

positional parameters, anisotropic thermal parameters, bond lengths and angles, and perspective structural drawings for $[\text{Ti}_7\text{O}_4](\text{OCH}_2\text{CH}_3)_{20}$, $[\text{Ti}_8\text{O}_6](\text{OCH}_2\text{C}_6\text{H}_5)_{20}\text{O}(\text{CH}_2\text{CH}_3)_2$, and $[\text{Ti}_{10}\text{O}_8](\text{OCH}_2\text{CH}_3)_{24}\text{C}_6\text{H}_5$ (86 pages); tables of calculated

and observed structure factors for $[\text{Ti}_7\text{O}_4](\text{OCH}_2\text{CH}_3)_{20}$, $[\text{Ti}_8\text{O}_6](\text{OCH}_2\text{C}_6\text{H}_5)_{20}\text{O}(\text{CH}_2\text{CH}_3)_2$, and $[\text{Ti}_{10}\text{O}_8](\text{OCH}_2\text{CH}_3)_{24}\text{C}_6\text{H}_5$ (64 pages). Ordering information is given on any current masthead page.

Computer Software Reviews

SYSTAT/SYGRAPH. Version 5.0 DOS. SYSTAT, Inc.: 1800 Sherman Ave., Evanston, IL 60201-3793. List price \$895.00. The package includes four manuals: GETTING STARTED, STATISTICS, DATA, and GRAPHICS. A MacIntosh version is available for \$795.00. Single copies of both versions are available to academic users in the U.S. and Canada at a 30% discount. A student version called MYSTAT is available at \$5.00 per copy. Site licenses and network versions are available to colleges, universities, and other multiuser organizations.

SYSTAT is a statistics package with extraordinary capability for a non-mainframe package. However, some might argue that its 6 Mb hard disk requirement puts it in a mainframe category. It can be run from floppy disks if two drives are available. The almost 700 page manual on statistics is packed with useful information in a very readable format. Some topics include correlations, factor analysis, multidimensional scaling, analysis of variance, nonlinear estimation, nonparametric statistics, and series analysis including Fourier transformations. Each individual statistical approach (e.g. linear regression, piecewise regression, analysis of covariance, Lilliefors test, exponential smoothing, etc.) is augmented with an example with pre-entered data for a hands-on experience. There are approximately 115 examples in the statistics manual alone. On the computer, the package is extremely easy to use with a well-designed menu system. For those with some computer experience it takes approximately one day to learn one's way around the menu system used in this program. The well-written tutorial in the GETTING STARTED manual provides an excellent and efficient way to learn the system.

Data input and preliminary manipulation is covered in a separate 250 page manual. Data are easily entered manually, from ASCII data files and from data bases such as Lotus 1-2-3, Symphony, and dBase. Data may be transformed, removed, and added to files by some simple BASIC style programming commands. Macros may be written for overall program control and long repetitive processes.

SYGRAPH is the second part of this package, described in its own 500 page manual. The graphics capabilities are excellent. Bar and pie

charts, scatter plots, three dimensional and contour plots and many more are all readily generated. Graphs are readily converted between Cartesian and polar coordinates. Maps (USA and world maps are included in the package) in a variety of projections are also easily drawn. Commands for all plots may be made from the menu or from typed command lines. Color may be added to graphics by specifying the name of the color or the desired wavelength in nanometers. There is an interesting and well-documented chapter entitled Cognitive Science and Graphic Design. It presents some important insights on avoiding unintended visual aberrations. Finally, output from SYGRAPH can be formatted for a wide range of printers, plotters, or laser printers, either in the setup program or directly from the menus. No listing of our Okidata Microline 320 was found, but after some trial and error the EPSON 8 pin high density option was found to be a suitable substitute.

The manufacturer offers unlimited technical support for registered users. SYSTAT has a two day training course costing approximately \$550. A bulletin board is available for users which also maintains a list of bugs that have been found (none were found in this review). At least 15 different supplements and map files are available to enhance SYSTAT/SYGRAPH.

This package most likely provides more statistical power than the chemist would typically use. The graphics portion has little capability for chemical structures, as was expected. Four volumes of instructions totalling about 1700 pages is daunting. However, after the tutorial the other manuals can be consulted on a need-to-know basis. All of the methodologies are amply referenced to appropriate texts and primary literature. The DOS version runs on IBM pc's or compatibles with at least 640k RAM and 7.5 Mb free hard disk space, and the license allows for one backup copy and use on only one computer at a time. This program is currently being used with the Perkin-Elmer LS-50 luminescence spectrometer in the generation of three-dimensional fluorescence plots.

Neil D. Jespersen, *St. John's University*

Book Reviews*

Progress in Colloid and Polymer Science. Volume 83. Interfaces in Condensed Systems. Guest Editor: G. H. Findenegg (Bochum). Springer-Verlag: New York. 1990. viii + 224 pp. \$89.00. ISBN 0-387-91369-6.

This book contains a selection of the papers presented at the Kolloid-Tagung 1989 at the Ruhr-Universität-Bochum on October 1-4, 1989. The papers are grouped into the following sections: General (Invited papers); Interfaces; Monolayers; Surfactant Systems; and Dispersed Systems. There is a 1-page preface, an author index, and a subject index.

Progress in Colloid & Polymer Science. Volume 82. Surfactants and Macromolecules: Self-Assembly at Interfaces and in Bulk. Guest Editors: B. Lindman (Lund), J. B. Rosenholm (Abo), and P. Stenius (Stockholm). Springer-Verlag: New York. 1990. viii + 364 pp. \$148.00. ISBN 0-387-91367-X.

This book contains a selection of the papers presented at the 10th Scandinavian Symposium on Surface Chemistry held at the Abo Akademi University in Abo, Finland, on June 14-16, 1989. The papers presented are grouped into the following sections: Adsorption from Solution; Emulsions, Foams, Thin Liquid Films; Self Assembling Systems;

and Surface Modification and Interactions. There is an author index and a subject index.

Flavour Science and Technology. Edited by Y. Bessi re (Borex, Switzerland) and A. F. Thomas (Firmenich SA, Geneva, Switzerland). John Wiley & Sons: Chichester, New York, Brisbane, Toronto, Singapore. 1990. xiv + 370 pp. \$150.00. ISBN 0-471-92782-1.

This book is based on the Sixth Weurman Symposium held May 2-4, 1990 in Geneva. It contains most of the contributions presented as oral communications and posters on the following main topics: (1) The Chemistry of Flavours, (2) Energy Application and Food Flavour Systems, and (3) Instrumentation and Data Treatment. There is an author index and a subject index.

Materials Chemistry at High Temperatures. Volume 1: Characterization. Volume 2: Processing and Performance. Edited by John W. Hastie (National Institute of Standards and Technology). Humana Press: Clifton, N.J. 1990. \$120.00 each volume. Volume 1: xviii + 446 pp. ISBN 0-89603-186-1. Volume 2: xviii + 522 pp. ISBN 0-89603-187-X.

These books contain selected papers from the Proceedings of the Sixth International Conference on High Temperatures: Chemistry of Inorganic Materials, many of which were originally published in *High Temperature Science, An International Journal*, Volumes 26-28; the plenary papers were originally published by IUPAC in *Pure and Applied Chemistry*

*Unsigned book reviews are by the Book Review Editor.

