader is familiar with the elements of graph theory, linear algebra, and group theory. However, for those interested in applying graph-theoretical methods in their field of endeavor, this splendid volume is an absolute must. You cannot afford to be without it.

E. Heilbronner, *Physikalisch-Chemisches Institut, Universität Basel*

Turbulent Reacting Flows. Topics in Applied Physics. Volume 44. Edited by P. A. Libby and F. A. Williams (University of California, La Jolla). Springer-Verlag, Berlin. 1980. xiii + 243 pp. DM 84 (\$49.50).

The rates of gas-phase chemical reactions occurring in turbulent flows—combustion processes, for the most part—are difficult to predict. The mathematical theory and current research aimed at improving our predictive capabilities in this area are developed in this tutorial volume, which may serve both as a graduate engineering text and research reference. The authors of the various chapters are preeminent in their research areas, and it is doubtful that such a uniform high quality could be maintained throughout the book if it were prepared by a single author. The book contains about 400 references and uses uniform nomenclature, although the chapters may be read independently.

The subject matter of the book is a combination of turbulence theory and aerothermochemistry, and it is assumed that the reader has some knowledge of both areas. The emphasis is on the effects of fluid mechanics and turbulence on chemical production rates, and the complex chemistry that occurs in real combustion processes is necessarily avoided.

The monograph consists of six chapters. The first, by editors Libby and Williams, is introductory and reviews the fundamental equations for the theory of compressible turbulent flows and the complications introduced by chemical kinetics. Chapter two, by A. M. Mellor and C. R. Ferguson (Purdue University), is concerned with turbulent combustion in practical devices, such as gas turbines, furnaces, and internal combustion engines. Chapters three and four are outstanding reviews of the theory of and predictive models for turbulent flows with chemical reactions: chapter three, by R. W. Bilger (University of Sydney, Australia), deals with non-premixed reactants, and chapter four, by K. N. C. Bray (University of Southampton, England), with premixed reactants. Chapter five, by E. E. O'Brien (State University of New York at Stony Brook), is an excellent review of the probability-density-function approach to reacting flows; this approach is perhaps the most promising one for dealing with nonisothermal reactions and nonlinear kinetic expressions. Chapter six, again by editors Libby and Williams, closes out the volume with a discussion of excluded topics—such as radiative transfer, two-phase flows, and high Mach number effects—and with suggestions for further research.

James C. Hill, *Iowa State University*

Chemical Application of Atomic and Molecular Electrostatic Potentials. By Peter Politzer (University of New Orleans) and Donald G. Truhlar (University of Minnesota). Plenum Press, New York and London. 1981. ix + 469 pp. \$55.00.

This book is a comprehensive compendium of individual research/review articles which focus upon a relatively new, but increasingly important, chemical tool—the electrostatic potential. Thus, this work is a timely addition to the chemical literature. The primary impetus for the book was an ACS symposium in 1980 at the 179th National Meeting in Houston entitled, The Role of the Electrostatic Potential in Chemistry. The authors have been careful to recognize that the written contents of a symposium may not lead to a successful book on the same topic.

*Unsigned book reviews are by the Book Review Editor.

Consequently, manuscripts from the symposium have been augmented with additional research papers and reviews. The result is a relatively comprehensive overview of the field at the end of 1980.

The book is divided into three major sections: I, Atoms, Molecules and Complexes in the Gas Phase; II, Biomolecules; and III, Crystal phase. Section I predominates and is subdivided into three subsections: I, Fundamental Aspects; II, Electron Scattering; and III, Molecular Structure and Interactions.

As one can deduce from the wide range of titles, there is something included for nearly everyone. Some may find the book too varied in content. Others, who are novices and/or simply interested in applications, may find it cumbersome identifying what computer programs are available as well as "recipes" for doing the calculations. Nevertheless, the information needed by the majority of chemists who might employ electrostatic potential theory is available in this work. I found the papers in the biomolecules section especially interesting and recommend them to anyone interested in structure-activity/reactivity.

This book should serve as a useful reference for the next few years in the field of electrostatic potential theory.

A. J. Hopfinger, *Drug Design Group, G.D. Searle & Co.*

Hydrocarbon Thermal Isomerizations. By J. J. Gajewski (Indiana University). Academic Press, New York. 1981. X + 442 pp. \$45.00.

At last the long-rumoured Academic Press review of hydrocarbon thermochemistry has appeared, and a fine one it is. After a very brief review of transition-state theory and the Woodward-Hoffmann rules, Gajewski launches into a discussion of the chemistry of hydrocarbons, beginning with methane and ending with C_{18} 's. The intervening pages are organized not by reaction type but rather by molecular formula with reactions of substituted molecules discussed together with those of the parent.

The whole marvelous range of hydrocarbon chemistry emerges in these pages. As one grazes through the chapters, there is scarcely a page that does not catch one's attention. Naturally enough, special attention is lavished on Gajewski's favorites—the splendidly complex isomerizations of cyclopropanes and spiropentanes, the Cope rearrangement, and so on. But I think there is something in this book for nearly anyone with even a passing interest in hydrocarbons. For those with current or past connections with this chemistry, old friends as well as wonderful new molecules will constantly delight.

The details of presentation are good. Cross referencing appears throughout. The literature coverage is up to mid-1980, which is about as good as can be expected these days.

The book is not perfect—I think the index is incomplete and occasionally one finds a favorite reaction that is given what seems to be short shrift. But to dwell too much in this vein would be to carp: This is an excellent book and all of us who maintain an interest in hydrocarbon chemistry are in the author's debt.

Bravo Gajewski!

Maitland Jones, Jr., *Princeton University*

Chemical Analysis by Microwave Rotational Spectroscopy. By R. Varma (Argonne) and L. W. Hrubesh (Livermore). (Volume 52 of Chemical Analysis. Edited by P. J. Elving and J. D. Winefordner.) John Wiley and Sons, New York. 1979. ix + 206 pp.

Microwave spectroscopy has not been widely used for analytical chemistry in spite of its high resolution and specificity. These authors feel that the situation is likely to change. They anticipate some growth in the direction of special purpose instruments such as industrial and energy-related selective gas monitors. Their monograph has the right emphasis to help a reader explore the question. It presents some basic theory, the instrumentation, and representative applications. It includes a comprehensive list of references related to the analytical use of the technique. I have had occasion to refer a graduate student preparing a seminar on the subject to this monograph and also an industrial chemist interested in possible use for on-line process analysis.

Robert L. Kuczkowski, *University of Michigan*

Organometallic Chemistry. Volume 8. Specialist Periodical Reports. Senior Reporters: E. W. Abel (University of Exeter) and F. G. A. Stone (University of Bristol). The Chemical Society, London. 1980. xx + 547 pp. \$115.00.

This volume covers the literature of organometallic chemistry for the calendar year 1978 comprehensively. The organization is similar to that of previous volumes with approximately one-third of the book devoted to non-transition-metal organometallic compounds. These are arranged according to the periodic table with A and B elements grouped in individual chapters. Organometallic transition metal coverage is grouped according to compound type, and chapters on Substitution Reactions of Metal Carbonyls, Homogeneous Catalysis, and Bioorganometallic

Chemistry and a tabulation of Diffraction Studies reported during 1978 are included.

For the most part the reviews are noncritical literature surveys. Many include additional bibliographies of publications not actually reviewed in the text. The comprehensive author index is of value in locating specific publications provided that the user is familiar with the active workers in a particular area. While the coverage of the 1978 literature is excellent, individuals interested in surveying a new area of interest will probably find more focused reviews of that particular area which cover a longer period of time of greater value.

