Book Reviews*

Methods in Enzymology. Volume 107. Posttranslational Modifications. Part B. Edited by Finn Wold (University of Texas, Houston) and Kivie Moldave (University of California, Irvine). Academic Press Inc.: Orlando, FL. 1984. XXVI + 688 pp. $69.50. ISBN 0-12-182007-1.

This volume of the "Methods of Enzymology" series, produced under Editors-in-Chief Sidney Colowick and Nathan Kaplan, is an excellent compilation of methods involved in the acylation, deacylation (other than phosphorylation), oxidation, reduction, halogenation, and hydroxylation reactions which modify the side chains of amino acids in proteins.

Concise but functionally complete introductions are provided in each chapter. Methodology for isolation, purification, and assay techniques are functionally complete. Both the introductory material and the methodology are well documented with references from primary sources. References at the end of chapters vary from 13 to 110 in number.

Posttranslation as used by the editors encompasses "the entire process by which the polymer of three-letter codons in the MRNA is 'translated' into a polypeptide chain of 20 'primary' amino acids". This volume along with its companion volumes, Volume 106—Posttranslational Modifications A, include all processing steps by which the direct translation product is altered from the structure specified by the gene.

The usefulness of the volume is further enhanced by the use of cross-references to previous volumes in the "Methods in Enzymology" series which are related to the materials in the three sections in Volume 107.

Persons interested in postranslational modification of amino acid residues in protein will find this volume of the series functional on the desk and in the laboratory.

Stearns W. Rogers, *McNeese State University*

Heterocyclic Chemistry. By T. L. Gilchrist (University of Liverpool). Pitman Publishing Inc.: Marshfield, MA. 1985. xii + 372 pp. $38.95. ISBN 0-273-01910-4.

It is a brave chemist who undertakes to present the enormous field of heterocyclic chemistry in one volume, and the size of the task becomes more readily apparent when one considers that just listing the known ring types makes up the larger part of the Parent Compound Index (formerly Ring Index). Nevertheless, there is a need for such works as both introductions and quick reference sources.

This volume seems to be unusually successful. The author has avoided being mired in the maze of individual ring systems by emphasizing general features. However, he has not lost sight of the reality of the specific, and for important, representative compounds, such as pyridine, he provides hard data, such as solubility, boiling and melting points, basic strength, and even odor, which is sometimes neglected. Significance of the major heterocyclic systems industrially, biochemically, and pharmaceutically is given good but not excessive attention. Sources are described, and the major synthetic routes are analyzed by retrosynthetic dissection.

The reaction chemistry of heterocyclic systems is taken up with a nice balance between description of processes of practical importance and elucidation of mechanism. Exceptions and unusual reactions are not ignored in favor of generalizations if significance justifies it.

A modest number of references are provided, which are particularly strong in reviews. A short chapter is devoted to the difficult problem of nomenclature. Each chapter ends with a few problem questions for those who want to practice; the answers to them are mostly given in the form of references to the original literature. The 9-page index is tightly set and is quite substantial.

This book could easily be used as a textbook for a course of study, but it also deserves consideration as a handy reference book for both facts and understanding.

How to Type Mathematics and Science. By Marion Smith and Graham Taylor. P. D. Meany Co.: Port Credit, Ontario. 1984. x + 70 pp. $9.95. ISBN 0-88835-012-0.

This book has a lot of highly specific information for typists who deal with scientific manuscripts; even idiosyncracies of handwriting as found in symbols and Greek letters are shown. On the other hand, the short section on typing chemical structures is too brief to be of much use and recommends practices that most chemists (that is, 100% of a survey of three chemists) consider unacceptable or at least grotesque. For example, the typist is instructed to leave a full space between the symbol for an element and a bond leading to it and to spread electron pairs so widely that the result resembles a diradical. Tear these pages out before putting this otherwise useful manual in a secretary's hands.

Rare Gas Solids. Springer Tracts in Modern Physics 103. Contributions by H. Coufal, E. Lüscher, H. Micklitz, and R. E. Norberg. Springer-Verlag: New York, 1984. ix + 99 pp. $24.00. ISBN 0-387-13272-4.

This volume consists of two competently written review articles. The book title is mildly misleading because one of the articles deals with ESR and Mössbauer studies of matrix-isolated species in which the solidified rare gas matrix plays a more or less incidental role. Furthermore, the second article describes NMR experiments on both solid and liquid rare gases, excluding helium but including solutions of H_2 in rare gas liquids and solids.

The article on matrix-isolated species contains descriptions of the experiments and some of the associated pitfalls as well as summarizing the results and their theoretical interpretation. Even though the experimental sections are perhaps more detailed than necessary, the authors do a good job, both of introducing the reader to this field and of explaining the significance of the results. It is unfortunate that the discussion does not cover matrix-isolated dimers and larger clusters which are currently of great interest.

For the most part, experimental details are omitted from the NMR review. More serious is the scanty description of the theoretical background needed to interpret the chemical shifts and nuclear relaxation times obtained for these simple materials. As is often done in reviews, equations are quoted and used without giving a clear picture of the assumptions and limitations of the arguments leading up to the final result. On the other hand, the ample literature citations will allow an interested reader to dig this material out on his own.

Both articles are informative and up-to-date. Their utility outweighs any minor defects noted here, and the book is well worth purchasing by those with interests in these research areas.

William A. Steele, *Pennsylvania State University*

Encyclopedia of Polymer Science and Engineering. Second Edition. Volume 1. A to Amorphous Polymers. Editor-in-Chief: Jacquelin I. Kvoschwitz. John Wiley and Sons, Inc.: New York. 1985. xii + 843 pp. $200.00. ISBN 0471-89540-7.

