Book Reviews*

Carbohydrate Chemistry. Volume 20. Part 1. Monosaccharides, Disaccharides, and Specific Oligosacchardies. Edited by N. R. Williams (University of London). Royal Society of Chemistry: London. 1988. xiv + 301 pp. $147.00. ISBN 0-85186-242-X.

This specialist periodical report of the Royal Society of Chemistry results from the continuing efforts of a devoted band of four reporters and the senior reporter shown above. The practicing carbohydrate chemist should be grateful to Drs. Davison, Ferrier, Furneaux, and Whightman for their labors on this task. The report is a survey of monosaccharide and selected oligosaccharide research reported in 1986. The selective process has been especially necessary in situations where either the aglycone or the glycose is considered the major interest in a glycoside synthesis. About 1460 references have been reviewed in this report. It contains 24 chapters dealing with specific types of compound such as free sugars, esters, deoxy-sugars, etc. The chapters range in length from 25 pages for Glycosides and Disaccharides and for Nucleosides, down to four pages for Thiosugars. References are grouped at the end of each chapter and the book has an author index that extends in triple columns for 26 pages! A thoughtful feature is the inclusion of the Chemical Abstracts reference with citations from some periodicals that may be less widely available. Inevitably, the nature of the reports is noncritical. They say that certain things have been recorded, normally without further comment.

This type of compilation of recent publications in a specialist field is especially valuable today when the growing avalanche of publications makes it less and less likely that the active researcher can browse all of the relevant journals in his field. The problem is especially evident in many areas of carbohydrate chemistry that border on neighboring disciplines. Thus for example the synthetic carbohydrate chemist may have interests in pharmacology or biochemistry. Analytical interests in carbohydrate chemistry may be based on ecological or nutrition sciences. Many workers are thereby forced to rely on computer-alert services, and to that extent they lose the genesis of lateral thinking and sparking of new ideas that occurs by serendipity as a result of browsing in the literature. This type of specialist report may assist in filling this gap. The most unfortunate aspect, which is presumably unavoidable, is the time lag. Thus this report includes the literature available to the reporters by March 1987, but presumably it will reach many readers in early 1989.

G. N. Richards, *University of Montana*

Biological Magnetic Resonance. Volume 7. Edited by Lawrence J. Berliner (Ohio State University) and Jacques Reuben (Hercules Incorporated). Plenum: New York and London. 1987. xix + 313 pp. $55.00. ISBN 0-306-42455-X.

Biological Magnetic Resonance is a series dedicated to contemporary topics of biological significance involving NMR and EPR. The perspective applied in the present volume is both pedagogical and critical. It is clearly a reference work suitable for most individuals having some background in the subject matter of its reviews and not a textbook on magnetic resonance.

The work consists of a series of four contributed review chapters generated by a total of eight authors. The first two chapters deal with NMR studies of in vivo systems. Chapter 1 addresses NMR spectroscopy of the intact heart. The main emphasis of this chapter is on ^{31}P NMR of normal and perturbed myocardial metabolism in the perfused heart. Chapter 2 addresses NMR methods for studying enzyme kinetics in vivo. The main emphasis of this chapter is the description of the methods and their applications using intact cells and tissues; there is also some discussion of in vitro enzyme kinetic studies in biological systems.

The last two chapters deal with ENDOR and NMR studies of in vitro systems. Chapter 3 is a thorough review of the principles and applications of ENDOR spectroscopy in photobiology and biochemistry. This chapter includes discussions of liquid-state and solid-state ENDOR as well as CIDEP-enhanced ENDOR. A number of illustrative examples employing these techniques are also provided. Chapter 4 deals with NMR studies of calcium binding proteins. The main emphasis of this chapter is on the study of the cation binding properties of these proteins using ^{43}Ca, ^{25}Mg, and ^{113}Cd NMR. Some of the more recent ^{1}H NMR studies on calmodulin and parvalbumin are also reviewed.

Taken individually, these chapters are informative reviews of their respective subjects. The topics are clearly and concisely presented in a straitforward manner. Each chapter is well referenced and outlined. A composite subject index is also provided at the end of the book. As a whole, the subjects discussed in this work span a variety of areas of biological interest and should appeal to a diverse audience.

Joseph R. Roebuck, *Henry Ford Hospital*

Phosphorus NMR in Biology. Edited by C. Tyler Burt (National Institute of Environmental Health Sciences). CRC: Boca Raton. 1987. 236 pp. $145.00. ISBN 0-8493-5842-6.