(1990, 62, No. 1). Volume 1 is broken down into two major sections: (1) Advances in Measurement Techniques (14 papers) and (2) Thermochemistry and Models (18 papers). Volume 2 also consists of two major sections: (1) Processing and Synthesis (26 papers) and (2) Performance Under Extreme Environments (10 papers). In a special preface by Leo Brewer "high-temperature science" is defined as "when things start behaving the way you don't expect them to behave". (This definition was found with relief by the reviewer after searching rather unsuccessfully for specific temperatures elsewhere in the books.) There are author and subject indexes in each volume.

The Chemistry of Sulfonic Acids, Esters, and Their Derivatives (The Chemistry of Functional Groups Series). Edited by Saul Patai and Zvi Rappoport (Hebrew University, Jerusalem). Series editor Saul Patai. An Interscience Publication/John Wiley and Sons: Chichester, New York, Brisbane, Toronto, Singapore. 1991. xvi + 1121 pp. \$690.00. ISBN 0-471-92201-3.

This is the last volume in the subseries on sulfur-containing functional groups. The literature searches by the authors (there are 29 with affiliations throughout the world) included publications up to the end of 1989, in most cases. The editors mention that they intend to publish a supplement in the "not too distant future" for more recent developments.

There are 22 chapters, ranging from general and theoretical aspects through analytical methods, stereochemistry, syntheses, photochemistry and radiation chemistry, electrochemistry, biological activities, properties of sulfenes, sulfoxides, sultams, and sulphamic acids, and descriptions of polymers containing SO₂H and related groups. The chapters are well illustrated with structural formulas and contain numerous tables; spectra and X-ray diagrams are also given. There are indexes of subjects and authors. The extensive author index is especially helpful: every author whose work is mentioned in the text is listed and it is easy to locate the exact contribution on the page where it is described as well as the reference at the end of the chapter.

Chromatography and Isolation of Insect Hormones and Pheromones. Edited by A. R. McCaffery and I. D. Wilson (University of Reading and ICI Pharmaceuticals, respectively). Plenum Press: New York and London. 1990. xiv + 376 pp. \$89.50. ISBN 0-306-43707-4.

This volume represents the outcome of a joint international symposium organized by the Chromatographic and Royal Entomological Societies at the University of Reading, March 21–23, 1989. It consists of a preface describing the two societies and 35 papers organized under the following headings: Juvenile Hormones; Ecdysteroids; Peptides; Pheromones; and Pattern Recognition. There are also six abstracts of papers and posters for which no manuscript was received. Indexes of compounds, species, and subjects are included.

Perovskites and High T_c Superconductors. By Francis S. Galasso (United Technological Research Laboratories). Gordon and Breach Science Publishers: New York. 1990. xiii + 293 pp. \$110.00. ISBN 2-88124-391-6.

This book was written to bring together the results of a study begun in the 1950's at the University of Connecticut and continued at the United Aircraft Research Laboratories on synthetic ferroelectric and piezoelectric materials having the ABO₃ composition. Preparation, properties, phase transitions, and structure are treated in eleven chapters, with a twelfth chapter on high-temperature superconductors. Numerous and extensive tables of data are included. The index, appropriately, is a modified formula index and is thorough yet easy to use.

Structure and Bonding 72. Edited by M. J. Clarke (Chestnut Hill), J. B. Goodenough (Oxford), J. A. Ibers (Evanston), C. K. Jorgensen (Geneve), D. M. P. Mingos (Oxford), J. B. Neilands (Berkeley), G. A. Palmer (Houston), D. Reinen (Marburg), P. J. Sadler (London), R. Weiss (Strasbourg), and R. J. P. Williams (Oxford). Springer-Verlag: Berlin, Heidelberg, New York. 1990. 230 pp. \$87.00. ISBN 3-540-51574-7.

This volume of the series is devoted to bioinorganic chemistry and contains four reviews. One is on crown thioethers, one on hybridization in coordination and organometallic compounds, one on NMR spectroscopy of Fe₂S₂ proteins, and one on voltammetry of metalloproteins. An author index for Volumes 1–72 is included.

Magnetic Atoms and Molecules. By William Weltner, Jr. (University of Florida). Dover Publications, Inc.: New York. 1989. xiv + 422 pp. \$9.95. ISBN 0-486-55140-7.

This softbound volume is a reprint of a book originally published in 1983, "corrected and slightly enlarged". The enlargement consists of a new illustration of an ESR spectrum and an appendix, Fundamental Physical Constants and Conversion Factors. The focus remains the same,

"to acquaint new graduate students and postdoctoral fellows...with the electron-spin-resonance theory of randomly oriented molecules".

Cellular and Molecular Basis of Cholinergic Function. Edited by M. J. Dowdall and J. N. Hawthorne (University of Nottingham, U.K.). Ellis Horwood Ltd.: Chichester, U.K., and VCH Verlagsgesellschaft: Weinheim, FRG. 1987. xv + 941 pp. \$229.50. ISBN 0930-3367.

This hefty volume sums up a triennial international meeting of cholinologists held in 1986 in Buxton, Derbyshire, United Kingdom. Such a large gathering of researchers in the field has not occurred since this time. The book consists of 105 chapters that range from brief 4-page-2-figure reports to lengthy historical perspectives. These are divided into three categories: Biochemistry of cholinergic receptors (23 chapters), Biochemistry and cell biology of cholinergic neurons (36 chapters), and Diseases and neurotoxins affecting cholinergic systems (46 chapters). The content of this volume represents a significant shift in the field from basic pharmacology of nicotinic receptors to more emphasis on cell biology and disease, with emphasis on muscarinic receptors. Also included are 15 very interesting chapters dealing with trophic factors and other regulatory molecules pertinent to cholinergic systems. As the basic molecular mechanisms underlying cholinergic synaptic transmission are now becoming fairly well understood, researchers in this field are turning their attention to more global problems aimed at the cellular and even organismal level.

The book is very good for readers wishing to gain an overview of this broad field. Even the minority view, now almost surely refuted, arguing against the role of synaptic vesicles in neurotransmitter release is represented. Most chapters, while specialized, include reasonable introductions and clear conclusions. The chapters give the reader a flavor for the types of approaches now being used to solve cholinergic problems, employing the new technologies of monoclonal antibodies, cDNA cloning, and patch-clamping in combination with mainstay pharmacological and biochemical methodologies.

Research in this field is moving quickly, and it is usually true for books of this type that they are almost outdated by the time they emerge from the printing press. This book is now 4 years old, and it is clearly somewhat dated. This is especially true in the consideration of the molecular biology of the muscarinic receptors, which has come to light subsequent to publication. More recent work has considerably clarified muscarinic receptor action. Meeting reports rarely deserve the permanence that their large volumes and hard covers suggest.

As with any field that is progressing rapidly, books must lag behind the current state of knowledge because of the nature of the publishing enterprise. Scientists could all benefit from some kind of instantaneous meeting report that could capture slides and talks onto paper or diskette before the meeting even ends.

Dennis O. Clegg, *University of California—Santa Barbara*

Advanced Organic Chemistry. Third Edition. Part A: Structure and Mechanisms. By F. A. Carey and R. J. Sundberg (University of Virginia). Plenum Press: New York and London. 1990. xxx + 802 pp. \$62.50. ISBN 0-306-43440-7.