Paul Ronald Jones, *North Texas State University*

Dielectric Properties of Binary Solutions: A Data Handbook. By Y. Y. Akhadov. Pergamon Press, New York and Oxford. 1981. 475 pp. \$112.50.

In the preface to his classic 1929 monograph, *Polar Molecules*, Peter Debye acknowledged the fact that "the literature on this subject is scattered in journals of many countries and different languages". This continuing situation and the diversity of fields for which dielectric data are required makes this handbook (and its earlier companion on pure liquids) a welcome addition to the research library. The author has compiled data on dielectric parameters of binary solutions which cover the literature from 1892 until 1978. The information, in both tabular and graphical form, is critically analyzed for the most reliable values.

The first chapter, which is preceded by a list of symbols, summarizes the fundamental formulas describing the dielectric properties of liquids. Chapters II and III consist of tables of data for nonaqueous and aqueous solutions, respectively. These are subdivided into sections on permittivity and on dielectric dispersion parameters for inorganic and organic solutes. Chapter IV presents dielectric data in graphical form. Chapter V updates the original Russian edition of this handbook for the period 1973-1978.

The compiler's objective of collecting and systematizing dielectric data from a wide variety of sources has been successfully achieved in a nicely produced volume which is fully referenced and well-indexed. Thus, this book should prove extremely useful to workers in a number of areas of the chemical, physical, and biological sciences.

Louis J. Kirschenbaum, *University of Rhode Island*

Hazards in the Chemical Laboratory. Third Edition. Edited by L. Bretherick (BP Research Centre). The Royal Society of Chemistry, Burlington House, London. 1981. xxii + 567 pp. £15.00.

Overall, this is one of the best single-volume sources of laboratory safety and health information now available. A copy should be on the bookshelf of every health and safety manager that has responsibility for chemicals.

The spectra of subjects covered in 9 chapters are: Introduction Health Safety at Work Act 1974 (U.K.), Safety Planning & Management, Fire Protection, Reactive Chemical Hazards, Chemical Hazards & Toxicology, Health Care & First Aid, Hazardous Chemicals, and Precautions Against Radiation.

Of particular interest was the chapter on Reactive Chemical Hazards and especially the discussion of chemical composition in relation to reactivity (pp 69-77). The chapter on Hazardous Chemicals provides a brief summary of toxic effects, hazardous reaction, first aid, and spillage disposal for over 480 substances commonly used in the laboratory. The yellow pages of this extensive chapter (pp 147-536) make it quite distinctive, and thus easy to find for quick reference.

The chapter which deals with the British Health & Safety Work Act of 1974 is interesting but not of direct use to the U.S.A. situation.

Again, this is a splendid reference which should find frequent use by industrial hygienists, chemists, health and safety managers, and a variety of others who have an interest in this field.

William C. Kuryla, *Union Carbide Corporation*

Handbook of Bimolecular and Termolecular Gas Reactions. Volumes I and II. Edited by Alistair Kerr (University of Birmingham) and Stephen J. Moss (University of Aston in Birmingham). CRC Press, Inc., Boca Raton, FL. 1981. Volume I: 445 pp. \$79.95 U.S. Volume II: 223 pp. \$49.95 U.S.

These two volumes provide an extremely useful summary and update (literature up to the end of 1977) of four previous collections of gas-phase rate constants. The original summary appeared as an NBS publication "Tables of Biomolecular Gas Reactions" in 1967.

Volume I includes eight sections of tables of rate constants for metathetical (transfer) reactions, reactions of radicals containing one to four carbon atoms (four sections), five or more carbon atoms, and inorganic radicals. The corresponding divisions in Volume II cover termolecular reactions, atom and radical interactions, addition reactions, atom additions, radical additions, molecule-molecule reactions, and group-transfer

reactions. The tables include Arrhenius parameters or single rate constants, the temperature range, the radical source, and the nature of the experimental method. Activation energies are given in both kcal/mol and kJ/mol. Many of the tables list experimentally determined ratios of rate constants. Both volumes contain long indices.

These volumes seem particularly timely in view of the recent resurgence in laser photolysis studies in the gas phase. The value of the tables is greatly increased by critical notes along with the literature references.

G. David Mendenhall, *Michigan Technological University*

Radiochemistry: Theory and Experiment. By T. A. H. Peacocke (St. John's School, Leatherhead). Wykeham Publications Ltd., London. 1978. xi + 274 pp.

The first impression on thumbing through this book was that it is a very readable account of what radiochemistry is about. On more thorough reading, this initial impression was generally sustained. Following is a list of randomly generated thoughts and comments:

The historical summaries developed in Chapter 1 are very helpful in forming a perspective of important conceptual developments. The chapter on nuclear reactors is informative and concise. The use of some acronyms (e.g., LIDO, PLUTO, HERALD, etc.) without mention of their derivation is irksome, however.

Throughout the book sample calculations are used to complement the descriptive portions. Failure to include dimensional units in these calculations is a serious shortcoming for aiding the beginning student of radiochemistry. An error appears in the exponent sign for σ in a calculation on page 58. Only one or two chapters close with an adequate supply of questions and problems for student practice.

The short historical review of events leading to the discovery of fission is especially well done. The binding energy concept is used to explain fusion (page 32) before it is defined and explained itself (page 34).

The chapter on the actinides is adequate for a book at this level. The discussion of this important group of elements is not so detailed as to lose reader interest nor so short as to leave one confused. It is just about right for a first reading of this great achievement by nuclear chemists and radiochemists.

The discussion on types of detectors slights channel electron multipliers (in wide use in today's research laboratories) and does not adequately cover the use of Ge(Li) detectors (the new ones do not require constant refrigeration) in analytical and research applications arising from their much superior resolution compared to that of NaI(Tl) detectors.

Finally, a portion (76 pages) of the book details 35 representative experiments which may be used in a laboratory course in radiochemistry.

On the whole, this book has just the right balance of introductory material (on the theory and properties of nuclear structure and radiations and the mathematics of radioactive decay) for an effective introduction to and understanding of radiochemistry techniques and applications. I would recommend it as a rewarding and suitable text for an introductory course aimed at graduate analytical, organic, and inorganic chemists who should not be totally ignorant of these very powerful techniques and laboratory tools.

Luis Muga, *The University of Florida*

Advances in Inorganic Chemistry and Radiochemistry. Volume 24. Edited by H. J. Emeléus and A. G. Sharpe (University Chemical Laboratory, Cambridge, England). Academic Press, New York. 1981. vii + 372 pp. \$46.00.

"Advances in Inorganic Chemistry and Radiochemistry" annually publishes reviews of significant value to inorganic chemists, but the radiochemistry label has become somewhat of a misnomer in recent years. The five articles in the current volume will appeal to a diverse audience of inorganic chemists.

In the first article, A. A. Woolf treats the thermochemistry of inorganic fluorine compounds in great detail. Methods for both measuring and estimating thermochemical quantities are surveyed, and these values are interpreted in terms of oxidation state, additivity, and periodicity. The literature coverage is complete to early 1979 (250 references), with an addendum carrying into 1980 (26 references).

J. Burgess and J. Kijowski discuss the preparation and solution thermochemistry of anhydrous lanthanide, yttrium, and scandium trihalides. Enthalpies of solution and solubilities in both aqueous and nonaqueous solvents are collected and critically analyzed. A treatment of solubilities in nonaqueous solvents, including ethers, may be useful to synthetic inorganic chemists. Of 320 references, relatively few are as recent as 1979; the more recent references draw heavily from the Russian literature, as might be expected.

