minimization or for the creation of a standard format MM2(87) card input file. Once converted to a VAX text file, these input files could be submitted to VAX MM2(87) without editing. Identical calculations performed on a VAX 8350 were completed in one-third to one-fifth the time required by a first-generation Macintosh II with a MC68020 processor. The full output of the Macintosh MM2 calculation is written to a text file that reports the resulting steric energy, the number of atoms and bonds in the molecule, the optimized coordinates with MM1 atom type numbers, and a list of bonds. This file can be used as input to the structure program (MacMimic) which displays the minimized structure. Another text file contains standard MM2(87) output which can be read by any text editor. Input to MM2(87) is thus very easy to achieve and data output and display of the minimized structure is also very convenient.

The MacMimic user's guide and the MM2(87) user's manual are very helpful, and appendices that include MM2 potential functions, atom types, and standard input files will be useful for those users that do not have extensive experience with this method. A modest library of MM2 structures comes with the program, and it is easy to add to this library and to use filed structures as starting points for building new compounds.

MacMimic and MM2(87) for the Macintosh make implementation of the Allinger force-field on the Macintosh a simple and effective process. With fast Macintosh II computers now available, chemists interested in the structure of organic molecules will find MacMimic to be a powerful, although expensive, alternative to some existing VAX and Macintosh programs. The MacMimic structure drawing application is reasonably easy to use and has several features not found elsewhere while other competing programs have more sophisticated displays and output to printers or word processors.

Ned A. Porter and Daniel M. Scott, *Duke University*

*Book Reviews**

Advanced Practical Organic Chemistry. By M. Casey, J. Leonard, B. Lygo, and G. Procter (University of Salford). Routledge, Chapman & Hall: New York. 1990. xii + 264 pp. $37.95. ISBN 0-412-02461-6.

This book is intended to be a guide covering the most up-to-date techniques commonly used in organic synthesis and it performs this task admirably. In general, the book brings together in one convenient volume many of the techniques and "tricks of the trade" necessary to be a practicing organic chemist. The beauty of this book is the simple straightforward presentation of these techniques. A chemist when confronted with a new technique or reaction type could consult this work and at the very least know how to get started carrying out or analyzing the reaction.

Specifically, the chapters of this book address the following: keeping a notebook, general laboratory equipment, purification of solvents and reagents, handling of compressed gases, typical setupts for carrying out reactions and monitoring them, typical workup and characterization procedures, an introduction to the chemical literature, and an introduction to "special" procedures such as catalytic reduction, photolysis, and ozonolysis. In addition, several appendices are included describing properties of common solvents and gases, pK_a's of common acids and bases, properties of common Lewis acids, and reactivity tables for common oxidizing and reducing reagents.

As can be seen from the above listing, this book covers many areas of direct interest to the practicing organic chemist. Therefore, it is strongly recommended as a laboratory reference guide for all academic and industrial chemists involved in the laboratory practice of organic chemistry.

James G. Davidson III, *Parke-Davis*

Dictionary of Drugs. Chemical Data, Structures and Bibliographies. Edited by J. Elks and C. R. Ganellin. Chapman and Hall: London, New York, Tokyo, Melbourne, and Madras. 1990. Two-volume set. Volume I: xiii + 1303 pp. Volume II (Indexes): vii + 755 pp. $1099.00 ISBN 0-412-27300-4.

The main purpose of this two-volume reference work as stated by the editors is to provide the definitive source of concise, easily accessed factual data on all of the most significant drugs currently in use or late development worldwide. The Dictionary is primarily intended for use by the medicinal and pharmaceutical chemist as an aid to research.

Volume I is the Drug Dictionary which contains over 6000 alphabetical entries which are also numbered to assist ready location. Entries include all drugs for which generic names have been assigned, pharmacologic agents in advanced stages of clinical trials, and substances which have been used in traditional folk remedies. The individual substance monographs are consistent with the *Dictionary of Organic Compounds*, Fifth Edition, and provide structure diagrams showing stereochemistry where applicable and selected references to synthesis, analysis, pharmacologic studies, and general review articles. The primary literature citations have been reviewed through July 1989. Additional components of each monograph include a listing of trade names and synonyms and the therapeutic uses of the substance.