The success of this book, which was written to give the reader a deeper understanding of structures and mechanisms than can be found in introductory textbooks of organic chemistry, has led to the new editions at roughly 7-year intervals. In providing some new material and many more recent references, the authors have done some reorganizing, primarily for pedagogic reasons. Although the emphasis is teaching at the graduate level, the book is well suited as a reference for the mature chemist who wishes to keep abreast of the progress of physical organic chemistry, and the many references and the index make it a useful reference work.

Research Centers Directory. 14th Edition. Volumes 1 and 2. Edited by Peter D. Dresser and Karen Hill. Gale Research Inc.: Detroit, New York, Fort Lauderdale, London. 1989. Volume 1: xxi + 983 pp. Volume 2: xiii + 2062 pp. \$390.00. ISBN 0-8103-4861-6.

This massive compendium, bound in two volumes, gives compact and systematic information on a wide range of not-for-profit institutions: laboratories, bureaus, experimental stations, foundations, etc., including academic and private institutions. Chemistry is included in the section on "physical and earth sciences", but there are many closely related activities in other sections that are also listed, such as agriculture, medical sciences, and biological science. Typical entries occupy about a page and give name, address, telephone and telefax numbers, the name of the head of the institution, organizational notes, research activities and fields, and publications and services. Although the entries are in alphabetical order, they may not be easy to locate if the reader is not sure of the exact name. This problem is solved by the provision of multiple and comprehensive indexes.

The uses of this compendium are many, indeed, and it is a recommended addition to chemistry libraries as well as general libraries.

Pore Size Engineering in Zeolites. By E. F. Vansant (University of Antwerp). John Wiley & Sons, Inc.: New York. 1990. xi + 145 pp. \$59.95. ISBN 0471-92779-1.

The scientific and technological interest in zeolites has grown rapidly in recent years, and one finds application of zeolites in separation processes, catalysis, and ion exchange. The properties of zeolites can be varied, especially by changing the pore size. This book reviews the techniques for such modification. Preadsorption of polar molecules, silanation, boronation, implantation, and modification by acids are examples. An appendix on the description of equipment and an index are included.

Liposomes: A Practical Approach. Edited by R. R. C. New (Liverpool School of Tropical Medicine). IRL Press at Oxford University Press: Oxford, New York, Tokyo. 1990. xvi + 301 pp. \$45.00. ISBN 0-19-963076-3.

Liposomes are "lipid vesicles enclosing an aqueous space", and this loose-leaf book about them has been written for two groups of people: laboratory workers wanting detailed information on reliable methods, and graduate students who are interested in the theory behind membrane processes. There are six contributed chapters, in which preparation, characterization, physical methods of study, attachment to proteins, and liposomes in biological systems are discussed. There are also four appendices, in which are given methods, manufacturers and suppliers, standard texts, and key references for application. There is a substantial index.

Handbook of Pesticide Toxicology. Volume 1: General Principles. Volume 2: Classes of Pesticides. Volume 3: Classes of Pesticides. Edited by Wayland J. Hayes, Jr. (Vanderbilt University) and Edward R. Laws, Jr. (George Washington University). Academic Press: New York. 1991. 1576 pp. \$395.00. ISBN 0-12-334160-4.

This nicely bound three-volume set begins with a phrase from Paracelsus, freely translated as "Dosage alone determines poisoning". The first volume, *General Principles*, consists of 11 contributed chapters, ranging from general topics, such as dosage and metabolism, through diagnosis and prevention, to the more specific ones of effects of pesticides on animals. Volume 2 is of more direct interest to chemists, for it is devoted to classes of pesticides. Its five chapters are concerned with inorganic and organometallic, chlorinated hydrocarbon, and organophosphorus pesticides and solvents and fumigants and pesticides derived from nature. The pesticides are identified by common name, systematic chemical name, and occasionally structural formula. Physical and chemical properties, uses, history, and toxicity data are given. Volume 3 continues this treatment with six more chapters. Two of them are about chemical classes (carbamate pesticides and nitro compounds), and the others focus on kinds of use: rodenticides; herbicides; fungicides; acaricides, etc.

The lists of references cited are very large (over 13000) and the index, which covers all three volumes, is extensive and includes CAS Registry Numbers.

Vapor-Liquid Equilibrium Data at High Pressure. Volume 42. Physical Science Data. By S. Ohe (Tokai University). Elsevier Science Publishers: New York and Amsterdam. 1990. 355 pp. \$202.50. ISBN 0-444-98797-5.

This is a book of compiled data for use in the design and operation of distillation processes. Data for 700 binary systems are plotted, using the Peng-Robinson equation, the parameters for which are given in the tables. Calculations are described in a 25-page introductory section. The data sheets, which occupy the bulk of the book, give critical constants, acentric factors, references, and error estimates in addition to the parameters. The systems are arranged in the Chemical Abstracts method, but there is also an index by names for easy consulting.

Isoxazoles. Part I. Volume 49. The Chemistry of Heterocyclic Compounds. By Paolo Grunanger and Paola Vita-Finze (University of Pavia). John Wiley & Sons: New York. 1991. xxi + 877 pp. \$225.00. ISBN 0-471-02233-0.

When examining a volume of this kind, I try to imagine what a user might look for. First, you would like to know how to identify oxazoles from their spectral properties. The authors have devoted 120 pages to a detailed examination of the spectral properties of isoxazoles. It appears to be exhaustive but very usable.

Secondly, one would like to know how these heterocycles can be prepared. Another 120 pages are devoted to this subject, divided up by the different ways the five ring atoms are assembled. This is a very useful

breakdown of the various methods as it is likely to stimulate thinking about other ways to produce this ring.

Finally, the variety of chemical reactions, particularly the conversion of this ring system to other heterocycles, is described in considerable detail. Especially useful is the section devoted to the ways isoxazoles have been used as intermediates to effect synthesis of nonheterocyclic systems.

As a way of calibrating myself on the quality of the volume, I carefully examined the section on 4-isoxazolines, a subject I had previously reviewed. The material in this volume is covered thoroughly and authoritatively and makes my previous review now superfluous.

Thus, this volume can be recommended with enthusiasm as the best current source of information about isoxazoles as well as the isoxazolidines and the isomeric isoxazolines.

Jeremiah P. Freeman, *University of Notre Dame*

Determination of Molecular Weight. Edited by Anthony R. Cooper (Department of Chemistry, Lockheed). John Wiley and Sons, Inc.: New York. 1989. xiv + 526 pp. \$95.00. ISBN 0471-05893-9.

The title of this book is misleading, for it is in fact about determination of molecular weight distribution in polymers. In 17 contributed chapters, the subject is treated according to method: end-group analysis; vapor pressure; membrane osmometry; laser light scattering neutron and X-ray scattering; ultracentrifugation; viscometry; fractionation; chromatographic techniques; field-flow fractionation; mass spectrometry; swelling, etc. A final chapter is devoted to standard polymers and is followed by a good index.