J. A. Davis reviews the coordination chemistry of sulfoxides with transition metals. An admirable effect is made to emphasize sulfoxides other than Me₂SO, in view of their importance in solvent extraction methods for metal refining, catalysis, and other applications. Coverage

of the topic is broad, including physical studies, numerous applications, and a metal-by-metal discussion. Complexes of the d-block transition metals (including the copper, zinc, and scandium subgroups) as well as the lanthanides and actinides are all discussed. Literature coverage is very thorough up to 1979 (498 references).

Main group chemistry is represented in a review of selenium and tellurium fluorides by A. Engelbrecht and F. Sladky. The review is intended as a progress report on developments in the chemistry of the title compounds occurring in the last 10 years, emphasizing facts rather than interpretation. Both synthetic and physical aspects are covered in a terse, tightly organized manner. The authors' own contributions figure predominantly among the 193 references.

Finally, B. F. G. Johnson and J. Lewis provide their views of transition metal molecular clusters. A comprehensive account of this burgeoning field is not attempted. Rather, the first third of the article is devoted to general principles of structure and bonding in clusters, with the latter two thirds illustrating these principles in terms of ruthenium and osmium cluster chemistry. This review capably fills the need for a summary of cluster chemistry, suitable for use in a graduate level course in organometallic chemistry. The literature coverage (262 references) extends into early 1979, with a significant number of unpublished results from the authors' own laboratories.

On the whole, this book is carefully edited, with few conspicuous errors in the text. An author index and a listing of the contents of earlier volumes in the series are included. This volume is a worthwhile addition to the series.

John P. Selegue, *University of Kentucky*

Aliphatic and Related Natural Product Chemistry. Volume 2: Edited by F. D. Gunstone (University of St. Andrews). The Royal Society of Chemistry, London. 1981. xiii + 265 pp. \$104.00.

This title results from a split of the Specialist Periodical Report "Aliphatic Chemistry" into two new titles, "General and Synthetic Methods" and "Aliphatic and Related Natural Product Chemistry".

"Aliphatic and Related Natural Product Chemistry" deals with those areas of natural product chemistry that relate to aliphatic compounds or to molecules with an important aliphatic component. The importance of natural products in contemporary organic chemistry justifies this division. The organization follows either structural type or occurrence. Volume 2 contains chapters on Natural Acetylenic and Olefinic Compounds, Acyclic Terpenoids, Insect Pheromones and Behavior Modifying Chemicals, Olefinic Microbial Metabolites, Prostaglandins, Fatty Acids and Glycerides, and Polar Lipids. A section of Marine Natural Products was not included because of unforeseen difficulties. The coverage includes 1978 and 1979.

The text focuses on the isolation, synthesis, and chemical modification of the specified classes of natural products in addition to certain of their structural, physical, and physiological properties. Although by necessity the coverage is extremely terse, it provides researchers with a concise and comprehensive review in addition to offering novices a convenient entry into the primary literature. The individual chapters are well written and structures are clearly drawn. These reports remain a valuable asset to the chemical research literature.

Kenneth J. Shea, *University of California, Irvine*

Order and Fluctuations in Equilibrium and Nonequilibrium Statistical Mechanics. Edited by G. Nicolis, G. Dewel, and J. Turner (Université Libre de Bruxelles). John Wiley & Sons, New York. 1981. 374 pp. \$55.00.

This book is not a textbook on the subject of the title but a reporting of the (invited) papers at the XVIIth International Solvay Conference on Physics. There are ten chapters, each written by a different participant. The level of the discussion for the most part is clearly for experts. The topics covered are very specialized topics and include the renormalization group, critical phenomena, hydrodynamic instabilities, symmetry breaking, Brownian motion, and several other related subjects.

Many of the chapters are far too concisely written to be of any benefit except for those already very familiar with the subject. Occasionally, the discussions following a chapter prove to be more interesting than the paper itself. The chapter that I found most instructive is the one by M. Suzuki on Theory and Instability, Nonlinear Brownian Motion, and Formation of Macroscopic Order. Other chapters that were reasonably useful to read were those by E. L. Koschmeider on Experimental Aspects of Hydrodynamic Instabilities, D. H. Sattinger on Symmetry-Breaking Bifurcation, R. Graham on Onset of Cooperative Behaviour in Nonequilibrium Steady States, and P. W. Anderson on Can Broken Symmetry Occur in Driven Systems?

It is unfortunate that the editors did not write an introductory chapter in an attempt to unify the various topics and provide the reader with an introduction into a highly specialized and difficult subject. This is a book

the ordinary chemist might want to borrow from the library to look at briefly and pick out something of interest. It is not the sort of book I would recommend to buy for one's personal library.

Bernard Shizgal, *University of British Columbia*

Methods of Cell Separation. Volume 3. Edited by N. Catsimpoalas (Massachusetts Institute of Technology). Plenum Press, New York. 1980. xii + 203 pp. \$27.50.

This volume is third in a series designed to present the basic theory and methodology of current cell separation techniques. The first half of the book covers the analysis of cellular images by computer; although concerned primarily with lymphocytes, the information in this chapter is directly applicable in other fields as well. The basic analytical approach, required equipment and computer software, methods of statistical analysis, and illustrative examples are discussed, based primarily on the TICAS 11/45 computer programs developed by the authors and others. Some knowledge of statistics is needed to fully understand this chapter. Subsequent chapters deal with the optimization of continuous flow centrifugation to harvest blood cells and the use of magnetic microspheres attached via lectins or antibodies to cell surfaces to permit magnetic separation of subpopulations of cells differing in their affinity for the ligands; emphasis is upon the methodology involved. The theoretical and technical aspects of isolating blood granulocytes or monocytes with elutriation in a counterflow centrifuge are outlined in the following chapter. The last chapter details various biological methods used to separate lymphoid cell populations, with rosetting and immunoabsorbent methods being stressed. Overall this volume will be of practical use to any worker using or considering using the described techniques; the lengthy chapter on cell imaging by computers is alone worth the modest price of this book.

John C. H. Steele, Jr., *Medical College of Georgia*

The Antigens. Volume 5. Edited by M. Sela (Weizmann Institute of Science). Academic Press, New York. 1979. xiii + 410 pp. \$35.00.

This book is the fifth in a series designed to review the chemistry and biology of all immunologically important antigens. Four topics are covered in this volume. The first chapter discusses the history, detection, purification, and immunobiology of tumor antigens. Methodology is emphasized, as are interactions between the tumor and the host's immune system. References to current literature largely supplant discussion of the actual chemistry of the antigens. The next chapter details the immunology and pathophysiology of helminthic antigens, concluding with reviews of the immunodiagnosis of parasitic infection and of the potential development of antihelminthic vaccines. The cytotoxic system mediated by lymphocytes is covered in the third chapter. The immunobiology of lymphocytes, their interactions with the rest of the immune system, and methods of detecting cytotoxicity are stressed. The final chapter reviews the chemistry and genetics of the complement components, their interaction in the complement system, and their biologic roles; methodology is less emphasized. Overall, this book comprehensively covers the literature through 1978 on four disparate topics. While the book is well-written and authoritative, most non-immunologists would benefit more from less immunologically oriented reviews available elsewhere.

John C. H. Steele, Jr., *Medical College of Georgia*

Treatment and Disposal of Liquid and Solid Industrial Wastes. Edited by Kriton Curi. Pergamon Press, New York and Oxford. 1980. 515 pp. \$81.00.