Volume II contains five carefully constructed and extremely useful indexes. The Name Index lists every name used in the Dictionary including the primary entries, isomers, and derivatives. The Molecular Formula Index lists all molecular formulae in Hill convention order. The CAS Registry Number Index lists all Chemical Abstracts Service registry numbers used in the Dictionary. The Type of Compound Index classifies all drugs listed in the Dictionary under one or more of approximately 200 headings related primarily to pharmacologic activity. The Structure Index provides reduced size structural formulae of all compounds in entry number order to allow rapid identification of structurally similar compounds.

The *Dictionary of Drugs* is a comprehensive and extremely useful reference which fully meets the goals set forth by the editors. The multiple indexes make the information in the Dictionary readily accessible. Since the continued usefulness of the Dictionary or any reference covering the rapidly changing area of drug development depends on the availability of current information and updated listings of new drugs, the publication of supplements and/or new editions will be essential. The frequency and method by which this information will be made available has yet to be determined; however, the cost of these updates must also be considered in the decision to acquire this reference work.

Cary E. Johnson, *The University of Michigan College of Pharmacy*

Atoms and Quanta. By Daphne F. Jackson (University of Surrey, United Kingdom). Surrey University Press: London. 1989. x + 215 pp. $29.95. ISBN 0-12-379075-1.

This is a textbook aimed at first-year physics undergraduates; it is also suitable for chemistry undergraduates with a strong background in elementary physics, perhaps as a supplementary source for physical chemistry. Students should be familiar with elementary classical mechanics and electricity and magnetism. The book has chapters on the structure of atoms, photons and their interactions, elementary quantum theory and the experiments related to its development, the nucleus, and instrumentation related to nuclear structure. Roughly one-eighth of the book addresses experimental considerations. Historical theories and ideas involved in the evolution of quantum theory are presented: Bohr model, planetary models, Rutherford's model of the atom. Each chapter has problems, though not extensive (usually about ten or fewer); solutions are provided for some exercises. Nearly all problems are numerical in nature and often require more insight and thought than the accompanying material. The text includes many figures of experimental data and illustrations of concepts described in the text.

The book has a strong physics orientation in its discussion. Extensive discussion of the photon and its characterization, the Compton effect, and electron and ion motion especially with fields are included. In the elementary discussion of the Schrödinger equation, the time-independent derivation is motivated from a classical wave equation and a number of simple one-dimensional examples are provided: electrons in a beam, electrons in a box, free electrons in a metal, electrons in a periodic potential, and one-electron atoms. Chemical bonds are only briefly discussed. Nuclear processes are discussed with some detail for α and β decay (with neutrinos included). Several nuclear models are discussed. The text does not include any of the more recent nuclear physics ideas, for example those involving quarks.

While the text is not as explanatory as I would prefer for course adoption, the book is an excellent source book for supplementary text. It takes many ideas and, if not fully explained quantitatively, does include qualitative descriptions. *Atoms and Quanta* can provide additional ma-

*Unsigned book reviews are by the Book Review Editor.

terial for those students of general chemistry where nuclear chemistry is included. This textbook is certainly recommended for libraries.

David J. Malik, *Indiana University—Purdue University at Indianapolis*

Specialist Periodical Report: Nuclear Magnetic Resonance. Volume 19. Edited by G. A. Webb (University of Surrey, Guildford). Royal Society of Chemistry: Cambridge, UK. 1990. lvii + 591 pp. $252.00. ISBN 0-85186-422-8.

The *Specialist Periodical Report* on NMR has for many years been a valuable resource for researchers in the field. Typically, this volume gives a selective but very extensive review of the literature for the period June 1988 to May 1989. Each of the 13 chapters reviews several hundred papers, devoting a sentence or two to each. The topics covered are the following: theoretical and applied nuclear shielding, theoretical and applied spin–spin coupling, spin relaxation in liquids, solid-state NMR, multiple-pulse NMR, natural and synthetic macromolecules, conformational analysis, living systems, oriented molecules, and heterogeneous systems. At the beginning, tables of symbols and abbreviations and a list of books and review articles for the same time period are given.

