

example, a diamagnetic intermediate is observed<sup>13</sup> by <sup>1</sup>H-NMR spectroscopy in the reaction of Pt(acac)<sub>2</sub> with *p*-ClC<sub>6</sub>H<sub>4</sub>ICl<sub>2</sub> but has yet to be isolated as it disproportionates rapidly to Pt<sup>II</sup> and Pt<sup>IV</sup> at room temperature.

**Acknowledgment.** We thank Dr. E. Krausz for the Raman spectrum and S. B. Lee for technical assistance.

## Book Reviews\*

**Inclusion Aspects of Membrane Chemistry.** Edited by T. Osa and J. L. Atwood (Tohoku University and University of Alabama, respectively). Kluwer: The Netherlands. 1991. vi + 292 pp. \$99.00. ISBN 0-7923-1123-X.

This book has six fairly good reviews from the 1987–1988 period about various topics in membrane chemistry. They include ion extraction and transport in crown ethers, ion transport in synthetic ionophores and liquid/liquid interfaces, electrochemical and photochemical properties of bilayer lipid membranes, photocontrol of ion permeation through membranes, and liquid crystal composite membranes.

Unfortunately, this book typifies a product that has become, in my opinion, all too common in scientific publishing: a photo-offset collection of disparate articles with little or no value added by the editors. There is no foreword to the book, nor is there any indication by the editors that the articles were subject to any significant review process. The articles are printed in different type—a common attribute of the photo-offset process when the editors fail to require a consistent format. There is a 3.5 page subject index, which I found to be of little use, as well as an afterword of 57 words on the back cover, which does little to summarize the book.

I believe the articles would be of some interest to the reader who wants a survey of the subject area. Each article has a number of references dating from about 1988 and earlier, and each provides the reader with sufficient information to begin a serious study of her/his own. However, if one wanted to begin a study of any of these areas, the use of Chemical Abstracts online on CD-ROM or in plain text would probably have been a faster, and perhaps less expensive, way of obtaining the required information. The book will be less interesting to the non-serious scientist or student.

In conclusion, I must say that I was frustrated with this book. The subject of technical applications of membranes needs a good reference book suitable for the advanced graduate student and senior researcher entering the field. The reader needs to be told of the connections between the various topics in this book and other relevant areas of membrane science, surface science, and biophysics. A comprehensive foreword and decent editing job could have made this book something more than just another of the many books containing collections of good reviews.

Joel M. Schnur, *Naval Research Laboratory*

**The Chemistry and Technology of Pectin.** Edited by Reginald H. Walter (Cornell University). Academic Press: San Diego. 1991. xi + 276 pp. \$95.00. ISBN 0-12-733870-5.

Two previous summaries of that class of polymers referred to as pectins have been published: *The Pectic Substances* by Z. I. Kertesz (1951) and *Chemistry and Function of Pectins* edited by M. L. Fishman and J. J. Jen (1986). This book is presented as a textbook that "attempts to explain the scientific and technical basis of many of the practices followed in processing and preparing foods fabricated with or containing pectin". That it does, but it contains some deficiencies that will limit its usefulness as either a text or reference book.

This book is a collection of twelve chapters that address major topics related to pectin, written by key experts in the field. A disturbing aspect to this reviewer is a lack of integration between chapters, an absence of cross-referencing, and a poor index. As one example, so-called amidated pectins are mentioned in passing in a sentence in four different chapters and determination of the degree of amidation in one, but nowhere does one learn what amidated pectin is, how it is made, what are its properties, and why and how it is used.