Organotellurium Compounds. Volume E, Part 12B of the supplementary set to the 4th edition of Houben-Weyl, Methods in Organic Chemistry. By Kurt Irgolic (University of Graz, Austria); edited by Dieter Klammann (Hamburg, Germany). Georg Thieme Verlag: Stuttgart and New York. 1990. XLI + 1004 pp. DM 1340.00 (subscription price DM 1206.00). English. ISBN 3-13-219904-4.

This hefty (2 kg), handsome, and well-produced book represents a landmark in the publishing history of the Houben-Weyl series in being the first (of currently 94 volumes) in the English language. Binding and paper appears appropriate to withstand decades of heavy use. The type is clear and readable with judicious use of boldface and just enough white space in the layout. Structures and tables can be scanned rapidly without the aid of a magnifying glass.

The general framework is very appropriate to synthetic organic chemistry. Each compound class is discussed first by methods of preparation (source reactants, reagents, procedures) and then by its transformations. The page layout follows the uniquely successful style of the series by combining a discussion of the subject matter and the associated structures, tabulations, and reaction schemes with detailed preparative procedures and footnote style literature references. The effect is that a copy of just about any single page will contain a useful set of working instructions, complete with structural formulas and specific source citations.

The key to navigate this book appears, for some reason, near the end of a lengthy and detailed table of contents. There, on page XXXVIII, is the classification scheme, embedded in a compact introductory section (4 p, 63 references) that also covers history, nomenclature, and work precautions and mentions the (low) toxicity of inorganic tellurium compounds. The organizational pattern is further reflected in the page running heads, which have the author's name plus a first level header on even pages, odd pages carrying 3rd through 6th level headers, often changing from page to page. Because there does not yet exist a comprehensive tellurium nomenclature, the book lacks an overall, encyclopedic subject index. Rather, the 101-page list of compounds is divided into two major sections (open-chain and cyclic compounds) that index individual materials under the major headings of the table of contents. The index incorporates good visual aids by carrying a rapidly adjusting running page header and, in section 2, by depicting ring system structures. Of great value is the listing of all author names in the individual citations and their incorporation in a cross-reference author index. The effect of this thoughtful layout is that the book becomes highly suitable for browsing. However, it may require some dedication to extract all information on a given compound or subject matter. One wishes that books of this nature might be accompanied by a full text and structure-searchable CD ROM.

The organic chemistry of tellurium has made tremendous strides in the 35 years since the subject was last covered in the Houben-Weyl series, when a mere 290 pages sufficed for both selenium and tellurium. While validated subject matter covered in the earlier volume does not appear to have been neglected, this book stands completely on its own, mostly by virtue of being able to cite an astonishing wealth of recent research and technology. In line with Houben-Weyl policy, information from patents is included whenever warranted by the available degree of syn-

thetic detail. The bulk of the references is from the 1970s and 1980s. Remarkably, the literature coverage extends to within 6 months of the December 1990 publication date.

The selection of molecules for inclusion required the presence of at least one carbon atom, but not necessarily that of a C-Te bond. Thus, the 150-page lead-off chapter represents a unique collection of information on compounds where tellurium in its di-, tetra-, and hexavalent states is linked to an organic residue through varied di- or polyvalent elements. Half the book, 470 pages, deals with open-chain compounds containing up to four C-Te (C=Te) bonds. Five pages on polymeric tellurium compounds are followed by 3 pages on three- and four-membered rings, 72 pages on five-membered rings, and 66 pages on six-membered rings, and the text concludes with reference to a single seven-membered Te/N ring compound. Altogether, we are presented with an exhaustive coverage of the tellurium synthesis literature in a very reasonable organizational pattern.

One reservation concerns the general classification of many organotellurium (II and IV) halides as "open-chain" compounds. Author and editor did not have much choice, because that is the way these compounds appear in the literature. However, whenever tellurium halides are paired with neighboring azo, nitro, or carbonyl groups, the properties of such compounds depart dramatically from those of their simpler analogues. First, they are unusually stable to thermal and hydrolytic influences. Further, many nominal aryltellurenyl halides with nitrogen substituents in the ortho position (pp 242, 326) have visible absorption spectra in the 500-nm range and reactivities to nucleophilic attack that indicate significant delocalization of the aromatic π -system with formation of electron-deficient Te heterocycles such as 2,1,3-benzoxatellurazoles (p 777 ff) and the analogous 1,2,3-benzotelluradiazoles. Likewise, compounds depicted as 2-(acylamino)aryltellurium trihalides (pp 778, 779) behave as water-soluble, internal salts represented by the six-membered 2,1,4-benzoxatellurazinium ring system (p 783). X-ray structures of the few examples investigated so far all show the appropriate Te-N and Te-O closures to 5- and 6-membered rings. A reclassification of such species as bona fide heterocycles appears warranted.

The preparative procedures incorporated into the book are immensely valuable. Yet, their judicious evaluation is advised, because not every reaction is well enough understood. It is hard to see how clean products can be expected from reaction of TeCl_4 with various starting materials in boiling toluene (pp 307, 320) when its reaction with toluene alone gives an 83% yield of $4\text{-CH}_3\text{C}_6\text{H}_4\text{TeCl}_3$ (p 307). On the other hand, the wealth of information packed into this volume offers numerous alternative approaches should any one procedure be found deficient.

The book is not without factual and typographical errors. What might have started out as a missing double bond (p 787) was neatly paired with a self-consistent (but wrong) "dihydro" name for the compound in the preparative example. Several column headers in the index have "Ti" in place of "Te" (pp 932, 934), the author index has a few misquoted co-author attributions, and somebody messed up the author's former address at Texas A&M University on one of the title pages. However, there are few flaws of this nature and they are minor. If past practice is a guide, the publisher will make good use of errata sheets.

The Houben-Weyl series should stand next to Beilstein in any library that serves synthetic organic chemists. For active researchers in the organochalcogen field, this book would be valuable as a desktop reference. Of course, the price of about \$800.00 (US) might not look very affordable, but it is still less than the cost of the Aldrich Data Search on CD ROM.

It is rare, these days, to find a book this encompassing and this good that is actually written by a single person. Author and editor are to be congratulated on the outcome of their efforts that have raised organotellurium chemistry to a new level of scientific respectability and are bound to have a stimulating influence on organochalcogen research for many years to come.

Wolfgang H. H. Günther, *Sterling Drug Inc.*

Introduction to Inductively Coupled Plasma Atomic Emission Spectrometry. By G. L. Moore (Council for Mineral Technology, South Africa). Elsevier Science Publishers: New York. 1989. xii + 340 pp. \$92.75. ISBN 0-444-43029-6.

G. L. Moore has written a practical and useful book about ICP atomic-emission spectrometry. Objectively, the book is the easiest-to-read presentation of ICP-AES that I have encountered. The book could be used as a text in a short course on ICP spectroscopy, or to help train ICP technicians, or to add modern material to an instrumental analysis course.

ICP-AES instruments have literally revolutionized parts of chemical analysis. The technique is applicable to about 70 elements with detection limits that average 5 ng/mL. The new instruments perform automated, simultaneous measurement of the concentrations of 22 elements in complex mixtures. If the ICP instruments in this country operated at full

efficiency for just 1 h per day, approximately 500 million analyses would be performed each year. Costs drop as the efficiency increases; labs are finding that if their instruments stay busy, the cost of determining 22 elements in an aqueous sample is less than \$10.00. Simple economics are leading more and more labs to these techniques; these labs need to train competent operators, and a text like Moore's will fill that niche.