The reviews appear to have been done with great thoroughness, and the diligence of the authors is admirable. However, the physical format of the book makes its reading very difficult. The book was made from camera-ready copy as provided by the authors, and these were provided in a great variety of formats and typefaces. Even if they were all legible such variety makes a book look like a dog's breakfast. But they were not: many used poor dot-matrix printers and are very difficult to read. One can certainly sympathize with any effort that reduces the cost of scientific publication—although at the price this effort was hardly successful. One also grants that many of the authors' institutions may not be able to afford a good quality printer. However, it appears that most, if not all, of the reviews were written on a computer, and it is hard to see why they could not have been submitted in machine-readable form and printed by the publisher, thereby ensuring a consistent and readable product. The computer revolution appears to have affected every aspect of science except publishing.

Joseph H. Noggle, *The University of Delaware*

Gas-Phase Ion and Neutral Thermochemistry. Journal of Physical and Chemical Reference Data. Volume 17. By Sharon G. Lias (National Institute of Standards and Technology), John E. Bartmess (University of Tennessee), Joel F. Liebman (University of Maryland), John L. Holmes (University of Ottawa), Rhoda D. Levin (National Institute of Standards and Technology), and W. Gary Mallard (National Institute of Standards and Technology). American Chemical Society and American Institute of Physics, Inc.: New York. 1988. 861 pp. $70.00. ISBN 0-88318-562-8.

This book is published as Supplement No. 1 to Volume 17 of *J. Phys. Chem. Ref. Data* and covers the literature through the middle of 1986. The extensive tables (covering 756 pp) compile critically evaluated data on the heats of formation of positive and negative ions in the gas phase. Auxiliary information on ionization energies, proton affinities, electron affinities, acidities, and relevant neutral thermochemistry is included. An extensive introductory section covers conventions used, experimental techniques, and the reliability of the data. The compilation is arranged into positive ion and negative ion sections, and the arrangement within each section is by molecular formula. Ions sharing a given formula are often delineated by molecular structures and CAS registry numbers. Each entry in the tables is keyed to one or more references given at the end of the book. The overall arrangement allows for rapid location of information for the ion of interest.

This volume has evolved from earlier compilations of ion thermochemistry published under the auspices of the National Bureau of Standards (now NIST) since the late 1960's. Beginning in the mid-1970's, a substantial amount of new ion thermochemistry has been derived from the study of ion/molecule equilibria, and this volume contains the most extensive evaluated compilation of data from this technique and earlier methods. Unlike the JANAF tables, which give the entropies, free energies, and enthalpies for a few ions over a large range of temperatures, this volume contains only enthalpies of formation at 298 K. The positive ion table lists the enthalpies for the ions and corresponding neutrals in both kcal/mol and kJ/mol, a convenience. Negative ion data are given in kJ/mol only, but the units can only be identified by reference to the Introduction since they are not given on the table heading (an inconvenience).

The Introduction to this compilation runs about 35 pp and is a gem. It is actually a short review (with over 100 references) of a number of critical topics related to the experimental techniques used and the evaluation of ion data. Included is a very clear discussion concerning thermochemical conventions for the electron and their impact on the tabulation of data. Short descriptions of various instrumental methods for determining the thermochemistry of ionization and electron attachment processes are given. The relationship of this compilation to older works is presented. The authors have produced a readable and concise review that is useful beyond its purpose as an introduction to the tables.

This reference work is indispensable for the researcher interested in thermochemical aspects of ion/molecule reactions and ion thermochemistry. It should be noted that a computer-searchable database derived from the tabulated data is available as Standard Reference Databases 19A and 19B from Standard Reference Data, NIST, Gaithersburg, MD 20899.

David E. Richardson, *University of Florida*

Phase Transition and Critical Phenomena. Volume 13. Edited by C. Domb (Bar-Ilan University) and J. L. Lebowitz (Rutgers University). Academic Press: London and New York. 1989. xv + 304 pp. $91.00. ISBN 0-12-220313-5.