Those wishing to learn about the structural and organic chemistry of pectin will be disappointed. The one general structure (on p 88) is incorrect, showing the glycosyl units joined by peroxy linkages and con-

**Supplementary Material Available:** For 3, Tables SI–SVII listing crystallographic data, bond lengths, bond angles, torsion angles, positional isotropic and anisotropic displacement parameters for non-hydrogen atoms, and hydrogen positional parameters (14 pages); Table SVIII listing observed and calculated structure factors for 3 (17 pages). Ordering information is given on any current masthead page.

taining mixed notations for the bonding of ring carbon atoms. The less than 1-page descriptions of the molecule in Chapters 1 and 5 leave much to be desired. The 2-page description of sugar beet pectin in Chapter 7 is a little more complete, but it still does not describe adequately the differences between native and commercial pectins in terms of the rhamnogalacturonan core, poly(galacturonic acid) stretches, and arabinan, galactan, and arabinogalactan side chains. Phrases such as the ones that indicate that 1,2-linked L-rhamnosyl residues are inserted in the galacturonan chain leave one wondering if a L-rhamnopyranosyl unit is attached to O-2 of a D-galactopyranosyluronic acid unit or if a D-galactopyranosyluronic acid unit is attached to O-2 of a L-rhamnopyranosyl unit. Reaction schemes would have been very helpful in Chapter 9, especially to indicate what is meant by bond 1, bond 2, etc. While it is common in the food industry to report the methyl ester content as "degree of methoxylation", this is incorrect chemical terminology and probably should have been pointed out. The concept of  $\beta$ -elimination seems to have been overlooked.

This book could be a helpful resource to chemists wishing to learn about the properties of pectins that make them useful in food applications, but a glossary would have been extremely helpful and the lack of introductory material, good structural chemistry, and integration of topics will restrict its usefulness.

James N. BeMiller, *Purdue University*

**Advances in Organobromine Chemistry I.** Edited by J.-R. Desmurs (Rhône-Poulenc Recherches) and B. Gérard (Potasse et Produits Chimiques). Elsevier: Amsterdam. 1991. xiv + 299 pp. \$151.50. ISBN 0-444-89274-5.

This volume contains the very diverse principal contributions to "Orgabrom '89", the first international symposium on brominated organic compounds held at Mulhouse in 1989. The editors wisely chose an organization in five sections: "Preparation of Organobrominated Compounds; Synthesis"; "Preparation of Organobrominated Compounds; Mechanisms"; "Use of Organobrominated Compounds; Synthesis"; "Use of Organobrominated Compounds; Mechanisms"; and, most important, "Economic Aspects and Applications".

This is a book about a unique industry at a time of rapid and competitively driven change. Roughly half the contributions (15 out of 27) come from academia, and so this book also bridges the interface of misunderstanding between the industrial and academic cultures.

The industrial culture emerged from geology. Three companies—the Dead Sea Bromine Group, the Ethyl Corporation, and the Great Lakes Chemical Corporation—produce 85% of the world's bromine, their relative contributions diminishing in that order. Through no coincidence, the sodium bromide concentration in the Dead Sea amounts to 12 g/L, whereas those in the underground brine reservoirs of Arkansas and Michigan amount to 3.0–3.5 and 2.0–2.5 g/L.

But it is only through chemistry that the industry can prosper. It is better to brominate exhaustively e.g. diphenyl ether and then to ship the flame-retardant decabromo derivative than it is to ship liquid bromine. It is better still to exploit the preparatively valuable combination of selectivity and moderate reactivity, both of bromine and of its derivatives, in multistep syntheses of bromine-free targets from bromine-free starting materials. A classic example in this volume comes from the Farmitalia group of A. Longo et al. in their syntheses of three steroidal aromatase inhibitors.

The debt which synthetic design owes to reaction mechanistic understanding is explicit in the organization of this volume. Less immediately obvious is the lesson that subtle experimental variables can distort the consequences of even well-known mechanisms (viscosity effects in aliphatic radical bromination by D. D. Tanner et al.; pH in phenol bromination by O. Tee). The practical importance of less-well-known mechanisms is illustrated in the B. R. Langlois review of perhalofluoro-

\*Unsigned book reviews are by the Book Review Editor.

methyl bromide nucleophilic reactivity. The classical  $S_N1$  and  $S_N2$  mechanisms are entirely replaced by  $S_{RN}1$ , (perhaps)  $S_{RN}2$ , and certainly carbene mechanisms.