This is a rather general work dedicated to showing how ^{31}P NMR has opened new vistas in biological research and, in particular, how these "vistas can range from the molecule to the microbe to man himself". The perspective taken is largely pedagogical and suitable for readers from a variety of backgrounds.

The volume consists of a series of nine contributed review chapters generated by a total of 18 authors. It is specifically arranged to emphasize the point that ^{31}P NMR can probe regions ranging in size from angstroms to centimeters. The book is divided into three broad subject areas. The first section consists of three chapters that provide basic information concerning ^{31}P NMR: chemical shift, relaxation and its measurement, and some solid-state NMR techniques. These chapters are largely pedagogical but should prove suitable for both the nonexpert and those with some experience in ^{31}P NMR. They are well organized, clear, and concise. The second section consists of four chapters that deal with low and intermediate molecular weight molecules from each of the major classes of biomolecules: nucleic acids, lipids, and proteins. A chapter on polyphosphates, which are biomolecules found primarily in plants and less complex living systems, is also included in this section. The discussion in the second section includes significantly more attention to biological details than the previous section.

The last section consists of two chapters that deal with more complex biological structures: subcellular organelles, perfused organs, and intact tissues in situ. Both of these chapters are disappointingly brief in treating their respective subjects, given the degree of activity in this field over the last decade. In particular, only 15 pages are devoted to the chapter on perfused organs and intact tissues in situ. Regrettably, the book does not have a chapter on NMR imaging and only indirectly considers noninvasive spatial localization of ^{31}P NMR signals.

This book will undoubtedly join a host of others in documenting the evolution of in vivo ^{31}P NMR, but it falls short of expectation given the rather broad title and relatively high price it possesses.

Joseph R. Roebuck, *Henry Ford Hospital*

Studies in Natural Products Chemistry. Volume 1. Stereoselective Synthesis. Part A. Edited by Atta-ur-Rahman (University of Karachi). Elsevier: Amsterdam and New York. 1988. xxii + 520 pp. $223.75. ISBN 0-444-42970-0.

This volume is as new collection of modern methods of stereoselective synthesis in natural products chemistry. The work consists of a series of 17 contributed monographs from various authors, who have written about their fields of interest and expertise. The emphasis is clearly on synthetic strategy, with sparse additional material such as biological activity, biosynthesis, etc.

In most cases, the authors include their own work in addition to the work of other researchers in the field. This leads to a generally balanced look at how stereoselective synthesis has been accomplished within a particular class of compound. Each monograph is generously footnoted and includes an individual bibliography.

The following compound classes are covered: indole alkaloids (4 chapters—indolecarbazole type, pentacyclic strychnos type, indole quinolizine type, unusual indole types); a vinyl azide approach to various alkaloid types (indole, isoquinoline, isoindolobenzazepine, complex antitumor); isoquinoline alkaloids via 8,14-cycloberbines (biogenetic approach); antitumor alkaloids from sugars; cycloaddition approaches to alkaloids (3 chapters); nucleoside based compounds; and macrolide compounds (milbemycins, avermectins, rifamycin, anthracyclines).

This volume belongs in the library of any serious organic chemist wishing for a clear, concise discussion of how the synthesis of complex natural products has been approached from the viewpoint of an expert in the field. This allows a quick and in-depth look at the strategies that have been employed in challenging difficult synthetic problems. The real value of this book is that such a diverse array of natural product types have been dealt with in one work.

James A. Thomas, *Warner-Lambert Co.*

*Unsigned book reviews are by the Book Review Editor.

Ions in Solution: Basic Principles of Chemical Interactions. By John Burgess (University of Leicester). John Wiley & Sons: New York and Chichester. 1988. 191 pp. $39.95. ISBN 0-470-21059-1.

This book is devoted primarily to the properties of metal ions in aqueous solution, though much of the discussion is equally applicable to dissolved anions and complex ions. Chapter 1 presents an overview of the distribution of aqua-metal ions with regard to the Periodic Table. Chapters 2–4 deal with fundamental chemical aspects of simple ions in solution. Spectroscopic (primarily NMR) and transport methods for estimating solvation numbers, diffraction and scattering studies of obtaining ion–solvent distances, and the different thermodynamic and spectroscopic techniques for determining the strength of ion–solvent interactions are discussed. Acid–base behavior, cation–ligand stability constants, and reduction–oxidation potentials are treated in Chapters 5, 6, and 7, respectively. The next five chapters discuss basic thermodynamics and kinetic mechanisms associated with solvent exchange, complex formation, substitution at complex ions, and oxidation–reduction reactions. The final chapter summarizes past and current research in the area of ionic solutions, and suggests specific areas where additional experimental studies are needed.