The first volume of this series, appropriately dedicated to Herman Mark, is the work of 42 contributors. Naturally there is considerable variation for each entry, but they all more or less meet the minimum standard of excellence which was established by the first addition. The articles are concise and authoritative. With the notable exception of Adsorption, there is an abundance of graphs, tables, formulas, and illustrations which are used efficiently for compiling and transmitting factual information. It appears that this Encyclopedia will be the best source for an overview of a wide range of polymer topics and should prove very useful to both industrial and academic chemists. Each article stands on its own and for some purposes, surveying a particular subject or preparing a lecture, a reader would need no other source. If, however, the intent is to start a serious literature search on the basis of these entries, then there is in many cases room for improvement. Future volumes should rely less on the patent literature as documentation and more on journal articles only because the latter are more generally accessible. It would also be useful to set apart from the list of references general references and recent reviews on the subject in question and to include where applicable CA registry numbers. Everything considered, this Encyclopedia will prove to be an extremely valuable and current source of information on polymer science and engineering, and no industrial or academic library should be without it.

Thomas St. Pierre, *University of Alabama at Birmingham*

Chromatographic Science Series. Volume 28. HPLC in Nucleic Acid Research: Methods and Applications. Edited by Phyllis R. Brown (University of Rhode Island). Marcel Dekker, Inc.: New York. 1984. xv + 403 pp. $59.75. ISBN 0-8247-72369.

Analysis of nucleosides, nucleotides, and oligonucleotides by HPLC has become commonplace in recent years. Particularly for the complex mixtures of nucleotides and their metabolites found in biological fluids, HPLC is now by far the most useful analytical tool. The literature in this area has become so extensive that the reviews found in this book are clearly warranted. Most of the chapters reference literature up through the first half of 1983. The book is divided into three sections that include

*Unsigned book reviews are by the Book Review Editor.

(1) an overview of nucleic acids and their chromatographic properties, (2) discussions of HPLC methodology, and (3) specific applications. Although much of the general material on methodology can be found in more detail in general texts on HPLC, the integration of methodology and application found in the early chapters is worthwhile. The overview presented in the first two chapters provides too little information to be of much use to researchers experienced in nucleic acid chemistry, but for novices to both nucleic acid chemistry and HPLC this material could provide a useful introduction and overview, as well as sufficient references to allow one to pursue the topics in greater depth. In contrast, there is sufficient information in some of the later chapters on applications to allow one to make some decisions about appropriate HPLC systems without having to consult all of the primary literature. The discussions of advantages and disadvantages of certain techniques and chromatographic systems may be very helpful to the new researcher in this area.

Each chapter was written independently by different authors, but this leads to less redundancy than might be expected. For example, the general problem of sample extraction from biological matrices is discussed in an early chapter devoted exclusively to the topic (Chapter 3), and then specific applications relevant to different classes of derivatives are discussed in six later chapters. A chapter is devoted to each important class of nucleic acid derivatives, with particular emphasis on analysis of the substances from biological matrices. In addition to the chapter on HPLC of nucleic acids, there are chapters on oligonucleotides, cyclic nucleotides, nucleotide coenzymes, nucleosides, pyrimidine and purine antimetabolite drugs, purine related CNS drugs, and nucleic acid constituents in disease processes. Finally, the chapter on enzyme assay by HPLC proved to be of real practical value, since we were able to initiate a new enzyme assay within a few days of receiving the book and reviewing this material.

The book is marred by an inordinate number of minor errors, including molecular structures that are wrong, typographical errors, and misspelled author's names in the references. On the plus side, every reference that I was able to check could be found. The captions to a few of the figures were incomplete, lacking either definitions for all of the symbols used or inadequate explanation. Tables found throughout the book, which compare chromatographic conditions, are generally complete and very useful.

Overall, this is an essential reference work for any laboratory which plans to use or already uses HPLC as an analytical tool in nucleic acid chemistry.

D. E. Bergstrom, *University of North Dakota*

Annual Review of Physical Chemistry. Volume 35. Edited by B. S. Rabinovitch, J. M. Schurr (University of Washington) and H. L. Strauss (University of California). Annual Reviews, Inc.: Palo Alto, CA. 1984. xv + 733 pp. $28.00 USA and $31.00 elsewhere. ISBN 0-8243-1035-7.

This annual series provides the most comprehensive reviews of recent advances in physical chemistry. The editors have consistently obtained contributions from outstanding scientists who are able to provide a concise but very complete and critical analysis of the literature and this 1984 volume is no exception. The rate at which the literature is expanding in all areas of chemistry has increased dramatically in the last 10 years. In no area has this pace been more rapid than in physical chemistry which has enjoyed a number of significant developments such as more useful lasers for spectroscopy, nozzle beam technology, superconducting NMR spectrometers, higher capacity and more flexible computers, etc. The volume and diversity of literature makes it increasingly difficult to provide both comprehensive and useful reviews of the literature and for this reason many reviews are admittedly very selective of the material they include rather than making claims of being very complete. In contrast to this, the "Annual Review of Physical Chemistry" has selected the topics so that the consistent reader of this series obtains a very complete picture of current studies and advances in this field.

The above comments on completeness are of course based on the evaluation of contributions which have appeared over a period of several years rather than any single year. It is always possible to cite examples of specific areas which do not get the coverage in any single volume that persons studying these areas would like to see and I must admit some personal observations that would fall into this category. These are that there have been some very significant advances in statistical mechanics in the last five years involving field theoretic and renormalization methods. Applications have and are being made in the areas of phase equilibria, electrolytes, polymers, etc., which are of interest to a large portion of the physical chemistry audience as well as persons in closely related interdisciplinary areas. Work in these areas is being performed by physical chemists (two of the most outstanding being B. Widom and M. E. Fisher) as well as physicists.

This review volume is available in almost all college, university, and technical libraries. However, for persons working in physical chemistry or related areas to whom it is not readily accessible, the purchase of a personal copy may be regarded as money well spent.

Adolph L. Beyerlein, *Clemson University*

Methods in Molecular Biology. Volume 2: Nucleic Acids. Edited by John M. Walker (Hatfield Polytechnic). Humana Press: Clifton, NJ. 1984. xiv + 375 pp. $45.00. ISBN 0-89603-064-4.