More generally important, mechanistic prediction presupposes kinetic control, a point made explicit here only in B. Fuchs' review of hexabromocyclopentadiene bromination of ketones. The opposite extreme, thermodynamic control, is appropriately illustrated by an industrial group (here, the Ishihara Sangyo Kaisha group of I. Shigehara et al.) in their preparations of 3,5-dichlorobromobenzene and related aromatics.

This volume includes a table of contents, author and subject indices, and greatly superior typesetting than was found in its 1988 Elsevier predecessor: "Bromine Compounds", edited by D. Price, B. Iddon, and B. J. Wakefield, and correspondingly derived from the 1986 "First Conference on the Chemistry and Applications of Bromine and its Compounds". Still awaiting improvement is a geographically less parochial selection of contributors: of the twenty-seven, only one each come from the U.S. and Japan, none at all from Germany or Switzerland. Other shortcomings are more typical of the genre; a commingling of the scholarly review, the experimentally detailed research report, and—albeit rarely—the experimentally unsupported research claim.

M. J. Goldstein, *Bromine Compounds, Ltd., Beer Sheva*

**Chromatography, 5th edition. Fundamentals and Applications of Chromatography and Related Differential Migration Methods. Part A: Fundamentals and Techniques, Journal of Chromatography Library Volume 51A. Part B: Applications, Journal of Chromatography Library Volume 51B.** Edited by E. Heftmann (Orinda CA). Elsevier: Amsterdam and New York. 1992. Part A: xxxvi + 552 pp. \$179.50. ISBN 0-444-88236-7. Part B: xxxii + 630 pp. \$189.50. ISBN 0-444-88237-5. Parts A and B Set: \$333.50. ISBN 0-444-88404-1.

These two books are part of the *Journal of Chromatography Library Series*, and as do the other volumes of the series, they provide practical and up-to-date guides to those who practice the subject matter.

Part A is organized by chromatographic separation methods and includes a chapter on the theory of chromatography using a practical and simplified treatment of the chromatographic concepts. Each of the following separation methods is covered in a separate chapter: (1) countercurrent chromatography, (2) planar chromatography, (3) column liquid chromatography, (4) ion-exchange chromatography, (5) size-exclusion chromatography, (6) affinity chromatography, (7) supercritical-fluid chromatography, (8) gas chromatography, (9) field-flow fractionation, and (10) electrophoresis. The chapters provide a jump start to those new to the technique and helpful suggestions to the seasoned users on how to use more efficiently the separation method. They also contain up-to-date references. It is a good text book for graduate students in organic chemistry and protein chemistry. Every laboratory engaged in chromatographic separations, analytical or preparative, should have this book on their reference shelf.

Part B is organized by compound types. A chapter is devoted to the separation of each of the following types of compounds: (1) inorganic species, (2) amino acids and peptides, (3) proteins, (4) lipids, (5) carbohydrates, (6) nucleic acids (including nucleosides, nucleotides, and oligonucleotides), (7) porphyrins, (8) phenolic compounds, (9) drugs (pharmaceuticals), (10) fossil fuels, (11) synthetic polymers, (12) pesticides, (13) environmental analysis, and (14) amines from environmental sources. This book provides a useful starting point when searching for an analytical method for the compound types covered. Although it is not as generally useful as Part A, libraries serving organic and analytical chemists should carry this book.

May D. Lee, *American Cyanamid Co., Medical Research Division*

**Organic Crystal Chemistry.** Edited by J. B. Garbarczyk (Poznan Technical University) and Derry W. Jones (University of Bradford). Oxford University Press: Oxford and New York. 1991. xii + 204 pp. \$55.00. ISBN 0-19-855383-8.

This book contains the papers presented at the Seventh Symposium on Organic Crystal Chemistry held at Poznan-Rydzyna, Poland, August 14–17, 1989. After a 1-page preface by the editors, it contains 15 papers in typescript form on the title subject. There is a list of contributors and their affiliations, but there is no subject index.

**Frontiers in Bioprocessing II.** Edited by Paul Todd (National Institute of Standards and Technology), Subhas K. Sikdar (U.S. Environmental Protection Agency), and Milan Bier (University of Arizona). American Chemical Society: Washington, DC. 1992. xx + 426 pp. \$99.95. ISBN 0-8412-2181-2.