The book is ideally suited for those individuals who desire only an introductory knowledge of electrolyte solutions. I would not recommend the book as an undergraduate/graduate level textbook or as a reference book to serious students/professionals seeking a thorough understanding of this topic. Too many important items such as nonaqueous solutions, thermodynamic transfer functions, effect of pH on stability constants, and equilibrium constant tabulations are either completely missing or briefly discussed in fragmentary fashion. The limited number of literature references (about 60 listed in the section entitled Further Reading) makes the book unsuitable as a reference source.

William E. Acree, Jr., *University of North Texas*

Non-Metal Rings, Cages and Clusters. By J. Derek Woolins (Imperial College, London). John Wiley & Sons: New York. 1988. viii + 124 pp. $54.95. ISBN 0-471-91592-0.

In the preface to this monograph, the author disclaims any attempt to cover comprehensively or in any great depth so diverse a field, and this I found disappointing. Clearly there are very few, if any, places where the chemistry of these systems is covered in a single volume. Indeed to undertake such a project would be a most difficult task. The present work does no more than survey the field and present a brief introduction. Except for review articles, the only other attempts to do this are: *Rings, Clusters, and Polymers of the Main Group Elements*, Cowley, A. H., Ed.; ACS Symposium Series 232 (1985) and Ken Wade's *Electron Deficient Compounds*, Appleton Century Crofts, New York (1971). Thus, a book on the subject is sorely needed. Woolins' attempt, however, falls short of adequately filling the void. Given the author's comment in the preface, perhaps I have no business in being disappointed; nevertheless, much more could have been done with the subject matter.

The book is arranged in sections based on structural similarities. The introduction presents some definitions and is quite brief. It is followed by three chapters dealing with electron-deficient species, electron-precise species, and electron-rich species, respectively. The chapter on electron-deficient species contains all the essential information that a reader unfamiliar with the subject would need, but it is arranged in such a way as to make it somewhat confusing. Electron counting rules are introduced, along with ample examples; however, the insertion of a description of the bonding of diborane(6) rather than, for example, pentaborane(9), misses an opportunity of treating cluster bonding in electron-deficient systems in contrast to bonding in electron-precise or electron-rich systems. After all, diborane(6) is not really a cluster anyway. Also, a treatment of NMR of boranes seems to be much too detailed when coverage of other areas such as the Zintl anions is so brief.

The chapter on electron-precise systems provides a nice comparison of the various allotropes of sulfur with related systems. The treatment of phosphorus systems, however, does not include any mention of the relationship between the structure of the element and the various polyphosphanes, in spite of the fact that a polyphosphane resembling the structure of Hittorf's red phosphorus appears on the cover. Also conspicuous in its absence is the growing class of polyhedral hydrocarbons, which surely belong in such a survey. The treatment of polysilane rings and clusters is also very brief. The third chapter, on electron-rich systems, suffers from the same problems as the earlier ones, but, as in the previous chapters, the author has done a good job of surveying the area.

In summary, although the book is rather superficial, the author does a good job of introducing the area to the general reader. It is well-written, and there are few mistakes. Those that I did find include the nonexistent species Bi_5^{2-} and Pb_7^{4-} (p 32). The book contains an excellent selection of references to which the reader may refer for the details.

The ultimate test for a text is whether one would adopt it for use in a course. Indeed, I am scheduled to teach a course in this area next year and I am inclined to use it. The major problem is that the cost of the book seems to be exorbitantly high; this book is priced at 44¢ per page!

Lawrence Barton, *University of Missouri—St. Louis*

Volumes of Proceedings

Petroleum Contaminated Soils. Volume 1. Remediation Techniques, Environmental Fate and Risk Assessment. Edited by Paul T. Kostecki and Edward J. Calabrese (University of Massachusetts). Lewis: Chelsea, Michigan. 1988. ix + 357 pp. $55.00. ISBN 0-87371-135-1.