This book is a collection of 43 papers presented at the Proceedings of the Third Turkish-German Environmental Symposium held in Istanbul in 1979. Thirty-six of these papers deal with waste water treatment and are about evenly divided in emphasis between case studies concerning specific industrial wastewaters and recent advances in application of conventional treatment processes. Characterization and disposal of solid waste are the subjects of five papers, but the technology of solid waste treatment is not emphasized. Some appreciation for the foreign viewpoint on the problems of industrial waste disposal can be obtained from the contents of this book, but the same information is undoubtedly available elsewhere at a lower cost. The book is printed in author's typescript.

Vincent L. Vilker, *University of California at Los Angeles*

Pharmacology Library. Volume 3. Pharmacology of 1,3-Indandione. By W. Th. Nauta and R. F. Rekker (Free University, Amsterdam, The Netherlands). Elsevier Scientific Publishing Co., Amsterdam and New York. 1981. XVII + 346 pp. \$72.75.

This volume is organized into four main chapters. In the first chapter the author presents a well-written description of the properties and reactions of the 1,3-indandione skeleton and its derivatives. This chapter illustrates the different synthetic approaches such as the reaction of a reactive cyclic β -dicarbonyl grouping with an active methylene group, rearrangement of phthalides and naphthoquinones, as well as cyclization

of substituted benzoylacetate esters and cyclization with malonyl chloride. The 2-substituted derivatives are synthesized through reaction at the C₂ or at the 2 substituent. The author also mentioned the limited examples in the literature concerning the labeled 1,3-indandiones. Chapter 2 covers the physicochemical aspects of 1,3-indandione, e.g., IR, NMR, electronic absorption spectroscopy, acidity, tautomerism, distribution, and electrochemical aspects such as polarographic reduction, electrochemical oxidation, HMO calculations, etc. This chapter includes compilation of data not readily found elsewhere. For example, there are 62 tables covering all physicochemical aspects described above. In regards to Chapter 3, it deals with the biological activities of 1,3-indandiones, such as anticoagulant, anti-inflammatory, antiallergic, uricosuric, diuretic, antiepileptic, neuromuscular, ganglionic, antinociceptive, antihistamine, chloretic, hypolipidaemic, antimicrobial, biocidal and growth regulating activities, etc. This chapter contains 40 tables which cover most of the data regarding the biological activity. The final chapter discusses the structural activity relationships in 2-aryl-1,3-indandiones concerning lipophilicity, electronic and steric parameters, an analysis of ortho substitution effects, and quantitative structure-activity relationships. The book also provides appendices for the use of adjusted r and s values in multiple regression analysis, the Free-Wilson model, and dipole moments and Hückle parameters.

The book is written lucidly and its contents are well balanced. There are adequate illustrations and tables from the literature that provide a fair amount of quantitative information. Referencing is good within citations running up to 1980. Throughout the book, the discussion is maintained at a sophisticated level so that the researcher can use it as a fair overview of the subject. The bibliography is exhaustive and consists of 1109 citations.

On balance, this is an extremely valuable review of pharmacology of 1,3-indandione and is considered a useful addition to the pharmacology library and a valuable tool for anyone working in this field.

Hanafi H. Zoorob, *El-Mansoura University*

Spectroscopic Properties of Inorganic and Organometallic Compounds. Volume 12. A Specialist Periodical Report. Senior Reporters: D. M. Adams (University of Leicester) and E. A. V. Ebsworth (University of Edinburgh). The Chemical Society, London. 1980. xv + 406 pp. \$84.00.

This is Volume 12 of a continuing series and reviews the recent literature published up to late 1978. The format is much like that of its predecessor volumes, dividing coverage over eight chapters each dealing with a separate method. Chapter 1 on nuclear magnetic resonance spectroscopy is by far the largest, covering completely all nuclei other than ¹H, which are included only when the ¹H NMR spectra make a non-routine contribution. An Appendix lists reference numbers for each nucleus. Chapter 2 covers nuclear quadrupole resonance spectroscopy and Chapter 3 reports high-resolution studies of rotational transitions by microwave spectroscopy. Coverage of vibrational spectroscopy occupies nearly as much space as that of NMR spectroscopy, but is divided into four chapters, Chapter 4 on Vibrational Spectra of Small Symmetric Species and of Single Crystals, Chapter 5 on Characteristic Vibrational Frequencies of Compounds Containing Main-Group Elements, Chapter 6 on Vibrational Spectra of Transition-Element Compounds, and Chapter 7 on Vibrational Spectra of Some Coordinated Ligands. The final chapter deals with Mössbauer spectroscopy emphasizing ⁵⁷Fe and ¹¹⁹Sr but mentioning 101 other isotopes.

One change from previous years is the elimination of the author index in an effort to reduce the length, and thus the cost, of this volume.

Harmon B. Abrahamson, *University of Oklahoma*

Soviet Scientific Reviews. Section B. Chemistry Reviews. Volume III. Edited by M. E. Vol'pin (Institute of Organo-Element Compounds). Harwood Academic Publishers, New York. 1981. ix + 300 pp. \$77.50.

This book is the third volume in a recently started annual review series. The series is an intended account of recent scientific advances in the USSR, with articles written by Soviet scientists. Four articles (translated into English) in different areas of chemistry are presented: Investigations in the Field of Technetium Chemistry by V. I. Spitsyn, A. F. Kuzina, G. N. Pirogova, and O. A. Balakhovskii (152 references); Carbyne—A New Allotropic Form of Carbon by A. M. Sladkov (66 references); Current Structure and Spectroscopic Investigations of Heteropoly Compounds by V. I. Spitsyn, L. P. Kazanskii, and E. A. Torchenkova (212 references); The Tautomerism of Free Radicals. "Wandering" Valence by M. I. Kabachnik, N. N. Bobnov, A. I. Prokof'ev, and S. P. Solodovnikov (67 references). The articles are clearly written and reasonably well illustrated. As has been the case with earlier volumes, the major impact of the series is to bring to a larger (international) scientific community reviews of research which otherwise would have been slow to immerge

due to language and circulation difficulties.

Alex Avdeef, *Syracuse University*

Polymer Chemistry. An Introduction. By R. B. Seymour and C. E. Carraher, Jr. Marcel Dekker, Inc., New York. 1981. 576 pp. \$29.75.

"Polymer Chemistry" is intended for use in the undergraduate curriculum, and the subject matter has been chosen to conform to suggestions in a syllabus adopted by a polymer education committee of the American Chemical Society. The wide range of topics discussed are treated at a level appropriate only for a one-semester course, possibly in an attempt to keep the volume size to a manageable level. The treatment is uneven in that some chapters are factually correct and comprehensive, whereas others are not so. The chapters on physical chemistry and physics topics cannot be recommended. These contain numerous erroneous statements, definitions, and equations and, in some cases, do not offer modern molecular interpretations of measurable properties. Unfortunately, a student would be ill-served by study of these chapters. The presentation is better in chapters on polymerization, although occasional misprints can be found in these chapters as well. Altogether, the book has some useful features, but it cannot be recommended for use as an undergraduate text.

Guy C. Berry, *Carnegie-Mellon University*

Annual Reports in Organic Synthesis—1980. Volume 11. By L. G. Wade, Jr., and M. J. O'Donnell. Academic Press, New York. 1981. xiii + 456 pp. \$24.00 (paperbound).