The book has 15 chapters and appears to have been prepared from camera-ready copy. Page references ("see page 125 for more information...") do not always match the occurrence of the information.

The first three chapters are a general introduction to atomic emission spectrometry and include brief discussions of techniques other than ICP-AES. Four chapters on ICP-AES, including a separate chapter on the important area of nebulization, occur next. These chapters are followed by four that include sampling, analytical methods, accuracy, and precision. The last four chapters are on internal standardization, optimization, interferences, and hybrid ICP techniques. All-in-all, the book represents a well-balanced approach to the subject.

The strength of the book is the even, well-presented prose. The book is easy to read, and difficult concepts are clearly presented. The book is heavy on the application and practice of IAC-AES while light on theory and mechanistic explanations. The author takes deliberate aim on his market, the technical user. For example, the section on diffraction gratings lacks the grating equation (although it includes the more complex equations for dispersion).

This text will make a fine tutorial for a technician or baccalaureate-level scientist, a good introduction to the technique for a well-trained chemist whose education has somehow excluded ICP-AES, and also good reading for those of us who perform chemical analysis by plasma emission each day.

Scott R. Goode, *University of South Carolina*

Fluorine in Bioorganic Chemistry. By John T. Welch (State University of New York at Albany) and Seetha Eswarakrishnan (PPG Industries, Inc.). John Wiley & Sons: New York. 1991. xviii + 261 pp. \$59.95. ISBN 0-471-50649-4.

Before starting with details for our review, we wish to note that this book by Welch and Eswarakrishnan is seemingly mistitled as it is mostly a collection of synthetic methods for compounds of interest to the bioorganic and medicinal chemical communities. This is unfortunate as the current and admittedly brief title suggests that there would be extensive discussion of the structural and mechanistic studies of drug action and toxicological activity. Instead, there are but three pages in the introduction and between one and five pages per chapter, although some of these discussions (such as enzymatic inhibition studies) are continued throughout the text. Relatedly, the synthetic chemist would not necessarily glean from the title that there is an entire armamentarium of general methods discussed herein. Other than writing this review, we will leave it to the publisher and the authors to ameliorate the noted error so that this book can reach the large audience it deserves. We do note, however, that Welch has also edited a likewise affordable complementary volume (*Selective Fluorination in Organic and Bioorganic Chemistry*, ACS Symposium Series, No. 456, 1991) which may be comfortably and usefully read along with the current book.

Turning now solely to Welch and Eswarakrishnan's volume, we note that syntheses of most important classes of "small", but still extensively functionalized, bioorganic molecules are discussed, e.g. amino acids, sugars, prostaglandins, steroids, purines, and pyrimidines. From these "pieces", derivatives such as polypeptides, oligonucleotides, and polysaccharides can be synthesized by conventional methods that are unaffected by the presence of fluorine and so the omission of these species should offer no problem to the reader. Atypical for a work with such extensive use of equations and schemes, typographical and structural errors are mercifully rare. The narrative portion of the work at times is disjointed, however, and suffers from periodic lapses of style and grammar. It is to be noted that there is an extensively detailed table of contents (10 pp) accompanied by a comparably lengthy but selective index (10 pp). As the table of contents clearly indicates, the text has been handily organized according to fluorinating reagent used to prepare compounds of various classes, each class constituting a chapter. It is a straightforward matter to locate fluorination examples either by compound class or by fluorinating reagent. The scope of methods presented is wide, including both popular well-known reagents and newer techniques. Although not intended to serve as a handbook for the laboratory, given the orientation of the work it is somewhat surprising that it contains no compilations of commercially available fluorine-containing reagents such as DAST and various "exotic" fluorocarbene precursors. Likewise, representative fluorinations with experimental details are not given following Organic Syntheses and Organic Reactions precedents. The index is mostly for compounds and reactions; other coverage is spotty. For instance, index entries for ^{18}F and ^{19}F isotopes point to only a few of their

numerous uses cited in the text. Additionally, almost no people's names are cited save a few founding fluorine fathers. No doubt intended to save space and lessen the price, it belies the extensive referencing to the current primary organic chemical literature in each chapter.

In summary, we recommend to any organic chemist interested in fluorinated species, bioactivity, and synthesis to acquire this book. Indeed, one can imagine using it for a one-term course or cumulative exam on the synthesis and/or functionalization of "small" bioorganic molecules.

Joel F. Liebman and Martin Hulce, *University of Maryland Baltimore County*

Mechanisms of Inorganic and Organometallic Reactions. Volume 6. Edited by M. V. Twigg (Imperial Chemical Industries P.L.C.). Plenum Press: New York and London, 1989. xvi + 535 pp. \$110.00. ISBN 0-306-43260-9.

The sixth volume in this useful series strives to provide an organized and convenient base through which researchers can access a wide array of experimental and theoretical work covering organometallic and inorganic reaction mechanisms. The format from earlier volumes has been maintained and continues to group the text into three main sections: Electron Transfer Reactions (Chapters 1-3), Substitutions and Related Reactions (Chapters 4-9), and Reactions of Organometallic Compounds (Chapters 10-14). In addition, the final section (Chapter 15) is a tabulation of volumes of activation for inorganic and organometallic reactions (12 pages, 193 entries) compiled by R. van Eldik. Chapter 12 (Reactivity of Coordinated Ligands, by R. W. Hay, E. C. Constable, and L. A. P. Kane-Maguire) has been significantly changed and expanded from earlier volumes to include reactions of ligands in classical coordination complexes as well as organometallic compounds. The book (and series) is very strongly oriented toward reactions that involve transition metals. Only Chapter 4 (Reactions of Compounds of the Nonmetallic Elements, by G. Steadman) is devoted to reactions of main group inorganic compounds, and very little is mentioned throughout the book of mechanistic work concerning compounds featuring lanthanide and actinide elements.

The literature covered in this volume was published from January 1987 to June 1988 inclusive. The only exception to this is the well-written Chapter 1 (Electron Transfer: General and Theoretical, by R. D. Cannon and J. F. Endicott) where over two-thirds of the references cited (290 total) were published prior to 1987. Enough selectivity has been exercised by various authors to lend to the readability and highlighting of important contributions, but comprehensive coverage of each literature period and *not* "critical commentary" remains the most obvious accomplishment of this book and the series in general. The majority of chapters are competently edited, but a few errors in structures and equations can be found which might cause confusion to those not familiar with the subject matter. Provided that readers take the time to utilize this resource to help select and locate original literature, then this series accomplishes its goals effectively.

The book maintains the tradition of attractive presentation that has been a signature of the series to date. In general, the chapters are concisely and efficiently written, considering the sizable number of literature references included. This is an important series which should be valuable to researchers at all levels and belongs in every complete science reference library. In future volumes, the editor may wish to consider additional coverage of work in main group as well as lanthanide and actinide complexes to reflect the growing interest in these areas.

George L. Gould, *Brookhaven National Laboratory*

Advances in Heterocyclic Natural Product Synthesis. Volume 1. Edited by William H. Pearson (The University of Michigan). JAI Press, Inc.: Greenwich, CT, 1990. xii + 193 pp. \$78.50. ISBN 1-55938-169-8.