Exact results are a most precious commodity to statistical mechanicians. In very different ways, the two reviews in Volume 13 of the series *Phase Transitions and Critical Phenomena* are concerned with the search for exact results (that, of necessity, can only be obtained for rather simple models of solids, liquids, and other strongly interacting systems). In the past decade it has become commonplace to rely on computer simulations to reveal the true behavior of a proposed statistical mechanical model. Although they provide information that is "exact" because it is not the product of an approximate theory, computer simulations are subject to severe limitations. Simulation results are subject to experimental error. Also many physical processes occur on time scales that are simply too slow to simulate on present-day computers. Fundamental issues, for example, the order of a phase transition, may not be definitively settled by a number with error bars from a computer simulation (although several promising methods for milking the utmost information from simulations have appeared in the last few years). Therefore the need for exact results in statistical mechanics is as sharp as ever.

The two review articles in this volume are very different in style and scope. Most of the volume is devoted to A. J. Guttman's useful review of series expansion methods. The central question is when n terms of the exact series expansion of a thermodynamic quantity are known, usually in the high- or low-temperature limit, what can be said about the nature of the critical phase transition points of the system? Guttman takes the reader through the variety of critical singularities observed in thermodynamic functions and the various methods used to extract information about critical behavior from series expansions. This review should be of great help to the expert on critical phenomena who wishes to choose and implement a series expansion method.

Nagle, Yokoi, and Bhattacharjee's review is an entertaining introduction to dimer models for those with some background in the statistical mechanics of phase transitions, but not nearly as specialized as for the previous article. This article excellently covers both techniques and applications at a level that conveys the essential physical idea without technical details. In a later section, Nagle et al. describe how the packing of chain molecules (albeit for idealized chain models—simplicity is the price paid for exact results) can be recast as a dimer model. This and other sections on applications will hopefully illustrate the value of spin lattice models to a wider audience.

The initial volumes in the *Phase Transitions and Critical Phenomena* series contained related articles on a central topic. The present editors have departed from this policy. While there are obviously good practical reasons for this departure, the importance of each volume is diminished when it contains articles not closely related. For example, it is doubtful that many scientists will buy their own copy unless the volume is *the* authoritative reference on renormalization group, dynamics of phase transitions, etc. I hope that the editors will strive to collect reviews on a central topic into authoritative collections whenever possible.

Sherwin J. Singer, *Ohio State University*

Inorganic Syntheses. Volume 26. Edited by Herbert D. Kaesz. John Wiley & Sons: New York, 1989. xxvii + 443 pp. $59.95. ISBN 0-471-50485-8.

It is a measure of the success of *Inorganic Syntheses* that it is now very difficult to find a reviewer who has not at some time been a contributor to the series. Syntheses of over 200 compounds are reported in this volume, which maintains the longstanding principle that all the syntheses are checked in another laboratory. Authors are often obliged to make their descriptions of procedures more explicit as a result of problems encountered by the checkers. Sometimes a checker will suggest a shortcut. The result is that the final version is usually very reliable. Another feature of the series is that each editor often has a theme in mind for his or her volume. This is not usually a problem because enough unsolicited manuscripts are received so that a balance is maintained, at

least in the areas traditionally covered by the series.

Volume 26 contains preparations for a wide variety of compounds in the fields of coordination, organometallic, and solid-state chemistry. An unusually large number of key compounds are covered. Perhaps the most widely useful work will be the new synthesis of PMe_3 reported by Sattleberger, Fackler, et al. Other highlights are definitive preparations of carbene and carbyne complexes by Fischer and by Schrock, Roper's metallabenzene complex, Adams S-bridged clusters, and some Chini-type multinuclear Pt species. Several important trinuclear ruthenium and osmium clusters are included, including $Os_3H_2(CO)_{10}$. Important ruthenium clusters with interstitial carbon and nitrogen, as well as unusual mixed metal clusters containing gold and mercury, are also covered. The usual author, subject, and formula indices are included.