This volume is a collection of a wide range of key methods and techniques used in nucleic acid research. Not all the techniques described in the book represent the state of the art; however, each method is written by an expert in the field. There are 53 chapters, and each chapter starts with a brief review of the basic theory behind the particular method, followed by a detailed step-by-step description of a protocol which should lead to a successful execution of the method.

The methods described consist of assays for DNA including phage DNA; isolation of DNA including satellite DNA, high molecular weight eukaryotic and bacterial chromosomal DNA, plasmid, and phage DNA; extraction of total RNA and purification of messenger RNA; gel electrophoresis and relating techniques of analyzing DNA and RNA; radiolabeling of DNA and sequence determination of DNA; DNA transformation of various types of cell, hybridization of nucleic acids, and RNA extension in isolated nuclei; in vitro transcription and translation of DNA and RNA; and gene products detection and identification.

Those who need to learn for the first time how to conduct research on the molecular biology of nucleic acids or who need to broaden their competence and laboratory skills in the field will find this volume an excellent benchside companion.

Yau-Kwan Ho, *State University of New York at Buffalo*

The Science of Structure: Synergetics. By Hermann Haken. Translated by Fred Bradley. Van Nostrand Reinhold: New York. 1984. 255 pp. $35.00. ISBN 0-442-237030.

This is a book whose aim is to encompass very large domains of both the physical and social sciences by appealing to some of the more interesting fields of physical chemistry and chemical physics, viz., the principle behind the laser and the Belusov–Zhabotinsky oscillating reactions. Its aims could be expressed as counteractive to the perceived directions of science, e.g., "We are in an age that assumes the narrowing trends of specialization to be logical, natural and desirable... Specialization has bred feelings of isolation, futility and confusion in individuals... Specialization breeds biases that ultimately aggregate as international and ideological disorder, which, in turn, leads to war...". These are strong words and, essentially, they are used to describe the perceived effects of science in the absence of the more coherent aims of Synergetics. They are appropriate to the concepts of the book—but these quotations do not come from the book itself! I have used them here to underline the principal flaw in this otherwise interesting book—that of overstatement.

The above sentiments are from the writings of Buckminster Fuller in the introduction of *his* 1975 book "Synergetics". I well remember his early comment to the effect that when he started talking about synergism in the fifties, only the chemists in his audience understood what he was describing, and yet, we have Dr. Haken, a significant scientist, stating (on p 242) 'I introduced the term 'synergetics' during my lecture at the University of Stuttgart in 1970'(!).

There are major differences between the precise ways in which both Fuller and Haken use this term, but they are concerned with the same issues. Fuller's main usage was geometrical and structural (as expressed in his famous "equation" relating to the combination of two planar equilateral triangles to form the three-dimensional tetrahedron, 1 + 1 = 4) while Haken's interest is in the physical and chemical (and social science) aspects of systems in which cooperative interactions occur. Dr. Haken takes the theories of the laser and the characteristics of oscillating reactions such as the Belousov–Zhabotinsky reaction and applies them in a conceptual way to social systems ranging from theories of evolution and revolution to the problems of university administration and particularly to economic systems.

In dealing with the physical examples of the laser and oscillating reactions, Dr. Haken is careful to explain the importance of the nonequilibrium nature of these phenomena, but when he progresses to the more biological and social systems, he is not as careful to delineate what he means by the isomorphous terms and concepts appropriate to those systems. Is is difficult to define the problems of evolution in the limits of equilibrium and far from equilibrium, but issues like this are left hanging and their status is thereby confused at best.

It is worthwhile, when reading his discussion of evolutionary theory, business competition, economics, university administration, public opinion, theory of revolutions, etc., to bear in mind James Baldwin's cautionary dictum "It does not seem to me that nature helps us very much when we need illumination in human affairs". This is not meant as a

nonscientific nor pessimistic comment, but simply as a reminder of the enormously increased complexity which arises in the social sciences leading to the "existence" of *many* competing and often ill-defined "order parameters". In fact there are many people who will find Dr. Haken's analogies between science and social science as ideologically unacceptable despite the apparent isomorphisms which he constructs to build bridges between science and society.

None of these comments should be construed to imply that what Dr. Haken has to say is not of interest—it is—but for this reviewer, there were sufficient "hobby horses" interjected to detract from many of the specific disclaimers at other times.

All in all, however, when read by discriminating and critical people, this book offers a consciousness-expanding exercise. At a price of $35 it is unlikely to be snapped up by the general public, but it is a timely reminder of the multiplicity of metaphorical isomorphs which occur in this remarkable universe and an opportunity to reflect upon how many or few of them are likely to be significant.

T. M. Dunn, *University of Michigan*

Annual Review of Biophysics and Bioengineering: 1983 and 1984. 1983: Edited by J. Mullins (University of Maryland). 1984: Edited by Donald M. Engelman (Yale University). Annual Reviews, Inc.: Palo Alto, CA. 1983 and 1984. 1983: xi + 520 pp. $47.00. 1984: ix + 538 pp. $47.00.

The 1983 and 1984 volumes continue the excellent tradition of keeping interested researchers abreast of developments in these fields.

The 1983 volume has 19 reviews. Nine deal with some aspect of structure and interactions: water and nonpolar solutes (Hvidt), small angle neutron scattering (Zaccaï and Jacrot), neutron protein crystallography (Kossiakoff), protein folding (Gō), microtubules (Correia and Williams, Jr.), protein–nucleic acid interactions (Ohlendorf and Matthews), resonance Raman of hemoglobin (Rousseau and Ondrias), time-resolved X-ray diffraction of muscle (Huxley and Faruqi), tRNA (Rigler and Wintermeyer). Modeling is the theme of reviews on immunology (DeLisi) and sodium channel gating (French and Horn). Ion properties underlie reviews on proton flux and ATP hydrolysis and synthesis (Wang), intracellular ion activities (Tsien), calcium transport in nerve fibers (Requena), and acetylcholine receptor-controlled ion translocation (Hess, Cash, and Aoshima). Other reviews cover photoreceptors (Song), NMR studies of metabolism (Gadian), thermodynamics of protein–ligand interactions (Hinz), and protein and nucleic acid sequence databases (Orcutt, George, and Dayhoff).