This is the first volume in a new series that will focus attention upon recent progress in various aspects of heterocyclic synthesis as it may be applied to natural products. This series should underscore the important, but often overlooked, point that heterocyclic chemistry is not limited to flat aromatic compounds. The individual accounts are also intended to provide the reader with perspectives not normally possible from reading the primary literature, since the authors are encouraged to discuss how their ideas were conceived and how the chemistry that evolved from those inspirations actually developed.

This first volume is comprised of four chapters written by different authors. The first chapter, which is written by Robert K. Boeckman, Jr., and Michael A. Walters, provides an excellent historical development of the cyclopropyliminium ion rearrangement from its original discovery to its recent implementation in tandem with an intramolecular Diels-Alder reaction in an elegant approach to the *Amaryllidaceae* alkaloid lycorine. The second chapter by Gordon W. Gribble describes synthetic approaches to the ellipticine alkaloids via metallation and cycloaddition chemistry. The first section of the chapter outlines the development of an efficient

route to a variety of pyridocarbazoles via sequential regioselective indole metallation and acylation followed by cyclization. These tactics have been applied to the preparation of several natural products. In the second part of the chapter, applications of pyridyne cycloadditions with furo-[3,4-*b*]indoles are described. In the third chapter, Thomas K. Highsmith and Albert I. Meyers provide an in-depth account of the applications of the α -alkylation of nitrogen heterocycles via formamidine-mediated chiral carbanions to the asymmetric synthesis of a wide variety of alkaloid natural products containing five- and six-membered-ring nitrogen heterocycles. Some mechanistic studies are discussed, and a few alternative synthetic methods for achieving similar goals are briefly summarized. In the last chapter, Chihiro Kibayashi provides a detailed account of methodological studies involving the stereochemistry of nucleophilic additions to α,β -bis[(methoxymethyl)oxy]carbonyl and imino compounds and the applications of such reactions to the enantioselective synthesis of a variety of nitrogen-containing heterocyclic natural products.

The accounts detailed in this volume provide a nice balance between methodological studies and applications of these methods to the total syntheses of interesting heterocyclic natural products. The chapters are individually well-written and informative. Although this first volume is exclusively devoted to nitrogen heterocycles, one can anticipate incorporation of accounts of synthesis of oxygen and other heteroatom containing natural products in future volumes. Nevertheless, the articles clearly depict the excitement of applications of heterocyclic synthesis to significant problems in natural product chemistry. Unfortunately, the high price of the book is likely to restrict its distribution to libraries; as the scope of future volumes increases and acceptance of this series is assured, the price might be reduced to an amount within reach of more researchers.

Stephen F. Martin, *University of Texas*

Properties of Polymers—Their Correlation with Chemical Structure; Their Numerical Estimation and Prediction from Additive Group Contributions. Third edition. By D. W. Van Krevelen (University of Technology, Delft and AKZO Research and Engineering). Elsevier: Amsterdam, 1990. xxii + 875 pp. \$337.25. ISBN 0-444-88160-3.

In spite of the vast body of experimental information on polymer properties, one frequently needs to know a characteristic (e.g., surface tension of the molten polymer, dielectric constant, or the permeability to a certain gas) that apparently has not been reported even though the material is relatively common. Of course, for new or contemplated polymers there is the obvious lack of the most basic information like density, refractive index, glass transition temperature, etc. In these cases, the experienced professional usually turns to the book by Van Krevelen for a means to estimate the needed property from the polymer's structure. The first edition of Van Krevelen's compilation of estimation schemes and data appeared in 1972. A completely revised edition was published four years later, but sixteen years elapsed before the third edition arrived.

The author's goal is to correlate known properties of polymers with chemical structure and to provide methods for estimating the most basic properties when measurements are not available. The premise is that physical properties are determined by a sum of contributions from the structural and functional units that make up the molecule or the repeating unit in the case of polymers. Thus, the main estimation schemes presented in this book consist of a variety of "group contribution" methods that have evolved over many years. The author has pulled together information from a variety of sources to give an up-to-date tabulation of group parameters for predicting a wide array of properties. The author appears to have done a careful job of selecting the most reliable values when more than one exists; thus, I recommend consulting this book first rather than the original references. In addition to the estimation techniques, one should not overlook the value of the many correlation schemes presented here that can be used to guide one in judging what a reasonable estimate might be.

The third edition is organized into seven parts and twenty-seven chapters just as the second edition was. Most of the chapters follow the same format as before, but there are a few dramatic changes and some reorganization. For example, the earlier chapter on properties of oriented polymers has been replaced by a new one on acoustic properties and the former material redistributed among other chapters. Although the framework is largely the same, there has been a 37% increase in content based on a page count. This reflects the addition of both new data published since the last edition and new subjects not covered before, e.g., modern topics like physical aging, mechanical behavior of highly oriented polymers, liquid crystalline polymers, scaling concepts of de Gennes, gas transport in glassy polymers, conductive polymers, and solid-state NMR spectroscopy.

The first part is a compact and interesting overview of polymer science and engineering that reflects the author's own perspective. This is followed by parts on thermophysical characteristics, properties in a force

field, transport properties, chemical stability and breakdown, and an attempt to address behavior more complex than a single simple property. The final part consists of comprehensive tables, which for many would be justification enough for having this book at their fingertips.

The author is to be commended for revising this book since it will be quite useful to many people working in this field. It must have been an immense task to sift through the staggering literature on polymer structure-property information. Choices of what to include and what not to were no doubt difficult to make, and nearly everyone might have made them a little differently. Since there is no other book that addresses this author's goal, comparisons are not possible. I might add that my students and I have found the second edition to be invaluable, and we are glad to replace it with this new and expanded version.

One might speculate about the possibility of a fourth edition or a competitor book. I doubt that either will be forthcoming. Dr. Van Krevelen is now retired and one gets the sense that this might be his last attempt. I really cannot envision any single person taking up this task. The most likely possibility is a replacement by computer software containing data banks, empirical estimation schemes, and more fundamental "molecular modelling" approaches. These already exist to a limited extent and many software firms have teams of people busily expanding the horizons of what can be calculated. The results are likely to be very powerful but considerably more expensive to purchase and maintain than the hefty price of this volume and more difficult to thumb-through or put in one's briefcase than Van Krevelen's book.

Donald R. Paul, *The University of Texas at Austin*

Organic Syntheses. Reaction Guide: Incorporating Collective Volumes 1-7 and Annual Volumes 65-68. By Dennis C. Liotta and Mark Volmer (Emory University). John Wiley and Sons, Inc.: New York. 1991. xvii + 854 pp. \$49.95. ISBN 0-471-54261-X.

In a brief foreword, Leo A. Paquette explains that this book is an attempt to produce a visual index, by means of structural formulas, to the 68 volumes of *Organic Syntheses* that have been the standby of synthetic organic chemists for many decades. The authors have organized the syntheses into 11 categories: Addition, Annulation, C-C Bond Formation, Cleavage, Elimination, Miscellaneous, Oxidation, Protection/Deprotection, Rearrangement, Reduction, and Substitution. There is a small amount of redundancy in that some of the entries are listed in multiple categories. For example, a Claisen rearrangement is classified not only in the Rearrangement category but also in the C-C Bond Formation category. However, most individual reactions are classified under a single category. Within a given category, the order of reactions is chronological, although this is not mentioned in the preface. A list of nine qualifications is given in the preface to guide the reader in the use of the index.