The problem of contamination of soil by petroleum and its derived products has become widely recognized in the present decade and will probably be with us for some time to come. Appropriately, two National Conferences on the Environmental and Public Health Effects of Soils Contaminated with Petroleum Products have been held, the last one in 1987 at the University of Massachusetts. This volume presents the proceedings in the form of 24 papers grouped under four headings: "Defining the Problem", "Environmental Fate and Modeling", "Remedial Options", and "Risk Assessment/Risk Management". One of the more interesting titles is "Epidemiological Study to Estimate How Much Soil Children Eat". Whereas babies under nine months eat none, 3.5 to 5 year olds are estimated to eat a gram per day. As a control, a brave group of adult volunteers, "ingested capsules containing clean soil with breakfast and dinner".

Well indexed.

Chemicals in the Oil Industry. Special Publication 67. Edited by P. H. Ogden (Akzo Chemie UK Ltd). Royal Society of Chemistry: London. 1988. viii + 284 pp. $37.50. ISBN 0-85186-736-7.

In the year 1988, the University of Manchester was host to the 3rd International Symposium on the title subject. The 21 typescript papers in this soft-bound volume of the proceedings have some down-to-earth titles, such as "Drilling Fluids: A Challenge to the Chemist", and some arcane ones, such as "Downhole Scale Inhibition in the Beatrice Field". Corrosion inhibition and analytical monitoring are prominent among the subjects. Well indexed.

Polymer Association Structures. Microemulsions and Liquid Crystals. ACS Symposium Series 384. Edited by Magda A. El-Nokaly (The Procter and Gamble Company). American Chemical Society: Washington. 1989. xii + 362 pp. $79.95. ISBN 0-8412-1561-8.

The 21 typescript papers in this volume are grouped under six headings: "Water-In-Oil Microemulsions", "Middle-Phase Microemulsions", "Oil-In-Water Microemulsions", "Liquid Crystals", "Polymer–Polymer Associations", and "Polymer–Surfactant Associations". Book reviews and reports of original research are represented. An eight-page subject index is especially helpful. The origin of the papers was a symposium held in New Orleans in 1987.

Biological Monitoring for Pesticide Exposure. Measurement, Estimation, and Risk Reduction. ACS Symposium Series 382. Edited by Rhoda G. M. Wang (State of California, Department of Food and Agriculture) et al. American Chemical Society: Washington. 1989. x + 387 pp. $69.95. ISBN 0-8412-1559-6.

The New Orleans National Meeting of the American Chemical Society in 1987 was the occasion of the symposium that gave rise to the 28 typescript papers in this volume. They are grouped under four headings: "Biological Monitoring", "Percutaneous Absorption After Pesticide Exposure", "Chemical Analysis", and "Risk Assessment and Regulation". The inclusion of a 12-page subject index is most laudable.

Bioanalysis of Drugs and Metabolites, Especially Anti-Inflammatory and Cardiovascular. Methodological Surveys in Biochemistry and Analysis. Volume 18. Edited by Eric Reid (Guildford Academic Associates), J. D. Robinson (Hoechst UK), and Ian D. Wilson (ICI Pharmaceuticals). Plenum: New York and London. 1988. xiv + 413 pp. $89.50. ISBN 0-306-42996-9.

The Seventh International Bioanalytical Forum, held in 1987, devoted itself to the title subject and generated the 58 typescript papers in this volume. Notes and comments are included. Both an analyte index and a general index are provided.

Adhesives from Renewable Resources. ACS Symposium Series 385. Edited by Richard W. Hemingway, Anthony H. Conner, and Susan J. Branhan (U.S. Department of Agriculture). American Chemical Society: Washington. 1989. ix + 510 pp. $99.95. ISBN 0-8412-1562-6.

The time was when "adhesives" was to most people synonymous with "glue", and the source, dead horses, was indeed renewable. The expansion of adhesives into all sorts of technology, from medicine to heavy construction, is an important aspect of the past half-century, and not only has consumption increased vastly, but the variety of adhesives has grown. A symposium on the subject was held at the National American Chemical Society Meeting in New Orleans in 1987 and produced the 34 papers in this volume. The text is pleasingly uniform in typeface. After an

introductory review paper, the papers fall into two groups: lignins in adhesives, and tannins in adhesives. A concluding paper is devoted to opportunities for new developments. The index (15 pages) is excellent.

Green Photosynthetic Bacteria. Edited by J. M. Olson (Odense University) et al. Plenum: New York and London. 1988. x + 327 pp. $69.50. ISBN 0-306-42920-9.