The 1984 volume also has 19 reviews, and again nine deal with structure and interactions: Raman of lipid phases (Wong), resonance Raman of transient enzyme–substrate bonds (Carey and Storer), solid-state NMR of protein internal dynamics (Torchia), structural myosin sequence and structure (McLaughlin), optical sectioning microscopy (Agard), immunoelectron microscopy of ribosomes (Stöffler and Stöffler-Meilicke), X-ray analysis of protein dynamics (Petsko and Ringe), inelastic neutron scattering (Middendorf), NMR of proteins in solution (Markley and Ulrich). Fluorescence techniques are discussed in two reviews: phase and modulation fluorometry (Gratton, Jameson, and Hall), total reflection fluorescence (Axelrod, Burghardt, and Thompson). Two reviews deal with organismic motion: bacterial motility (Macnab and Aizawa), magnetic guidance (Frankel). Ions are the subject of three reviews: NMR of metal ions in cells and tissues (Gupta, Gupta, and Moore), single ionic channels (Auerbach and Sachs), cardiac cell Na/K pump (Gadsby). Other reviews deal with protein volume in solution (Zamyatnin), sequence-determined DNA separations (Lerman, Fischer, Hurley, Silverstein, and Lumelsky), and protein evolution (Bajaj and Blundell).

All in all, quite a feast.

S. Krimm, *University of Michigan*

Applied Environmental Geochemistry. Edited by Iain Thornton (Imperial College). Academic Press: London and Orlando, FL. 1983. xiii + 501 pp. $70.00. ISBN 0-12-690640-8.

This reference book is an excellent review of the field of environmental geochemistry with its emphasis of trace elements. The book is a collection of 16 chapters by different authors dealing with a range of topics.

Chapter 1 discusses some of the principles of environmental geochemistry followed by examples of surveys from Great Britain. Chapter 2 continues with regional mapping of trace element distributions and how these maps are used to detect actual and potential environmental problems. Chapter 3 discusses analytical methods applied to media such as soil, sediments, and plant materials. Procedures for handling of large numbers of samples and the quality control discussion are particularly useful in detection of real trends and separation from analytical drift or methods improvement. Chapter 4 discusses some of the relationships in geochemical character of the soil and plant/animal relationships. Chapters 5 and 6 discuss the chemistry of soils and water, respectively. These two chapters do not treat their respective topics to the same depth, and the sequence of the two chapters might be better reversed. Chapter 7 brings the role of microorganisms into the geochemistry of trace metals, a topic that has not been adequately covered in the past. This is an area of study which has not been considered to an adequate degree and could benefit from additional material.

Chapters 8–14 discuss various applications of environmental geochemistry to the fields and problems of agriculture (Chapter 8), health status of man (Chapter 9, 10, and 11), and metal pollution by the extractive metal industry (Chapters 12, 13, and 14). Chapter 15 discusses environmental and potential health implications of expanded coal extraction and use. The book concludes with a brief review of the sources of natural radioactivity in the environment.

The text is an excellent reference for those who are either novices or experts in the field of environmental geochemistry. In general, the text is well written and moderately well coordinated and integrated. The book could benefit by a few additions which would improve the coverage of the topics. A chapter on weathering, soil formation processes, and adsorption would aid in understanding the distribution of elements and their mobility. Much of the material is on trace elements in soils, but the novice still does not know what a soil is or how soils are formed. The extensive studies of the Regional Geochemistry Branch of the U.S. Geological Survey are not adequately represented. A chapter summarizing these studies in the United States would add completeness to the text. The chapter on Health Implications of Coal Development is too narrow. The substantial literature on acid deposition is within the realm of environmental geochemistry but is not discussed. Finally, the importance of organic substances in the environment is not discussed. Although many organic compounds of environmental interest are not derived from the geochemical environment, the mode of dispersion and uptake by organisms has some common pathways. There is a need for more cross fertilization and exchange between geochemists who study trace elements and the chemists who study organic compounds in the environment.

There are relatively few mistakes, typographical errors, and inappropriate data in the book. More notable examples include pages 27–29 where it is stated most of northern Scotland has Precambrian rocks in outcrop. Page 219 lists a figure location as "Camp County" instead of "Camp Century". On page 316 a line of text is repeated. The Eh–pH diagram on page 19 is calculated for an unrealistic activity for carbonate species. This diagram has unfortunately propagated itself into many places in the literature as well as this book.

Ronald W. Klusman, *Colorado School of Mines*

Topics in Inorganic and General Chemistry. Volume 20. Ozone. By M. Horvath, L. Bilitzky, and J. Hüttner (Oxygen and Dissougas Co., Budapest). Elsevier Science Publishers: Amsterdam and New York. 1984. 340 pp. $75.00. ISBN 0-444-99625-7.

This monograph is a general survey of the physical and chemical properties of ozone. It provides a detailed review of the physical properties of ozone, the analytical methods for its determination, and its physiological effects. Chapters are also devoted to atmospheric ozone chemistry, processes for ozone generation, and the stability and storage of the gaseous, liquid, or solution phases. The treatise concludes with applications, including a thorough discussion of water treatment and agricultural and food industry utilization. Some of the more laboratory-oriented applications familiar to most bench chemists are also included.

The volume is attractively organized and written. Numberous tables, figures, and illustrations explain and catalog the material. A 17-page index provides considerable assistance. Because of the detail in which many of the topics are presented, this will be an extremely useful reference for many readers.

There is no similar source of information on the ozone topics covered here except for the 1959 monograph "Ozone Chemistry and Technology" (ACS Advances in Chemistry Series. Vol. 21). P. S. Bailey's two volumes on "Ozonation in Organic Chemistry" contain very little in common with the present work.

Robert L. Kuczkowski, *University of Michigan*

Environmental Chemistry. Volume 3. A Specialist Periodical Report. Edited by H. J. M. Bowen (University of Reading). The Royal Society of Chemistry: London. 1985. ix + 144 pp. $85.00 U.S. ISBN 0-85186-775-8.