Calixarenes, a Versatile Class of Macrocyclic Compounds. Edited by J. Vicens and V. Böhmer. Kluwer: Dordrecht. 1991. XII + 263 pp. \$99.00. ISBN 0-7923-0714-3.

This book is the third in the series *Topics in Inclusion Science*; the two preceding volumes deal with cyclodextrin and membrane chemistry. In four different parts the chemistry and potential applications of calixarenes are described by 18 different experts in the field.

Part one gives an overview of the history and the basic chemistry of calixarenes. Gutsche describes the one-step synthesis and several chemical transformations of (mainly) calix[4]arenes, together with the physical and spectral properties. Böhmer and Vicens outline the alternative stepwise synthesis of calixarenes with the emphasis on the different strategies. They also address the problem of acidity and chirality of calix[4]arenes and molecules in which more than one calix[4]arene unit are combined.

Part two reviews the many solid-state structures that have been published. Perrin and Oehler describe the structures of simple unfunctionalized calix[4] to [8]arenes with the emphasis on the different conformations (cone, partial cone, 1,3- or 1,2-alternate). The solid-state inclusion phenomena are dealt with by Andreotti and Ugozzoli. In a systematic way they treat the different types of guest species that can be coordinated to the calixarene. They also describe the conformational preferences of functionalized calixarenes, e.g., calixcrown ethers and metallo-calixarenes. The inclusion of the neutral molecules in calixarenes is also discussed from a theoretical point of view.

Part three deals with complexation properties in solution. This part represents about half of the book and five different (groups of) authors have contributed. Inevitably this has led to some duplication, but there is sufficient discrimination between the different chapters to render this acceptable. Ungaro and Pochini have placed the emphasis on the complexing properties of calix[4]arenes that are O-functionalized or bridged at the lower rim, whereas Schwing and McKervy give most detailed information on tetra-O-alkylated calix[4]arene derivatives. Both chapters

give a wealth of quantitative information.

Shinkai describes water-soluble and chiral calixarenes together with aggregation and inclusion phenomena. He also addresses the problem of the acidity of the phenolic groups. Atwood and Bott deal with their own work on solid structures of molecular clays, whereas Bünzli and Harrowfield discuss the role of calixarenes in lanthanide coordinations including luminescence spectroscopy.

Part four by Perrin and Harris deals with industrial applications, which in practice means possible industrial applications. Recovery of cesium from nuclear waste and uranium from seawater are still in the laboratory stage. Closer to practical applications are the calixarene-based ion selective electrodes and field effect transistors. A number of other possibilities, e.g., as stabilizers and ion scavengers, are mentioned as well as their use in separation science.

The overall impression of this book is positive. It gives a good, up-to-date overview of the now rapidly developing field of calixarene chemistry. Because of the structure of the book, the styles vary a lot and for several topics there is some duplication. A serious omission is the lack of a subject index.

David N. Reinhoudt, *University of Twente*

Synergism and Antagonism in Chemotherapy. Edited by T.-C. Chou and D. C. Rideout (Memorial Sloan-Kettering Cancer Center and Research Institute of Scripps Clinic, respectively). Academic Press: San Diego. 1991. xvii + 752 pp. \$149.00. ISBN 0-12-174090-0.

This book presents a practical, mechanistic overview of chemotherapeutic drug combinations that have been used in the treatment of human diseases, or are currently being evaluated in clinical trials, or are under investigation in model systems. Although the main emphasis is on cancer chemotherapy, the chemotherapy of antiviral and antimicrobial diseases is also presented. The 20 chapters are classified under three parts: I, Reviews and Methods of Quantitation; II, Mechanisms of Interaction; and III, Condition-Selective Synergism and Antagonism. The first chapter provides an overview of the diverse aspects of drug interactions, including references to reviews published in the period 1983-1989 that deal with synergism, antagonism, and potentiation. There is a list of the 35 contributors with their affiliations and a subject index.

Acronyms and Abbreviations in Molecular Spectroscopy. An Encyclopedic Dictionary. By Detlef A. W. Wendisch. Springer-Verlag: Berlin, Heidelberg, New York. 1990. 315 pp. \$59.59. ISBN 3-540-51348-5.

The title of this book correctly defines its content but does not disclose the depth of the definitions it contains. Each entry is provided with a definition, a description of the effect, application, and literature citations. As an example, the entry for FNMR (Flow Nuclear Magnetic Imaging) contains six paragraphs and takes up a full page. The selection of entries is always arguable, and the continuing coining of new acronyms makes sure that any book can never be up to date, but the selection in this book is broad and useful. There is an index, but since the entries are themselves in alphabetical order, it is not really needed.

NMR. Volume 22. Isotope Effects in NMR Spectroscopy. Edited by P. Diehl, E. Fluck, H. Günther, R. Kossfeld, and J. Seelig, with contributions by S. Berger, R. L. Van Etten, J. M. Risley, and N. M. Sergeev. Springer-Verlag: Berlin, Heidelberg, New York. 1990. 171 pp. \$75.00. ISBN 3-540-51286-1.

This volume of the series is subtitled *Isotope Effects in NMR Spectroscopy*. It consists of three reviews. One is on deuterium isotope effects in ^{13}C and ^{19}F NMR, one is on isotope effects on coupling constants, and one is on ^{18}O isotope shifts in ^{13}C and ^{15}N NMR. Not indexed.

Gas and Liquid Chromatography in Analytical Chemistry. By R. M. Smith (Loughborough University of Technology). John Wiley & Sons, Inc.: New York. 1988. xiv + 402 pp. \$131.00. ISBN 0-471-90980-7.

Since the first report of chromatography by Tswett in 1906, and the pioneering work of Martin and Synge in 1941, the technique of chromatography has come a long way. This is being utilized in applications from purification of diverse products to the characterization and assay of biological substances in ultratrace amounts. Numerous books in the liquid and gas chromatography field are available. Often they are written with little consideration to the practical problems encountered by the chromatographer in the laboratory. There are only a few modern texts available to the newcomer that can be used as an introduction to this field. This book has come out of Roger Smith's experience of over 16 years in teaching chromatography at Loughborough University.

The book contains 16 chapters and their contents include the following: an introduction to chromatography from a historical prospective; basic concepts of chromatography (principles, definitions, and optimization of separation efficiencies); instrumentation, columns and stationary phases, detectors, sample identification, and quantization in gas-liquid

chromatography; special techniques of gas chromatography; basics of liquid and thin-layer chromatography methods.

In addition to its major emphasis of gas-liquid chromatography, the book describes HPLC in extensive detail covering five major chapters. They include instrumentation, different detection techniques, different separation principles involving various columns and mobile phases, applications, and special techniques of HPLC. Two final chapters deal with data handling and automation in chromatography and the future scope of chromatography.

This book is aimed at technical staff in industry and graduate and undergraduate students. Individuals with limited practical experience or background in the field anxious to learn more than the simple operation of an instrument will find this book very rewarding. This book introduces the major techniques of gas-liquid chromatography, thin-layer chromatography, and high-performance liquid chromatography (HPLC). Each chapter provides a comprehensive bibliography. The book is written with special attention to provide a practical viewpoint of different techniques. The book omits earlier methods no longer in use and compilation of applications. However, the Appendices list the main literature sources to provide a starting point for method determination.