Once again the compilers have produced their annual aid to the harassed organic chemist who cannot keep up with the never-diminishing stream of new primary literature. The authors have kept the same plan as in previous editions, the same table of contents, and, remarkably, the same size. In a carefully organized fashion they present the principal synthetic advances published in 1980, using clearly drawn equations rather than words and giving reagents, conditions, yields, and references. The detailed table of contents serves in lieu of a subject index, but there is an index of authors. The last chapter, Miscellaneous Reviews, provides a means of locating earlier literature. Let us all hope that the authors can keep their steam up and provide us with this inexpensive aid for many years to come.

Biology of Carbohydrates. Volume 1. Edited by Victor Ginsburg (N.I.H.) and Phillips Robbins (Massachusetts Institute of Technology). John Wiley and Sons, New York. 1981. vii + 320 pp. \$49.50.

In the late sixties and the seventies, the field of carbohydrates has undergone a renaissance and, as the editors point out in the preface, "The next decade may well see an expansion of knowledge concerning the role of carbohydrates comparable to previous developments in proteins and nucleic acids". This book gives the reader a thorough and critical discussion on a good mixture of selected topics in carbohydrates and, more importantly, attempts to generate ideas and provide direction for future research. The editors of this book should be congratulated on the publication of an excellent first volume in a new series.

In Chapter 1 Vincent C. Hascall discusses the structure, biosynthesis, and function of proteoglycans. The cartilage proteoglycans on which extensive research has been done are given detailed treatment, but information on the proteoglycans of cornea, liver membranes, and aorta is also provided. The author points out the present exploratory nature of research in this area and concludes that the stage is now set to ask questions regarding structure-function relationships.

The next two chapters are authoritative accounts on the structural carbohydrates of microorganisms and plants. Chapter 2 by Enrico Cabib and Eleanor M. Shematek deals with the chemical structure and biosynthesis of chitin, β -glucans, and yeast mannan. The authors give special emphasis to the morphogenetic aspects of these polysaccharides. In Chapter 3 Robert S. Munson and Luis Glaser provide a clear account of the assembly of the giant macromolecule peptidoglycan, and teichoic acid of gram positive organisms.

Complex carbohydrates are present both as extrinsic and intrinsic molecules in association with animal plasma membranes. The realization that these molecules may play important roles in various cell surface related phenomena is one of the reasons for increased interest in complex carbohydrates. In spite of this impetus for the study of the cell membrane complex carbohydrates, very little is known about these molecules. An exception is Glycophorin A, an intrinsic glycoprotein of human erythrocytes which has been studied in some detail. In Chapter 4, Heinz Furthmayr gives a critical account of the current information on this model membrane glycoprotein. The practical information in this chapter should be of extreme value to researchers planning to investigate other intrinsic membrane glycoprotein. This reviewer, however, felt that the chapter would have been improved if the lengthy historical account and the largely speculative portion on the physiological role of glycophorin

were shortened.

The last chapter by Jack Preiss and Donal A. Welsh is an in-depth review of the comparative biochemistry of glycogen and starch. Glycogen metabolism in animals and bacteria and starch metabolism in algae and higher plants are covered with emphasis on regulatory phenomena. The authors deal effectively with both the highly complex, hormonally regulated, allosteric and covalent control of mammalian glycogen metabolism and the seemingly simple regulation of the metabolism of α 1 \rightarrow 4 glucans in bacteria and plants.

Overall, this book should be very valuable for both the beginner and the specialist in carbohydrate research. If the quality of the first volume is maintained we can look forward to a welcome addition of a very useful series to the literature on carbohydrates.

V. P. Bhavanandan, *The Milton S. Hershey Medical Center of The Pennsylvania State University*

Potential Industrial Carcinogens and Mutagens. By Lawrence Fishbein (National Center for Toxicological Research). Elsevier Scientific Publishing Co., New York and Amsterdam. 1979. x + 534 pp. \$66.75.

This book is a comprehensive review, arranged by class of compound (e.g., alkylating agents, phosphoric acid esters, nitrosamines, etc.). For each substance are given brief orienting facts, such as occurrence, preparation, and uses, and a statement of the results of published biological testing. Where appropriate, this information is augmented by a discussion of metabolic mechanism. There is a subject index, essentially an index of compounds, to supplement the detailed table of contents. It is an unsettling book for a chemist to read.

Quinonediazides. By V. V. Ershov, G. A. Nikiforov (Academy of Sciences USSR), and C. R. H. I. deJonge (AKZO Research Laboratories, Arnheim). Elsevier Scientific Publishing Co., Amsterdam and New York. 1981. ix + 301 pp. \$74.50.

The subject of this monograph is the class of substances that may be considered as 4-diazocyclohexadienones or *p*-diazoniophenoxides. Because the properties of these compounds correspond to a hybrid of these two limiting structures, the authors have an old, trivial name for the compounds. It is unfortunate, since the uninitiated may be led to expect an azide structure. The alternative name in the older literature, benzenediazooxides, may be less objectionable.

The compounds of this class have an involved chemistry as a result of their ability to behave either as aromatic diazonium compounds or as diazoalkane derivatives. They undergo conventional diazonium coupling to yield azophenols and can also lose nitrogen to give rise to products derived from carbenes. The latter reaction can be used to attach phenolic groups to polymer chains, and thus provide a built-in free-radical inhibitor function. The versatile chemistry of these compounds has aroused much technological interest in them, and they are used in photolithography as well as in polymer chemistry.

This book covers the field comprehensively, with chapters on spectroscopic properties, stability to heat and light, acid/base properties, synthesis, reactions, detection and determination, and practical applications. There are many tables giving yields and properties. The lists of references are particularly valuable because of the balanced representation of western and eastern sources. There is a somewhat short subject index.

Annual Reports in Medicinal Chemistry. Volume 16. Edited by H.-J. Hess and six section editors. Academic Press, New York. 1981. xi + 364 pp. \$27.50.

This work, sponsored by the Division of Medicinal Chemistry of the ACS, is very familiar to the members of the Division but may not be known as widely as it should be among other organic chemists. It consists of short reviews (29 of them) arrayed in six general categories. They deal with recent advances in synthetic drugs, natural medicinal agents, pharmacology, drug design, drug metabolism, analysis, etc. The major theme is the relation between chemical structure and biological activity.

Access to the large amount of information in this volume is provided through an index of compound names and code numbers, a cumulative index of chapter titles, and a cumulative index of keywords in chapter titles. The last is an innovation with this volume.

Aquameyry. 2nd Edition. Part III. By John Mitchell, Jr., and Donald M. Smith. John Wiley & Sons, New York. 1980. xv + 851 pp. \$75.00.

This is a treatise on the Karl Fischer reagent, which provides an extraordinarily versatile means for determining water content over a concentration range of parts per million to 100%. The book is part of the monograph series "Chemical Analysis", edited by P. J. Elving and J. D. Winefordner.

After a brief chapter on Recent Methods for Determining Water, there comes an overview in summary form. A whole chapter is then

devoted to the nature of the Karl Fischer reagent, which, although it is empirically a solution of iodine, sulfur dioxide (or, more recently, dimethyl sulfoxide), and pyridine in methanol, consists of pyridine complexes. Addition of water results in stoichiometric involvement of the water in reduction of iodine by the sulfur dioxide. Unfortunately, the exposition of the chemistry is flawed by ignorance of chemical structure that would have been excusable only if it had been written in the 19th century. Pyridine is represented with a saturated ring with exocyclic nitrogen, looking more like cyclohexylamine than anything else; its salts are written with a covalent bond from the anion to nitrogen, and its complex with SO_2 is written with a three-membered N, O, S ring.