This short volume contains reviews of recent research in four areas of environmental chemistry. Included topics are tropospheric ozone (48 pp), organotin compounds (29 pp), the determination of heavy metals in sewage sludge (24 pp), and inorganic deposits in invertebrate tissues (36 pp).

Review articles are perhaps more important in environmental than in any other branch of chemistry. The diversity of sources of relevant

publications for any research undertaking in this field is staggering, even with the availability of modern computer searches. For the same reason, the writing of a useful, comprehensive review is an extremely difficult and challenging undertaking.

Similarly, the assembly of a series of review articles into a coherent and useful volume is made more difficult by the diversity of research areas called environmental chemistry. Unfortunately, this volume fails in this regard. Independent of the quality of the individual chapters, the selection of such a disparate group of topics for inclusion into a single volume seriously detracts from the usefulness of this book. The chapter on tropospheric ozone seems particularly inappropriate in a book which contains three other chapters which are related to the environmental chemistry of metals.

This is doubly unfortunate because the ozone chapter is a very well conceived and clearly presented review of a difficult and important research area. The critical research issues regarding the sources, sinks, and transport of ozone in the atmosphere are presented succinctly and fairly.

The remaining chapters are less noteworthy. The organotin chapter contains several potentially useful tabulations of physical properties of organotin compounds, but little additional useful information. The chapter on sewage sludge analysis is well done.

The final chapter, on inorganic deposits in invertebrate tissues, provides an excellent summary of an area not generally considered as a part of environmental chemistry. The authors state their case for the importance of this research area quite well. Unfortunately, the readability of their review is seriously diminished by seemingly random switches between mass- and mole-based concentration units and use without definition of terminology which is unfamiliar to all but the most zoologically oriented chemists.

The reviews would have been improved by a brief summary containing the reviewer's suggestions for future research directions.

Purchase of this volume by anyone other than specialized libraries is probably not cost effective.

Donald L. Macalady, *Colorado School of Mines*

Analytical Profiles of Drug Substances. Volume 13. Edited by K. Florey. Academic Press: New York. 1984. ix + 771 pp. $46.50.

The present volume is a continuation of a series designed to provide supplemental chemical information on drugs contained in the official compendia. It provides a compilation of the synthesis, physical and chemical properties, and methods of analysis (both formulations and biological fluids) of 19 drugs not previously profiled. These include the following: atenolol, camphor, chloroquine, cimetidine, disopyramide phosphate, indomethacin, ketotifen, melphalan, moxalactam disodium, oxyphenbutazone, pentazocine, phenytoin, pyridoxine hydrochloride, saccharin, salicylamide, silver sulfadiazine, sulindac, tetracycline hydrochloride, and vitamin D_3. There is also supplemental information on tolbutamide (cf. Volume 3) and reserpine (cf. Volume 4). Each of the drugs in this volume is well reviewed. The series continues to be carefully edited and is an extremely valuable resource for chemists involved in drug characterization, drug analysis, quality control, and drug metabolism.

William H. Soine, *Virginia Commonwealth University*

Chromatographic Science Series. Volume 27. Affinity Chromatography: Template Chromatography of Nucleic Acids and Proteins. By Herbert Schott (University of Tübingen). Marcel Dekker, Inc.: New York. 1984. x + 234 pp. $59.25. ISBN 0-8247-7111-7.

Considering the importance of affinity chromatography in molecular biological and biochemical research, the number of years over which some of these chromatographic methods have been available, and the number of significant advances made in column preparation techniques in the recent past, the collection of this information into one volume is long overdue. In this book, the literature is covered from the inception of template chromatography through developments in 1984, and this work, therefore, should be of value both to persons desiring an introduction to the methods and applications of template chromatography and to those familiar with the technique who need a source to the literature in this area. Following a brief introduction describing template chromatography in general terms, a detailed examination of methods available for immobilization of nucleic acid components, ranging in complexity from nucleobases to intact nucleic acids, is presented (Chapters 2–4). The advantages and limitations of the various immobilization techniques are discussed and data presented in condensed form in tables. Chapters 5–8 illustrate the use of template chromatography for the isolation of DNA, DNA fragments, RNA, and mRNA with examples from the literature. Detailed descriptions of experimental procedures are given in many cases and problems, with solutions to the problems where known, are identified. Chapter 9 is a thorough coverage of the literature describing methods for the isolation of proteins using template chromatography. This chapter is difficult reading for persons not familiar with the terms used in molecular biology, e.g., this reviewer, and a good biochemistry text close at hand is recommended. However, the material is presented concisely, and specific proteins of interest may be located by referring to the well-organized index. The last two chapters describe the use of template chromatography for the synthesis or degradation of polynucleotides and for studying peptide–nucleotide interactions. An additional chapter summarizing the current status and future potential of template chromatography, relative to nucleic acid chemistry, would have been a welcome addition, but this minor deficiency should not detract from this otherwise well organized, thoroughly referenced (579 references), wide ranging survey of the methods and applications of template chromatography in nucleic acids research.

Karl H. Schram, *University of Arizona*

Chlorine: International Thermodynamic Tables of the Fluid State-8. Tentative Tables. By S. Angus, B. Armstrong, and K. M. de Reuck (IUPAC Thermodynamic Tables Project, Imperial College). Pergamon Press: Oxford and New York. 1985. xviii + 162 pp. $47.50. ISBN 0-08-030713-2.

The compilers discuss the distressingly incomplete state of the reported data on chlorine and the difficulties of assessing accuracy. They then present the tables of data, along with the methods by which they were constructed and a discussion of the limits, use, and accuracy of the tables. There would appear to exist nothing else so reliable as this work, given the present state of the subject.

Lange's Handbook of Chemistry. Thirteenth Edition. Edited by John A. Dean. McGraw-Hill: New York. 1985. 1792 pp. $57.00. ISBN 0-07-016192-5.