The growing importance of solid-state inorganic chemistry is reflected by a small but very interesting section devoted to this topic, including the syntheses of highly conducting and superconducting solids based on organosulfur compounds. The solid state and compounds of interest to the bioinorganic community could play a larger role in future volumes.

Robert H. Crabtree, *Yale University*

Progress in Heterocyclic Chemistry. Volume 2. Edited by H. Suschitzky and E. F. V. Scriven. Pergamon Press: Oxford and New York. 1990. viii + 295 pp. $70.00 hardbound. ISBN 008-037069-1. $35.00 softbound. ISBN 008-037070-5.

The seven chapters in this volume consist of a review on Oxidation of Five-membered-ring Heterocycles Containing N and S (by R. A. Aitken, D. P. Armstrong, and S. T. E. Mesher) and six chapters that treat ring systems according to heteroatoms present. In these chapters, the literature of 1989 is systematically reviewed. They are reproduced from typescripts and have carefully drawn structural formulas. The chapters are essentially self-organized, but a substantial index is provided as a backup. This book is a useful tool in keeping up with a complex, highly active, and important part of organic chemistry.

Volumes of Proceedings

Advances in X-ray Analysis. Volume 33. Edited by Charles S. Barrett (University of Denver), John V. Gilfrich (Sachs/Freeman Associates), Ting C. Huang (IBM Almaden Research Center), Ron Jenkins (JCPDS), and Paul K. Predecki (University of Denver). Plenum Publishing Company: New York. 1990. xx + 704 pp. $95.00 (hardback). ISBN 0-306-43615-9.

This book reproduces the typescripts of many of the papers given at a 1989 conference held in Denver. The emphasis is on X-ray diffraction. A list of papers not published is given in the preface. The papers are grouped under ten headings: Characterization of epitaxial thin films and crystal defects by X-ray diffraction; XRD characterization of polycrystalline thin films; X-ray spectrometric characterization of thin films; Analysis of digital diffraction data including Rietveld; X-ray stress analysis; Determination of crystallite size and strain; Phase identification, structural and quantitative analysis by diffraction; X-ray spectrometry data analysis; XRF instrumentation; XRF techniques for hazardous wastes and other applications. A substantial subject index is included.

Interbiotech '89. Mathematical Modelling in Biotechnology. Progress in Biotechnology. Volume 6. Edited by A. Blazej and A. Ottova (Slovak Technical University). Elsevier: Amsterdam and New York. 1990. 448 pp. $218.00 ISBN 0-444-98796-7.

This volume of typescript papers arose out of the symposium INTERBIOTECH '89, held in Bratislava. The papers reflect the interdisciplinary character of the field and are collected in three groups: Biotechnology and electronics; Bioengineering and biocatalysis; and Fermentation processes. There is no index.

Contemporary Topics in Polymer Science. Volume 6: Multiphase Macromolecular Systems. Edited by Bill M. Culbertson (Ohio State University). Plenum: New York and London. 1989. xiv + 733 pp. $125.00. ISBN 0-306-43374-5.

This large volume of typescript papers arose from the 14th Biennial Meeting of the ACS Division of Polymer Chemistry, held in San Diego in 1988. It is dedicated to the late John K. Stille. The 43 papers are augmented by a 23-page index.

Marine Toxins. Origin, Structure and Molecular Pharmacology. Edited by Sherwood Hall (U.S. Food and Drug Administration) and Gary Strichartz (Harvard Medical School). American Chemical Society: Washington, D.C. 1990. xi + 377 pp. $47.95. ISBN 0-8412-1733-5.

The 27 papers in this volume are groups under four headings: General Considerations; Polyether Toxins; Polytoxin; and Peptide Toxins. The topics include isolation, identification and structure determination, biosynthesis, and mechanism of action. The original papers were given at a symposium held in Woods Hole in 1987. The index is thorough.

Insecticide Action. From Molecule to Organism. Edited by Toshio Narahashi (Northwestern University Medical School) and Janice E. Chambers (Mississippi State University). Plenum: New York and London. 1989. viii + 275 pp. $69.50. ISBN 0-306-43406-7.