This volume of typescript papers grew out of the "EMBO Workshop" on the title subject (EMBO is the European Molecular Biology Organization) held in 1987 in Denmark. The papers are grouped under eight headings: "Chlorosomes and Chlorophyll-Binding Proteins", "Energy Transfer", "Reaction Centers", "Electron Transport", "Carbon, Hydrogen, Nitrogen and Sulfur Metabolism", "Phylogeny and Taxonomy", "Physiology and Ecology", and "Genetics". There is an index of contributors and a short subject index.

Natural Products Chemistry III. Edited by Atta-ur-Rahman (University of Karachi) and Philip W. Le Quesne (Northeastern University). Springer-Verlag: New York and Berlin. 1988. vi + 374 pp. $101.50. ISBN 0-387-50227-0.

The 3rd International Symposium and Pakistan–U.S. Binational Workshop on Natural Products Chemistry, held in Karachi in 1988, was organized to "illustrate the frontiers of natural products chemistry as they stand today". There were 22 typescript papers and plenary lectures, covering synthesis, discovery, and isolation of new substances, structure elucidation by NMR and circular dichroism, metabolism, stereochemistry, prospects to industrial development, etc. The subject index is satisfyingly large.

Protein Structure and Protein Engineering. Edited by Ernst-Ludwig Winnacker (Labor für Molekularbiologie) and Robert Huber (Max-Planck-Institut für Biochemie). Springer-Verlag: New York and Berlin. 1988. vii + 131 pp. $39.00. ISBN 0-387-50394-3.

The Gesellschaft für Biologische Chemie held a colloquium in Baden in 1988 and thereby generated the 15 typescript papers that make up this volume. Several of them are concerned with calculations and modelling; others discuss important questions such as, "How Does ATP Make Work?" (W. P. Jencks) and "Is There a Code for Protein Folding?" (R. Jaenicke). There is no index.

Topics in Current Chemistry 150. Relationships and Mechanisms in the Periodic Table. Edited by Michael J. S. Dewar (University of Texas) et al. Springer-Verlag: New York and Berlin. 1989. 292 pp. $89.50. ISBN 0-387-50045-6.

The latest volume of this hard-bound serial publication contains four extensive reviews: "Are Atoms Significantly Modified by Chemical Bonding?" by C. K. Jørgensen, "Chemical Bonding Across the Periodic Table" by N. D. Epiotis, "Periodic Group Relationships in the Spectroscopy of the Carbonyls, Ketenes and Nitriles: The Effect of Substitution by Sulfur, Selenium, and Phosphorus" by D. J. Clouthier and D. C. Moule, and "Theory of Reaction Mechanisms" by P. L. Corio. Although there is no subject index, this volume contains a cumulative author index for Volumes 101–150; it gives the titles of the reviews after the senior author's name, a helpful feature.

Medical Applications of Piezoelectric Polymers. Ferroelectricity and Related Phenomena. Volume 5. Edited by Pierre M. Galletti (Brown University) et al. Gordon and Breach: New York and London. 1988. xi + 306 pp. $89.00. ISBN 2-88124-277-4.

This book is "a hardcover version of selected papers from the Pisa Symposium, together with some other associated papers". The proceedings of that symposium, held in 1984, have already been published in Volume 60 of the journal *Ferroelectrics*. The papers are grouped under the following headings: "Physical Properties of Piezoelectric and Pyroelectric Polymers", "Potential for Applications in Medical Devices", "Low-Frequency Sensors", "An Application of PVDF-Film to Medical Transducers", "Ultrasonic Transducers", "Charge Generators", and "Actuators". A 2-page subject index is included.

Biophysical Chemistry of Dioxygen Reactions in Respiration and Photosynthesis. Chemica Scripta: Volume 28A. 1988. Edited by Tore Vänngård (University of Göteborg). Cambridge: Cambridge and New York. 1988. 131 pp. $32.50. ISBN 0-521-366046.

A Noble Conference on the title subject held in 1987 was the occasion for the 20 papers in this volume. Three are general, about half come under the heading "Respiration", and the remainder under "Photosynthesis". A 5-page "Postscript" is a pleasingly written overview of the conference, but an index is not to be found.

Electrochemical Surface Science. Molecular Phenomena at Electrode Surfaces. ACS Symposium Series 378. Edited by Manuel P. Soriaga (Texas A&M University). American Chemical Society: Washington. 1988. xii + 553 pp. $94.95. ISBN 0-8412-1542-1.