The long wait since the twelfth edition of this broadly useful reference work has been well rewarded, for this new edition shows vast improvements. The longest section, that on organic compounds, has been completely rewritten; even the structural formulas have been redrawn or reset, and the 1979 IUPAC recommendations on nomenclature have replaced the outdated ones. There is much new thermodynamic information, including extensive tables of heats of formation, bond dissociation energies, etc. Acid–base dissociation constants, formation constants of complexes, tables of spectroscopic values, including ^{13}C NMR, tables of solubilities, etc., are presented more completely than before (but tables of logorithms, which survived the slide rule, have met their bane with the pocket computer, and have faded from the scene). A new feature that many users will find helpful is a formula index for the 7600 organic compounds listed.

This handbook can still be lifted with one hand; it should be handy to have on one's desk, and its sturdy construction suggests that it will withstand a lot of handling. It gives a lot of information, well selected, for the money.

Physical and Mechanistic Organic Chemistry. Second Edition. By Richard A. Y. Jones (University of East Anglia, U.K.). Cambridge University Press: New York. 1984. iii + 426 pp. $69.50 (cloth), $27.95 (paper). ISBN 0-521-25863-4 (cloth), 0-521-25886-4 (paper).

This is a very good book for the study and review of organic reaction mechanisms. It manages, in less than 400 pages, to present relevant physical fundamentals and then to deduce the mechanisms of many organic reactions. The style is direct, reasoned, and lucid. There is a continual interplay of evidence and deduction which is pedagogically sound and which, in my own case, reinforced my enthusiasm for the subject.

The physical fundamentals reviewed in the first few chapters include kinetics, thermodynamics, acidity, solvation, and molecular orbital theory. The level of presentation is such that, for chemists receiving their training in the USA, prior completion of one year of graduate work is an appropriate prerequisite. The remaining two-thirds of the book deals with reaction mechanisms. The specific reactions whose mechanisms are analyzed include aliphatic and aromatic substitution, elimination, addition (to C=C and to C=O), ester hydrolysis, molecular rearrangement, aliphatic radical substitution, and pericyclic reactions.

There are more than 600 references to the original literature, dating back as far as 1870, but mostly dating from 1950 to 1984. Controversial issues and limits to mechanistic knowledge due to limitations of physical fundamentals are brought out. A person completing this text will have a good grasp of current and unresolved issues in mechanistic organic chemistry.

Ernest Grunwald, *Brandeis University*

Problems in Physical and Mechanistic Organic Chemistry. By Richard A. Y. Jones Available from the author, School of Chemical Sciences, University of East Anglia, Norwich NR4 7TJ, U.K. ix + 104 pp. $2.75 plus postage. ISBN 0-9510098-0-8.

Includes problems, hints, and solutions.

Volumes of Proceedings

ACS Symposium Series. Volume 271. Purification of Fermentation Products: Applications to Large Scale Processes. Edited by D. LeRoith, J. Shiloach, and T. J. Leahy. American Chemical Society: Washington. 1985. x + 197 pp. $53.95. ISBN 0-8412-0890-5.

The eleven chapters in this book are based on papers given at a symposium sponsored by the Division of Microbial and Biochemical Technology of the American Chemical Society. The text is in uniform typescript and there is a substantial subject index.

Wenner-Gren International Symposium Series. Volume 41. Somatosensory Mechanisms. Edited by C. van Euler, O. Fransen, U. Lindblom, and D. Ottoson. Plenum Press: New York. 1984. xiv + 396 pp. $55.00. ISBN 0-306-41842-8.

Proceedings of an international Symposium held in Stockholm in 1983, containing typescript papers on original research on the neurophysiology of sensory behavior, including some chemical effects. Indexed.

Ergonomics Problems in Process Operations. Institution of Chemical Engineers, Symposium Series. No. 90. Pergamon Press: Oxford and Elmsford, NY. 1984. vi + 238 pp. $28.00. ISBN 0-08-0302823.

Proceedings of a symposium held at the University of Aston in 1984, consisting of 16 typescript papers and five "workshops", divided into three groups: The Role of the Human Operator; Interface Design; Job Design, Organization, and Training. The subject of this symposium takes on special importance in the light of recent disasters in the chemical industry and efforts to understand and avoid them.

Springer Series on Atoms and Plasmas. Volume 2. Multiphoton Processes. Edited by P. Lambropoulos and S. J. Smith. Springer-Verlag: New York and Heidelberg. 1984. viii + 201 pp. $26.00. ISBN 0-387-15013-7.

Proceedings of the 3rd International Conference, held in Crete in 1984, consisting of the 21 invited papers in heterogeneous typescripts. Not indexed.

Springer Proceedings in Physics. Volume 2. EXAFS and Near Edge Structure. III. Edited by K. O. Hodgson, B. Hedman, and J. E. Penner-Hahn. Springer-Verlag: New York and Heidelberg. 1984. xvi + 533 pp. $35.00. ISBN 0-387-15068-4.

Proceedings of an international conference held at Stanford University in 1984, containing the typescripts of a very large number of short papers. Not indexed.

Instrumental Analysis of Foods. Recent Progresses. Volume 1. Edited by G. Charalambous and F. Inglett. Academic Press: Orlando, FL. 1983. xvi + 437 pp. $42.00. ISBN 0-12-168901-8.

The 3rd International Flavor Conference, held on Corfu in 1983, gave rise to the 25 papers reproduced from typescripts in this volume. Indexed. A companion volume deals with beverages.

Studies in Physical and Theoretical Chemistry. Volume 32. Physical Chemistry of the Solid State: Applications to Metals and their Compounds. Edited by P. Lacombe. Elsevier Science Publishers: Amsterdam and New York. 1984. xxii + 600 pp. $132.75. ISBN 0-444-43270-2.

Proceedings of the 37th International Meeting of the Société de Chimie Physique, held in Paris in 1983. The papers are in English, and the discussions are in French. Not indexed.

Journal of Chromatography Library. Volume 30. Microcolumn Separations: Columns, Instrumentation, and Ancillary Techniques. Edited by M. V. Novotny and D. Ishii. Elsevier Science Publishers: Amsterdam and New York. 1985. xii + 336 pp. $64.75. ISBN 0-444-42429-6.