The bulk of the book describes titrations with the reagents, beginning with a detailed discussion of methods of detecting the end point. Three chapters are devoted to the determination of water per se: in organic compounds; in commercial organic materials; and in inorganic compounds. The last fifth of the book surveys analytical methods for compounds other than water, utilizing reactions of them that give rise to water. These include alcohols, carboxylic acids, ketones and aldehydes, amines, peroxides, esters, etc. There is even an application to determination of sulfur trioxide in fuming sulfuric acid. Unfortunately, the great value of the compilation of the many practical applications is undermined by mishandling of basic chemistry. For example, dehydration is confused with dehydrogenation in applications to alcohols. The ninhydrin reaction is shown not only incorrectly, with a misconception about the basis for its use in quantitative analysis, but also in contradiction to the reference cited. Dithio acids are depicted as reacting with alcohols to form mercaptans and monothio acids. Grignard reagents are shown in equation as liberating hydrogen iodide by reaction with alcohols. Worse still is a purportedly balanced equation to demonstrate the stoichiometry of the reaction of potassium *N,N'*-dichloroisocyanurate with sulfur dioxide and pyridine that is not only unbalanced but also shows a spurious major product. When it is used strictly as a source of practical procedures and references, this book may nevertheless be considered valuable.

Progress in Pesticide Biochemistry. Volume 1. Edited by D. H. Hutson and T. R. Roberts. John Wiley & Sons, New York. 1981. xi + 346 pp. \$66.00.

This volume begins a review series with seven reviews contributed by ten authors. For the purposes of the series, the title is taken to subsume mode of action, transformation in living systems, environmental effects and chemistry, and toxicology. The topics chosen for this introductory volume are: juvenile hormone; fate of pesticides in soil; metabolism of synthetic pyrethroids; action of phenoxyacetic acids; mechanisms of teratogenesis induced by organophosphorus and methyl carbamate insecticides; correlation of *in vivo* and *in vitro* metabolism of pesticides in vertebrates; and metabolism of insecticides in man. The index is substantial enough to be an effective tool for retrieval of specific information.

The Bipyridinium Herbicides. By L. A. Summers (University of Newcastle, N.S.W.). Academic Press, New York. 1980. ix + 449 pp. \$69.00.

This book is intended to be a reference work on an important group of herbicides that includes diquat and paraquat. They are derivatives of 4,4'-bipyridyl and 2,2'-bipyridyl that have been converted to diquaternary salts, with or without bridging from N to N. The synthesis, physical properties, reactions, uses, metabolic fate, analytical methods, mode of action, toxicology, and environmental effects are reviewed to the middle of 1978. There is also a chapter on the selection of structure and herbicidal activity. The depth of the treatment of the overall subject is indicated by the fact that there are approximately 2500 references in the book.

Photochemistry. Volumes 9, 10, and 11. Edited by D. Bryce-Smith (University of Reading). The Royal Society of Chemistry, London, 1978, 1979, 1981. Volume 9, xxii + 653 pp. £38.00. Volume 10, xxiv + 717 pp. £40.00. Volume 11, xxiv + 680 pp. £70.00.

The "Specialist Periodical Reports on Photochemistry" continue to be an excellent source of a broad overview of activity in research in this area. Volumes 9, 10, and 11 of the series survey the literature between July and June for the years 1976-1977, 1977-1978, and 1978-1979, respectively, with the thoroughness and in the same format as the previous volumes in the series. Part I in each volume is devoted to physical aspects of photochemistry with the latest developments in instrumentation and technology being emphasized in Volume 10 and spectroscopic and theoretical aspects featured in Volume 11. This reviewer was struck by the multiplicity of the sections in Volume 10 dealing with laser technology, laser spectroscopy, and laser-induced chemistry and intrigued by a section on undergraduate experiments in photochemistry, including one involving the construction of a pulsed CO_2 laser. Part II in each volume deals with the photochemistry of inorganic and organometallic compounds and re-

fects a growing body of literature on the photochemistry of transition-metal compounds. Part III and Part IV cover the organic aspects of photochemistry and polymer photochemistry, respectively. In each volume, Part V is devoted to photochemical aspects of solar-energy conversion. The biennial report on the chemical aspects of photobiology appears as Part VI in Volume 10.

The series remains an important reference work for chemists wishing to acquaint themselves with the range of work being done in various areas of photochemistry. The coverage is detailed enough with the liberal use of diagrams, equations, and formulas that items of interest are easy to find in spite of the absence of a subject index. While each volume purports to cover the literature for a given period of time, the reporters do an excellent job of putting the new work in context of what has gone before, enhancing the usefulness of these volumes as continuing reviews of the field of photochemistry.

Seyhan N. Ege, *University of Michigan*

Experimental High-Resolution Electron Microscopy. By John C. H. Spence (Arizona State University). Oxford University Press, Oxford, England. 1981. xii + 370 pp. \$74.00.

This is an excellent, timely book for those interested in the rapidly developing field of high-resolution electron microscopy where phase contrast effects are of primary importance in determining image characteristics. The first few chapters, covering electron optics, wave optics, and coherence, provide a theoretical basis for understanding the phenomena involved. These chapters are, of necessity, theoretical in character and involve considerable mathematics; however, the author has attempted to minimize mathematical difficulties by extensively discussing and illustrating the concepts involved. Chapter 5 discusses high-resolution images of periodic structures, including the currently popular topic of lattice imaging and its use in studying the crystalline defects in solids. Chapter 6 discusses the imaging of single atoms and non-periodic specimens. The remaining four chapters cover the instrumental parameters which must be measured and controlled, and the operating procedures recommended, for performing high-resolution electron microscopy. These chapters are essentially practical and experimental in orientation and would be useful to most persons interested in doing high-quality electron microscopy.

The book is well-written and well-illustrated and contains extensive references to key topics in each chapter, plus good author and subject indexes.

W. C. Bigelow, *The University of Michigan*

Color Measurement: Theme and Variations. By David L. MacAdam (Eastman Kodak Co., retired). Springer-Verlag, New York. 1981. xiii + 229 pp (4 color plates). \$39.50.

Written by one of the major contributors to the science of colorimetry (that is, the calculations related to color measurement), this book is dedicated to the memory of Arthur C. Hardy, MacAdam's mentor, a pioneer in both the instrumentation and the calculation methods for color measurement some 50 years ago. The subtitle refers to MacAdam's "theme" of revision and restatement of Hardy's 1936 "Handbook of Colorimetry" (which MacAdam effectively coauthored) and his addition of "variations" in the form of alternative methods and discussions of implications.

Judged for usefulness to readers of this Journal, the book may be divided into three parts: sections valuable even to beginners in the field, those reserved for experts, and those which are not generally useful.

The best parts of the book, by and large, are the restatements of the content of the Hardy "Handbook" (itself still in print after some 45 years): a good, simple introductory chapter; good information on standard sources of light (but not on the light booths actually used in color matching); the revisions of "Handbook" material in Chapters 5 and 6; and some sections describing the author's own special fields of interest in colorimetry.

An excellent chapter on color differences should be required reading for those already familiar with the topic, but is by no means a balanced introduction. Also for the expert are an advanced and not-too-useful chapter on color-matching functions and a very brief overview of chromatic adaptation.

Regrettably unsuccessful are the sections of the book dealing with the interaction of light with matter and the instrumentation for color measurement. They are not current even conceptually and say nothing about actual practice; they present unconventional definitions and do not adhere to international convention. In addition, several calculation methods the author has developed are discussed at length despite the general lack of acceptance in the field or even, in the last analysis, by the author himself. Finally, the brief index is far from adequate.