The gas chromatography and HPLC chapters are very balanced and broad in their coverage. They provide general examples of commonly used techniques and equipment. For example, in the chapters on detectors, the basic properties of most commonly used detectors are described, and the mechanisms of operation for both widely used and specialized detectors are furnished with examples of chromatograms. No subjects are perused in detail because of the breadth of coverage; however, the reader is referred to the bibliography which appears at the end of each chapter. References end around 1987, but for a book of this scope and depth, this does not seem to be a drawback. The book is very well written and would be an excellent candidate for a text in a first-year graduate analytical curriculum.

Ram P. Singhal, *Wichita State University*

Organic Chemistry of the Earth's Atmosphere. By V. A. Isidorov (Leningrad University). Translated by E. A. Koroleva. Springer-Verlag: Berlin, Heidelberg, New York. 1990. x + 215 pp. \$98.00. ISBN 3-540-51731-6/0-387-51731-6.

Dr. Isidorov is a prominent atmospheric chemist in the USSR whose specialty is experimental field measurements of organic compounds in the air. His book was published in Russia in 1984 to help address the paucity of information on atmospheric organic compounds. It was translated into English and republished in 1990. The small, well-printed book contains six chapters, an extensive reference list, and a detailed index.

The first chapter provides some basic information on atmospheric structure and circulation, discusses the atmosphere's evolution, and concludes with three pages on the greenhouse effect. This is the weakest chapter in the book. The table of atmospheric composition misspells krypton and has many incorrect trace gas concentrations. The discussion of circulation is much too compressed to be of use. I had hoped that the discussion of atmospheric evolution would emphasize organic chemistry, but it did not. The final section, on the greenhouse effect, is quite dated in view of the intense scientific and governmental efforts on climate change of the last few years; its most recent reference is 1986.

Chapter 2 comprises nearly a third of the book. It is enigmatically titled Time-Dimensional Distribution of Organic Components in the Atmosphere, a word choice (perhaps of the translator) that may reflect on attempts to present data as functions of space and time. Little such is done, however, with most of the text dealing with extensive listings and discussion of organic compounds in the troposphere. Much interesting information is contained here, and the discussion of Russian references is of special value to those who have little access to the Russian literature. Some 500 organic compounds were mentioned in the tables of occurrence and typical concentrations.

The third and fourth chapters discuss natural and man-made sources of atmospheric organic compounds. I find this information useful but imbalanced, with 34 pages devoted to a few natural sources (though their fluxes of organics are substantial) and only 16 pages devoted to the numerous and diverse man-made sources. Twelve pages of discussion on the emission of terpenes and other species from vegetation, a specialty of the author's, are well-written and quite useful.

Chapter 5 treats the atmospheric transformation of organic compounds. There is a good section on alkane and alkene reactions, although terpene chemistry, to my surprise, received little treatment. This is followed by an outdated section on stratospheric CFC chemistry, which

seemed out of place in this volume, and, in any case, contained no mention of the Antarctic ozone hole, now well-known for 5 years. The chapter ends with 8 pages of rather speculative discussion of the potential loss of CFCs to particles of volcanic ash and sand.

The book concludes with a chapter on methods of analysis. With technology changing so rapidly, such a chapter is destined to be quickly outdated. A more significant problem, however, is the very uneven treatment of technique: Gas chromatography is given 16 pages, ion chromatography $1\frac{1}{2}$ paragraphs, and mass spectrometry no mention.

In most cases, the translation from the Russian original (which has been updated through about 1987) is competent. Occasional problems occur, such as using the phrase "reactive particles" to indicate gas-phase species; "reactive species" or "reactive components" would have been better. More serious for the reader are technical inaccuracies that seem to arise largely because of relatively recent information. The rate of methane increase is given as 2% per year, for example; it is now known to be about half that. In another example, hydroxyl radical is stated to be the only intermediate species whose concentration has been measured as a function of altitude; HO₂, ClO, and others have now been so measured. Typographical errors are fairly common: I was particularly attracted by Lost Angeles, a social comment as well as a proofreader's error.

To summarize, I share the author's feeling that atmospheric organic compounds have not received their just due, and I applaud the effort that went into producing this book. Among its most valuable items are its exposition of the Russian literature and some insightful comments on current estimates of global organics emissions. In 1984, when the Russian original was published, much of the contents would have been unique. I suspect that the decision to translate without complete re-writing was an unfortunate one, however. In the interim, two books have appeared that subsume most of the information in Isidorov's book in larger context. One is the very extensive treatise *Atmospheric Chemistry* by Finlayson-Pitts and Pitts, which treats chemical processes and experimental techniques in much more detail than does Isidorov. The other is my own compilation with Hawkins and Claxton: *Atmospheric Chemical Compounds: Sources, Occurrence, and Bioassay*, which lists and cross-references almost 3000 compounds, most of them organic. Because of the existence of these and other recent books, Professor Isidorov's volume will see occasional use as a reference volume in libraries, but will be required reading for only a few atmospheric organic chemists.

T. E. Graedel, *AT&T Bell Laboratories*

Volumes of Proceedings

Down Stream Processing and Bioseparation: Recovery and Purification of Biological Products. ACS Symposium Series 419. Edited by Jean-Francois P. Hamel, Jean B. Hunter, and Subhas K. Sikdar. American Chemical Society: Washington, D.C. 1990. vii + 312 pp. \$69.95. ISBN 0-8412-1738-6.

The first of the 15 papers in this volume is a 37-page survey of innovative strategies in Modelling and Applications of Downstream Processing by Hamel and Hunter. The remaining papers of the 1988 symposium, held in Toronto, fall in three groups: Extraction and Membrane Processes; Processes Using Biospecific Interaction with Proteins, and Novel Isolation and Purification Processes. A detailed subject index is included.

Surface Reactive Peptides and Polymers. Discovery and Commercialization. ACS Symposium Series 444. Edited by C. Steven Sikes and A. P. Wheeler. American Chemical Society: Washington, D.C. 1990. xiii + 416 pp. \$69.96. ISBN 0-8412-1886-2.

The 25 papers in this volume come from a symposium held at the 1989 ACS National Meeting in Dallas. Many of them are concerned with biomineralization (bones, teeth, shells), but some are far from that subject (e.g., inhibition of growth of ice crystals in fish, silica inhibition in cooling water systems, corrosion inhibition). The index is very thorough.

Biomedical and Biotechnological Advances in Industrial Polysaccharides. Edited by V. Crescenzi, I. C. M. Dea, S. Paoletti, S. S. Stivala, and I. W. Sutherland. Gordon and Breach Science Publishers: New York, London. 1989. xiv + 553 pp. \$75.00. ISBN 2-88124-368-1.

A meeting held in Trieste in 1988 on Recent Developments in Industrial Polysaccharides gave rise to the typescript papers in this volume. The papers are grouped under the following four headings: Glycosaminoglycans, Microbial Polysaccharides and Microbial Enzymes, Algal Polysaccharides, and Oligo- & Polysaccharide Structure. As well as a subject index, a list of participants with their affiliations is included.