The chapters in this volume grew out of a seminar meeting held in Hawaii in 1982. They have been selected for an integrated coverage of the subject and have been rewritten for the purpose, with inclusion of more recent material. The subject is divided into these four sections: column studies; miniaturized instrumentation and new techniques; spectroscopic detection; and electrochemical detection. Subject index.

NATO ASI Series B: Physics. Volume 113. The Electronic Structure of Complex Systems. Edited by P. Phariseau and W. M. Temmerman. Plenum Press: New York and London. 1984. viii + 803 pp. $120.00. ISBN 0-306-41824-X.

Contains 15 papers given at a NATO Study Institute held in Belgium in 1982. Reproduced from typescripts; indexed.

NATO ASI Series B: Physics. Volume 117. Movement Formation in Solids. Edited by W. J. L. Buyers. Plenum Press: New York. 1984. xiv + 336 pp. $49.00. ISBN 0-306-41884-7.

This volume in the NATO Advanced Study Institute Series consists of 22 chapters reproduced from typescript, a photograph of the participants, and a subject index.

First U.K. National Conference on Heat Transfer. Volume 1: Sessions 1–10. Volume 2: Sessions 11–20. Institution of Chemical Engineers. Pergamon Press: Oxford and Elmsford, NY. 1984. x + x + 1322 pp. $112.00. ISBN 0-08-030281-5.

These two volumes contain the typescripts of the large number of papers presented at a conference held at the University of Leeds in 1984. There is no index, but the papers are grouped in fairly homogeneous sessions according to topic.

Specificity in Biological Interactions. Edited by C. Chagas and B. Pullman. D. Reidel: Dordrecht. 1984. xxxvi + 318 pp. $86.00. ISBN 90-277-1813-8.

Proceedings of a Working Group of the Pontifical Academy of Sciences, which met in 1983. The thirteen papers are set in type and printed with outstanding quality. Unfortunately, there is no index.

Contemporary Topics in Polymer Science. Volume 5. Edited by E. J. Vandenberg. Plenum Press: New York. 1984. xii + 458 pp. $75.00. ISBN 0-306-41665-4.

The Eleventh Biennial Polymer Symposium, held in Puerto Rico in 1982, had "High-Performance Polymers" as its theme. The fourteen invited lectures make up this volume, which begins with a presentation address for the Division of Polymer Chemistry Award to Herman F. Mark. Biological polymers, such as carbohydrates, genes, and liposomes, as well as synthetic polymers and polymeric carbon, are included. Text is in typescript; the index is unusually thorough.

Environmental Research and Protections: Inorganic Analysis. Edited by W. Fresenius and I. Lüderwald. Springer-Verlag: Berlin. 1984. xi + 292 pp. Approximately $15.30 (paper). ISBN 3-540-13469-7.

The papers herein are reprinted from Fresenius' Zeitschrift für Analytische Chemie, Vol. 317, No. 3/4 (1984), with the original journal page numbers. The papers, mostly in German, are from a symposium held in Germany in 1983. No index.

Nato ASI Series C: Mathematical and Physical Sciences. Volume 127. Applications of Picosecond Spectroscopy to Chemistry. Edited by K. B. Eisenthal. D. Reidel: Dordrecht. 1984. xxii + 363 pp. $59.00. ISBN 90-277-1788-5.

Contains papers in these areas: Spectroscopic Techniques, Isolated Molecules, Vibrational Relaxation, Photochemistry, and Energy Relaxation and Molecular Motions in Condensed Media. They were given at a NATO Advanced Study Institute held in Italy in 1983 and are reproduced from an extraordinary variety of typescripts. Subject index.

NATO ASI Series C: Mathematical and Physical Sciences. Volume 139. Spectroscopy of Biological Molecules. Theory and Applications—Chemistry, Physics, Biology, and Medicine. Edited by C. Sandorfy and T. Theophanides. D. Reidel: Dordrecht. x + 646 pp. $89.00. ISBN 90-227-1849-0.

This is a volume in the NATO Advanced Study Institute Series. It contains the typescripts of a large number of papers, grouped under these headings: Theoretical Overview; Raman and Infrared Studies of the Structure and Dynamics of Nuclei Acids and Proteins; NMR Spectroscopy and its Applications; The Mechanism of Vision Plant Pigments; Spectroscopy of Membranes; Recent Advances in Spectroscopic Techniques. Author and subject indexes.

Studies in Physical and Theoretical Chemistry. Volume 34. Electrochemistry: The Interfacing Science. Edited by D. A. J. Rand and A. M. Bond. Elsevier Science Publishers: Amsterdam and New York. 1984. x + 482 pp. $113.50. ISBN 0-444-42304-4.

Proceedings of the Sixth Australian Electrochemistry Conference, held in 1984. Contains the typescript papers on such varied subjects as mineral processing, trace analysis, bioelectrochemistry, electrochemical power sources, etc., and a short subject index.

Interface Kinetics in Solution. Faraday Discussions of the Chemical Society. No. 77. The Royal Society of Chemistry: London. 1984. 317 pp. £33.00. Approximately $57.00.

Contains 23 contributions and the attendant discussions from a meeting held at the University of Hull in 1984. Set in type, but not indexed.

Studies in Surface Science and Catalysis. Volume 20. Catalysis by Acids and Bases. Edited by B. Imelik, C. Naccache, G. Coudurier, Y. Ben Taarit, and J. C. Vedrine. Elsevier Science Publishers: Amsterdam and New York. 1985. xiv + 446 pp. $94.50. ISBN 0-444-42449-0.

The many papers, in English or French, in typescript in this volume were part of a symposium held in Lyon in 1984. No index.

Nitrogen Fixation and CO_2 Metabolism. Edited by P. W. Ludden and J. E. Burris. Elsevier-North Holland: New York. 1985. xxviii + 455 pp. $72.00. ISBN 0-444-00953-1.