In summary, this book is one the expert in color measurement will treasure for certain definite sections. He can also use it to good effect

by recommending specific sections to his less expert colleagues and warning them against others. However, it cannot be recommended as a balanced overview of color measurement, even in the narrow sense of colorimetric calculations used by the author.

F. W. Billmeyer, Jr., *Rensselaer Polytechnic Institute*

Medicinal Chemistry Advances. Edited by F. G. De Las Heras and S. Vega (Instituto de Quimica Medica, Madrid, Spain). Pergamon Press, Oxford, England. 1981. xiii + 512 pp. \$80.00.

This book is a compilation of the 38 papers, complete with pertinent references and background, presented at the Seventh International Symposium on Medicinal Chemistry, Torremolinos, Spain, September 2-5, 1980. Each chapter, written by leading research scientists, details the current research activity in a wide variety of areas within the field of Medicinal Chemistry, including topics such as: current options and problems in drug design and/or development, nucleosides, antitumor and antiviral agents, QSAR, receptors, peptides, enzyme inhibition, agents acting on the central nervous system, the respiratory system, platelets, and antithrombotic agents.

Medicinal chemists, pharmacologists, biochemists, and organic chemists alike will enjoy the opportunity to read this text.

Dale L. Boger, *The University of Kansas*

Analytical Methods for Pesticides and Plant Growth Regulators. Volume XI. Updated General Techniques and Additional Pesticides. Edited by G. Zweig (U.S. Environmental Protection Agency) and J. Sherma (Lafayette College). Academic Press, New York. XIII + 408 pp. \$46.00.

This book is separated into four sections: analytical instrumentation, insecticides and acaricides, fungicides, and herbicides and plant growth regulators. The first section consists of three chapters, the first of which is an excellent treatise on automated pesticide analysis. This chapter covers automated sampling, separation, and detection. Some very clever automated cleanup and pretreatment methods are discussed in detail. Anyone planning to build a partially or totally automated laboratory will find this chapter most helpful.

The next two chapters cover high-performance liquid chromatography (HPLC) and quantitative thin-layer chromatography (TLC). Both chapters include detailed discussions of the methods and a number of good applications. The chapter on HPLC covers the theory, instrumentation, solvents, columns, and measurement conditions.

The formats of the chapters in the last three sections of the book are very similar. Each chapter is devoted to an individual chemical and includes the chemical, physical, and biological properties and the source of standard samples. Most of each chapter is devoted to the analytical technique. One or more recommended methods are presented along with the required reagents, apparatus, calibration procedures, and detailed methodology. A total of seventeen chemicals are treated in the last three sections.

In general, with the exception of the first three chapters, the book consists of the procedures used for analyses of the individual chemicals. The book is laid out well and the procedures are well documented.

Chris W. Brown, *University of Rhode Island*

Liquid Chromatography in Clinical Analysis. By P. M. Kabra and L. M. Marton (University of California). Humana Press Inc., Clifton, New Jersey. 1981. 17 + 466 pp. \$55.00.

This is a useful book on the use of high-performance liquid chromatography (HPLC) in the clinical laboratory. Unfortunately, because of the explosive growth of clinical applications of HPLC, it was almost out of date by the time it was published, and for the majority of the chapters references are only through 1979. As in most books in which the chapters are written by different authors, the book is uneven in depth of content, clarity of writing, and literature coverage. However, this book, which is written for clinical chemists who are just starting to use HPLC, should be useful to many workers in clinical laboratories as well as scientists in biomedical research.

The first chapter on principles of liquid chromatography, which is very elementary, is well written. However, it would have been helpful if there were a discussion in greater depth on optimization of separations and if the major points were illustrated with more examples. Also a more complete list of references should have been included for the reader who is interested in more information in depth than was provided.

Chapter 2 on instrumentation is well done; however, it would have been preferable to omit the names of manufacturers of parts or instruments since this information dates the book because of the rapid changes in the field. The third chapter on column technology is excellent, clearly written, comprehensive, and well illustrated and has a good list of references.

Although chapter 4 on Why Measure Drug Levels? is interesting and

informative to the "un-initiated", it is not necessary in a book titled "Liquid Chromatography in Clinical Analysis".

In part II on Therapeutic Drug Monitoring and Toxicology, Chapter 5 on anticonvulsants is well organized and written and supplies the information needed by clinical chemists. By supplying the structures of the drugs discussed and the tables on drug properties and chromatographic procedures, the material was presented clearly and concisely.

Chapter 7 on antibiotics was well done and the use of case histories to illustrate the need for good clinical assays was very effective. In this chapter, as well as in Chapters 6 and 9, the compilation of data in tables is useful for rapidly surveying the HPLC methods currently available for the drugs under discussion. A table such as these could have been helpful in the chapter on hypnotics. Since, clinically, theophylline and antiarrhythmics are both important topics, they deserved separate consideration, while the chapter on toxicology screening, which was very weak and did not have adequate, up-to-date references, should have been either omitted or more comprehensive.

In part III, the tyrosine and tryptophan metabolite section was well written with the most comprehensive and up-to-date bibliography of any of the chapters. I do not agree with the authors on steroids that "the only advantage resulting from the introduction of a high-performance chromatographic assay is that gained by the manufacturer in terms of greater sales". I do agree with the editors note at the end of the chapter and feel that the authors are biased and not sufficiently up-to-date on the HPLC literature. For example, the work of Morris et al. (work reviewed "Advanced in Chromatography", Vol. 19, J. C. Giddings, Ed., Dekker, New York, 1981) has shown that certain studies of aldosterone could not have been carried out without HPLC.

The material on proteins, bilirubin, and nucleosides was well covered; although the chapters on porphyrins, polyamines, and organic acids were short, they were well done. However, the organic acid chapter was limited because only ion chromatography was discussed and the references were not comprehensive. It is surprising in a book on clinical analysis that two very important topics, amino acids and carbohydrates, were not covered.

In general, however, the book is well written and easy to read and should be useful to clinical chemists and technicians.

Phyllis R. Brown, *University of Rhode Island*

The Alkaloids. Chemistry and Physiology. Volume XVIII. Founding Editor R. H. F. Manske; Edited by R. G. A. Rodrigo (Wilfrid Laurier University). Academic Press Inc., New York. 1981. XVI + 411 pp. \$65.00.

The community of alkaloid chemists will note with satisfaction the appearance of the eighteenth volume of this invaluable and scholarly series. Despite the loss of its guiding hand of its founding editor, Professor Rodrigo has done a commendable job of following in his tradition.

The present volume consists of five chapters on quite varied topics. Chapter 1, by S. F. Dyke and S. N. Quessy, concerns the *Erythrina* and related alkaloids, including the homoerythrina and the *Cephalotaxus* alkaloids. Although smaller facets of this area have been reviewed in recent years, this is the first comprehensive treatment of the *Erythrina* alkaloids since the 1966 review in Volume IX of this series. The discussion of the *Cephalotaxus* alkaloids is of timely interest in view of the anticancer properties of some of these compounds.

Chapter 2, by S. W. Pelletier and N. V. Mody, is concerned with the chemistry of the C_{20} -diterpenoid alkaloids. It consists of an update of the 1970 review of the same subject in Volume XII of this series. This is a useful review of one of the most complex of alkaloid families. A particularly valuable feature of the chapter is the catalog of all known C_{20} -diterpenoid alkaloids, including correct structures, physical properties, plant sources, and key references.