A symposium held by the Agrochemical Division of the ACS in Los Angeles in 1988 was the origin of this collection of 15 typescript papers. There is a good index.

Spatial Inhomogeneities and Transient Behavior in Chemical Kinetics. Edited by P. Gray et al. St. Martin's: New York. 1990. xii + 756 pp. $150.00. ISBN 0-7190-2451-X.

This book of papers reproduced from typescripts reports the proceedings of a conference held in Brussels in 1987. There are 41 papers and 48 poster abstracts. The former are arranged under six headings: Coherent behavior, oscillations and chaos in chemical systems; Chemical reactors and mixing; Transient behavior and critical dynamics; Spatial patterns; Stochastic aspects of chemical instabilities; Reaction dynamics in heterogeneous systems. A 6-p subject index is included.

Trends in Colloid and Interface Science IV. Progress in Colloid and Polymer Science. Volume 81. Edited by M. Zulauf (Basel) and P. Lindner and P. Terech (Grenoble). Springer Verlag New York, Inc.: New York. 1990. x + 302 pp. $104.00 (hardback). ISBN 0-387-91368-8.

A conference held in Basel on an unspecified date was the origin of the large number of papers and abstracts of poster presentations included in typeset form in this volume. The papers are grouped under seven headings: Micelles and mesophases; Microemulsions; Dynamics; Colloid systems and nonequilibrium conditions; Additives to colloids and applications; Aggregates, ordering and structural transitions; Films, membranes, surfaces and wetting. They are largely accounts of original research. A subject index, shorter than the table of contents, concludes the book.

Ultrafast Phenomena VII. Proceedings of the 7th International Conference, Monterey, CA, May 14-17, 1990. Edited by Charles B. Harris (University of California, Berkeley), Erich P. Ippen (Massachusetts Institute of Technology), Gerard A. Mourou (University of Michigan), and Ahmed H. Zewail (California Institute of Technology). Springer-Verlag: New York. 1990. xxi + 554 pp. $69.00 (hardback). ISBN 0-387-53049-5.

A large number of papers, given at an international conference held in Monterey, California, in 1990 are reproduced from typescript in this volume. They are mostly between 3 and 5 pp long and are grouped under thirteen headings, ranging from "Ultrashort Pulse Generation" to "Biology", including superconductors, solvation, phonons, interfaces, optoelectronics, etc. There is an index of contributors but not of subjects.

Molecular Mechanisms in Bio-Organic Processes. Edited by Christine Bleasdale and Bernard T. Golding (University of Newcastle-upon-Tyne). Royal Society of Chemistry: Great Britain. 1990. xi + 371 pp. 49.50 pounds. ISBN 0-85186-946-7.

At the University of Newcastle upon Tyne in 1989 there was held a symposium on the title subject, which brought together chemists, biochemists, and medical scientists. This book includes the papers given, including the 2nd Clemo Memorial Lecture, "C-Nucleosides: Synthesis and Biosynthesis", by J. Grant Buchanan. Three chapters are based on selected poster presentations. The presentation in this book deserves mention, for it is unusually good for a work reproduced from camera-ready typescript. The Editors have achieved this by having the manuscripts re-typed in common format and typeface. The pleasing result can be recommended to other editors of volumes of proceedings.

Novel Materials in Heterogeneous Catalysis. Edited by R. Terry K. Baker (Auburn University) and Larry L. Murrell (Engelhard Corporation). American Chemical Society: Washington, D.C. 1990. x + 366 pp. $89.95. ISBN 0-8412-1863-3.

A 1989 symposium that took place at the National ACS Meeting in Miami was the source of the 30 papers in this typescript volume. They are grouped under seven headings: Zeolitic Materials, Layered Structures, Clusters, Ceramic Membranes, Metal Oxide Catalysts, Catalysts in Fuel Production, New Techniques. The short preface by the editors succintly points out the most significant new trends in catalyst research. The papers themselves are largely reports of original research at the forefront of the new developments.