An evidently busy symposium sponsored by the Division of Colloid and Surface Chemistry of the American Chemical Society, held in New Orleans in 1987, was the origin of the 36 typescript papers in this volume. A thorough subject index is provided.

Chemistry and Biotechnology of Biologically Active Natural Products. Edited by Cs. Szántay (Budapest Technical University) et al. Akadémiai Kiadó: Budapest. 1988. xi + 403 pp. $39.00. ISBN 963-05-4950-6.

In 1987, Budapest was the venue of the Fourth International Conference on the title subject. It provided the 20 typescript papers in this volume, augmented by opening remarks by Gy. Fekete, a list of contributors, and a subject index.

Redesigning the Molecules of Life. Edited by Steven A. Benner (Federal Institute of Technology Zürich). Springer-Verlag: New York and Berlin. 1988. vii + 175 pp. $32.50. ISBN 0-387-19166-6.

The five typescripts of lectures in this softbound volume document a symposium held in 1988. Two of the papers are concerned with the design and evolution of peptides and proteins, and three are concerned with enzymes. Not indexed.

The Photosynthetic Bacterial Reaction Center. Structure and Dynamics. NATO ASI Series Volume 149. Edited by Jacques Breton and Andrê Verméglio (Centre d' Études Nucléaires). Plenum: New York and London. 1988. x + 443 pp. $85.00. ISBN 0-306-42917-9.

A 1987 workshop held in southern France produced the 43 typescript papers in this volume of reports on original research. The final paper, "Light Reflections", by G. Feher, has some entertaining cartoons as well as pleasant thoughts. There is a short subject index.

Photosynthetic Light-Harvesting Systems. Organization and Function. Edited by Hugo Scheer and Siegfried Schneider (Universität München). Walter de Gruyter: Berlin and New York. 1988. xv + 631 pp. DM290.00. ISBN 0-89925-427-6.

An "international workshop" held in Germany in 1987 was the origin of the large number of typescript papers collected in this volume. They are grouped under five headings: "Organization: Biochemical Methods", "Organization: Molecular Genetics and Crystallography", "Organization: Special Spectroscopy Techniques and Models", "Function: Electronic Excitation and Energy Transfer", and "Concluding Remarks". There is a substantial index.

Chemistry of Heterocyclic Compounds. Studies in Organic Chemistry 35. Edited by J. Kováč and P. Zálupský (Slovak Technical University). Elsevier: Amsterdam and New York. 1988. xx + 600 pp. $223.75. ISBN 0-444-98917-X.

The IXth Symposium on Chemistry of Heterocyclic Compounds was held in Bratislava in 1987. It consisted of eight plenary lectures (8 to 22 pages each), four lectures given at a "Session of the Commission on Small Molecules", and a large number of short and poster communications (about 3 pages each). They are reproduced from uniform typescript. There is an index of contributors, but the lack of a subject index in such a large volume is unfortunate.

Atmospheric Ozone Research and Its Policy Implications. Studies in Environmental Science 35. Edited by T. Schneider (National Institute of Public Health, The Netherlands) et al. Elsevier: Amsterdam. 1989. xviii + 1048 pp. $192.75. ISBN 0-444-87266-3.

This volume of typescript papers is the proceedings of the 3rd U.S.–Dutch International Symposium, held in Nijmegen in May 1988. In view of the timeliness of the subject matter, the prompt appearance of this volume is commendable. The contributions are arranged under 15 headings: "Plenary Session: Welcome and Overview Papers", "Tropospheric Ozone, Oxidants and Precursors: Sources and Levels", "Effects on Vegetation and Ecosystems", "Emerging Health Study Methodologies and Issues", "Global Atmospheric Circulation and Modeling", "Mobile Source Control Technologies", "Mechanisms of Health Effects", "Chronic Ozone Exposure Health Effects", "Atmospheric Chemistry and Modelling", "Stationary Source Control Technologies", "Recent Studies Assessing the Need for an Additional Long-Term Ozone Standard", "Source Control for Stratospheric Ozone Protection", "Health Effects of Stratospheric Modification", "Risk Evaluation, Control Costs and Assessment", and "Policy Issues and Control Strategies". Virtually every aspect of the subject is touched upon, but the long-term utility of the work is limited by the spottiness of the short subject index (for example, Vitamin E is listed, but Vitamin D_3, the heading for a discussion on page 810, is not).