Chapter 3, by D. W. Hughes and D. B. Mac Lean, is a discussion of the ^{13}C NMR spectra of isoquinoline alkaloids. It is not intended as a comprehensive listing of all available data. Instead, the authors have chosen to discuss selected examples from a wide variety of isoquinoline alkaloid subtypes. Emphasis has been placed on showing how the chemical shift of a particular carbon atom may be influenced by both electronic and stereochemical factors. The contents of this chapter should be very useful to investigators engaged in the structure elucidation of isoquinoline alkaloids.

Chapter 4, by W. M. Gołębiewski and J. T. Wrobel, discusses the *Lythraceae* alkaloids. It should be noted that this chapter represents the first comprehensive review of this interesting alkaloid family. All aspects of the chemistry of these alkaloids are covered thoroughly and competently, including synthetic work.

The volume closes with Chapter 5, by H. L. Holland, on the subject of microbial and in vitro enzymic transformations of alkaloids. This is a topic which is little known to the average alkaloid chemist who may be surprised, like this reviewer, how much work has already been carried

out. As the author points out, the field is as yet underdeveloped, but biological reagents hold considerable promise for the chemical modification of alkaloid structures on a synthetic scale. The literature has been covered through Volume 88 (1978) of Chemical Abstracts.

Michael P. Cava, *University of Pennsylvania*

Quality Control in Analytical Chemistry. By Gerrit Kateman and Frans W. Pijpers (Catholic University of Nijmegen). Wiley-Interscience, New York. 1981. vii + 276 pp. \$40.00.

Chemical analysis can be regarded as a process whose product is subject to optimization and control. This concept is the basis of the book by Kateman and Pijpers, who consider the interaction of the three phases of an analysis, sampling, measurement, and data reduction, in determining the quality of the analytical result.

The book is organized with one chapter devoted to each of these three phases. The chapter on sampling discusses the statistical and practical considerations associated with obtaining representative samples for description, threshold control, and process control. A chapter on measurement follows; it discusses Youden plots, measurability, and cost, in addition to the more usual treatments of accuracy and precision. The largest section of the book is given to the chapter on data processing. Here, coverage is given to analysis of variance, pattern recognition, and some techniques new to analytical chemistry. The book also includes a chapter on the optimization of the organization of the analytical laboratory. Planning and laboratory management are emphasized here.

Throughout the book, the authors avoid mathematical detail, preferring instead to reference the original papers. This practice has the effect of making the book a brief catalog of techniques, since much of the material presented is not discussed in sufficient detail to be used by the uninitiated. Students will find the book difficult, since the level of mathematical treatment varies widely, ranging from material requiring knowledge of stochastic time series in Chapter 2, to a long discussion of the one-sided *t* test in Chapter 3. Relatively few literature references are given, and no references are given to recent texts on analytical optimization, data reduction, or similar topics, although several excellent ones are available.

Despite these shortcomings, the book is a useful survey of optimization and control strategies in chemical analysis. Its integrated outlook should be particularly appealing to those desiring a broader view of the area.

Steven D. Brown, *Washington State University*

Table of Laser Lines in Gases and Vapors. Third Edition. By R. Beck, W. Englisch, and K. Gürs. Springer-Verlag, Berlin-Heidelberg-New York. 1980. ix + 247 pp. \$36.00.

This revised and enlarged edition lists 6145 laser lines in 147 media. The lines are arranged by both medium and wavelength (in μm); pump transitions for the far IR lines of optically pumped organic vapors are also listed. Pump conditions are listed at the head of each table. The tables were published directly from computer listings of the data and sub- and superscripts could not be printed. Therefore, atomic and molecular species are listed in separate tables (e.g., N_2^+ and N^{2+} are both listed at N^{2+} , in separate tables). There are 617 references and a subject index.

This information is useful primarily to those involved in the design of new types of lasers. Most chemists, though, prefer to use commercially available laser systems or, at most, to construct systems from well-documented designs. This volume will not prove particularly useful to the readers of this journal.

G. R. Daigneault and M. D. Morris, *University of Michigan*

Polymer Blends. Processing, Morphology & Properties. Edited by Martuscelli, Palumbo, and Krysewski. Plenum Press, New York. 1980. xii + 510 pp. \$59.50.

This book is the compilation of papers presented at the First Joint

Italian-Polish seminar on multicomponent polymeric systems held in Capri, Italy, October 16-21, 1979.

The topics presented in this book are mainly concentrated on some aspects of polymer blends preparation and studies of their properties in the solid state rather than in the molten state or in solution. Articles covered include processing, morphology, crystallization, and mechanical properties of blends and their interrelationships which affect the end use properties. The first paper is by one of the editors and summarizes the current understanding of the preparation and properties of blends. The second paper is also by one of the editors and discusses the current understanding of morphology, crystallization phenomena, and transitions in crystalline polymer blends. Other papers are specific to certain polymer blends and quite pertinent for this book.

This book is organized well except that one of the papers (by G. Riess) is presented in French. I think it would have been more appropriate if the English translation of this paper was included in this book.

In my opinion this book will be a useful reference for scientists and technologists who are exploiting the current state-of-the-art knowledge of polymer blends.

K. C. B. Dangayach, *Shell Development Company*

Catecholamines and Stress: Recent Advances. Edited by E. Usdin (NIMH, Rockville, Maryland), R. Kvetnansky (Slovak Academy of Science, Bratislava, Czechoslovakia), and I. J. Kopin (NIMH, Bethesda, Maryland). Elsevier/North-Holland, New York. 1980. xxv + 618 pp. \$65.00.

This book is the proceedings of a conference and represents a compilation of state-of-the-art research in the area of catecholamines and stress. Transcripts of the opening lectures given by J. Axelrod and R. Kvetnansky and the papers presented at the conference comprise the text. Presented are 83 original research papers. Nine areas are covered, namely: (1) Brain Catecholamines Under Stress; (2) Catecholamines in Neuroendocrine Regulation Under Stress; (3) Plasma Catecholamines Under Stress; (4) Catecholamine Receptors Under Stress; (5) Catecholamine Related Enzymes Under Stress; (6) Synthesis and Degradation of Catecholamines Under Stress; (7) Catecholamines and Space Flight; (8) Catecholamines Under Psychosocial and Occupational Stress; and (9) Catecholamines in Human Subjects Exposed to Stress. Most areas are introduced by a short paper which puts the subject matter into perspective. The book closes with a brief panel discussion on stress theory. This book should be valuable to everyone interested in the area of catecholamines and stress.

David C. DeMeglio, *University of Michigan School of Dentistry*

Analytical Profiles of Drug Substances. Volume 10. Edited by K. Florey. Academic Press, New York. 1981. xi + 735 pp. \$41.00.

Volume 10 continues this excellent series prepared under the auspices of the Pharmaceutical Analysis and Control Section of the Academy of Pharmaceutical Sciences. An additional 21 drugs are included, each as a complete contributed chapter. Each profile is a comprehensive review which includes all important physical and chemical data available, a thorough review of methods of analysis, and relevant pharmacologic disposition information. Each chapter is thoroughly referenced and includes carefully reproduced UV, IR, and NMR spectra. The chapters are uniformly organized and a cumulative index for Volumes 1-10 is an extremely useful feature.

The writing is concise and the entire series is recommended as an important reference source for those involved in drug isolation, synthesis, testing, manufacture, and particularly analysis.

Jordan L. Cohen, *University of Southern California School of Pharmacy*