Proceedings of the 14th Steenbock Symposium, held at the University of Wisconsin in June 1984. Contains a large numer of typescript papers and a substantial subject index.

Polyimides: Synthesis, Characterization, and Applications. Volume 1. Edited by K. Mittal. Plenum Press: New York and London. 1984. xvi + 614 + xxxv (index) pp. $89.50. ISBN 0-306-41670-0.

The First Technical Conference on Polyimides was held in Ellenville, New York, in November 1982 and generated two volumes of proceedings, of which this one contains the papers on chemical subjects and an index to both volumes.

Developments in Food Science. Volume 10. Progress in Flavour Research 1984. Edited by J. Adda. Elsevier Science Publishers: Amsterdam and New York. 1985. xiv + 634 pp. $126.00. ISBN 0-444-42432-6.

Proceedings of a symposium held in France in May 1984, consisting of a large number of typescript papers, without an index.

Analytical Applications of Bioluminescence and Chemiluminescence. Edited by L. J. Kricka, P. E. Stanley, G. H. G. Thorpe, and T. P. Whitehead. Academic Press: Orlando, FL. 1984. xxviii + 602 pp. $49.00. ISBN 0-12-42629-0.

Proceedings of a symposium held at the University of Birmingham in April 1984, containing a large number of short papers reproduced from quite varied typescripts and a good subject index.

Chemical Mössbauer Spectroscopy. Edited by R. H. Herber. Plenum Press: New York and London. 1984. xiv + 378 pp. $59.50. ISBN 0-306-41885-1.

This volume, dedicated to Professor Rudolf Mössbauer, contains 15 chapters derived from presentations at a symposium held at the American Chemical Society National Meeting in St. Louis in 1984 and a substantial subject index.

ACS Symposium Series. Volume 270. Reaction Injection Molding: Polymer Chemistry and Engineering. Edited by J. Kresta. American Chemical Society: Washington, D.C. 1985. x + 301 pp. $59.95. ISBN 0-8412-0888-3.

Contains 18 typescript chapters based on papers presented at a symposium held at the 186th meeting of the American Chemical Society, Washington, 1983.

Advances in X-Ray Analysis. Volume 27. Edited by J. B. Cohen, J. C. Russ, D. E. Leyden, C. S. Barrett, and P. K. Predecki. Plenum Press: New York and London. 1984. xviii + 579 pp. $69.50. ISBN 0-306-41712-X.

Contains the many papers, in a variety of typescripts, presented at a conference held in Denver in 1983, ornamented by the inclusion in the preface of the words to a song sung in the honor of Ludo Frevel, the first Hanawalt Award Winner, to the tune of "Bill Grogan's Goat". Indexed.

Advances in Chemistry Series. Volume 209. Mapping Strategies in Chemical Oceanography. Edited by A. Zirino. American Chemical Society: Washington, D.C. 1985. xi + 467 pp. $89.95. ISBN 0-8412-0862-X.

The Division of Analytical Chemistry of the American Chemical Society sponsored a symposium at the 185th National Meeting of the American Chemical Society, Seattle, 1983, on the subject Analytics of Mesoscale and Macroscale Processes. The 21 invited papers have been collected under the more marketable title of this volume, which has a thorough subject index.

ACS Symposium Series. Volume 273. Dermal Exposure Related to Pesticide Use: Discussion of Risk Assessment. Edited by R. C. Honeycutt, G. Zweig, and N. N. Ragsdale. American Chemical Society: Washington, D.C. 1985. x + 529 pp. $79.95. ISBN 0-8412-0898-0.

A collection of the large number of typescript papers based on a symposium sponsored by the Division of Pesticde Chemistry of the American Chemical Society. Indexed.

ACS Symposium Series. Volume 274. Chemical Process Hazard Review. Edited by J. M. Hoffman and D. C. Maser. Americal Chemical Society: Washington, D.C. 1985. x + 121 pp. $34.95. ISBN 0-8412-0902-2.

Eleven chapters based on presentations at a symposium held at the 187th National Meeting of the American Chemical Society, St. Louis, 1984. The topics range from the very general, such as Thermochemical Hazard Evaluation, to the highly specific, such as The Nitration of 5-Chloro-1,3-dimethyl-1*H*-pyrazole. There is a substantial subject index.

Gallium Arsenide and Related Compounds, 1982. Institute of Physics Conference Series. No. 65. Edited by G. E. Stillman. Heyden and Sons, Inc.: Philadelphia. 1983. xviii + 650 pp. $65.00. ISBN 0-85498-156-X.

The uninitiated chemist is likely to be surprised by the fact that such an arcane substance should give rise to no less than 85 papers, together with an equal number for which no room in the program could be found. Such an event nevertheless took place in 1982 in Albuquerque, New Mexico, at the Tenth International Symposium on GaAs and Related Compounds. There is unfortunately no index to this typescript volume of proceedings.

Analytical Colorimetry. Volume 5. Edited by J. F. Johnson and P. S. Gill. Plenum Press: New York and London. 1984. x + 402 pp. $59.50. ISBN 0-306-41507-0.

The compiled papers presented at a symposium held at the 185th National Meeting of the American Chemical Society, Washington, 1983, make up this volume, which also contains a quite short subject index.

Studies in Surface Science and Catalysis. Volume 19. Catalysis on the Energy Scene. Edited by S. Kaliaguine and A. Mahay. Elsevier Science Publishers: Amsterdam and New York. 1984. xvi + 602 pp. $109.50. ISBN 0-444-42402-4.

The proceedings of the 9th Canadian Symposium on Catalysis, held in Quebec in 1984, gave rise to the 68 typescript papers in this volume. Not indexed.

Local Density Approximations in Quantum Chemistry and Solid State Physics. Edited by J. P. Dahl and J. Avery. Plenum Press: New York and London. 1984. xiii + 851 pp. $125.00. ISBN 0-306-41667-0.

The large number of typescript papers in this volume are from a symposium held in 1982 at the University of Copenhagen. About half are on fundamentals and about half on applications. Indexed.