This book contains the proceedings of the symposium on Frontiers in Biochemistry II held in Boulder, CO, June 17–21, 1990. A preface by the editors is followed by an introductory chapter by Alan S. Michaels—Frontiers in Bioprocessing: An Assessment. The book is then

divided into the following sections: Part I, Protein and Enzyme Engineering; Part II, Biosensors and In Situ Measurement Systems; Part III, Cell-Culture Systems; Part IV, Bioreactor Engineering and Control; Part V, Bioseparations Scaleup; and Part VI, Emerging Technologies in Bioseparations. The articles are illustrated with many photographs and drawings. There is an extensive subject index.

**Molecular Conformation and Biological Interactions.** Edited by P. Balaram (Indian Institute of Science, Bangalore) and S. Ramaseshan (Raman Research Institute, Bangalore). Indian Academy of Sciences: Bangalore. 1992. xii + 722 pp. \$65.00. ISBN 81-85324-12-3.

This book consists of over 40 articles presented in honor of G. N. Ramachandran, a pioneer in the area of molecular biophysics and structural biology. The articles are divided into sections with the following titles: 1. Analysis and Prediction of Protein Structures; 2. Protein Structure and Function; 3. Nucleic Acids and Drug Interactions; 4. Molecular Recognition; 5. Peptide Conformation and Design; 6. Peptides as Biological Models; 7. Membrane Transport; and 8. Viruses and Cellular Metabolism. There are many photographs and drawings, some stereoscopic, of molecular models. There are indexes of subjects and contributors.

**New Developments in Selective Oxidation by Heterogeneous Catalysis. Studies in Surface Science and Catalysis. Volume 72.** Edited by P. Ruiz and B. Delmon (Université Catholique de Louvain, Belgium). Elsevier: Amsterdam, London, New York, and Tokyo. 1992. xiv + 478 pp. \$197.00. ISBN 0-444-89466-7.

This book contains the Proceedings of the Third European Workshop Meeting on the title subject held at Louvain-la-Neuve, Belgium, April 8–10, 1991. The Proceedings include the invited papers and communications, in typescript form, presented at the meeting, which was attended by over 150 researchers from 20 countries. The papers are organized under the following sections: 1. Prospectives in Selective Liquid-Phase Oxidation; 2. Other Heterogeneous Selective Oxidation Reactions; 3. Advances in  $C_1$ – $C_5$  Alkane Selective Transformation; 4. New Aspects of the Mechanism and Surface Reactivity of Selective Oxidation Catalysis; and 5. New Aspects on the Preparation of Oxide Catalysts and the Application of Characterization Techniques. There are indexes of subjects and authors.

**Computational Aspects of the Study of Biological Macromolecules by Nuclear Magnetic Resonance Spectroscopy. NATO ASI Series, Series A: Life Sciences. Volume 225.** Edited by Jeffrey C. Hoch (Rowland Institute for Science), Flemming M. Poulsen (Carlsberg Laboratory), and Christina Redfield (University of Oxford). Plenum Press: New York and London. 1991. x + 464 pp. \$115.00. ISBN 0-306-44114-4.

This book is based on the NATO Advanced Workshop on the title subject held July 3–8, 1990 at Il Ciocco, near Barga, Italy. It contains 37 papers. There is a list of the participants with their affiliations and an index at the end of the book.

**Chemically Modified Surfaces.** Edited by Horacio A. Mottola (Oklahoma State University) and James R. Steinmetz (Hüls America Inc., Bristol, PA). Elsevier: Amsterdam and New York. 1992. xiv + 400 pp. \$197.00. ISBN 0-444-89305-9.

This book contains the Proceedings of the Fourth Symposium on Chemically Modified Surfaces held at Chadds Ford, PA, July 31–August 2, 1991. The book begins with a preface by the editors, opening remarks by W. T. Collins, a chart of the organization of the symposium, a foreword by Mottola, and a plenary lecture authored by J. M. Drake, J. Klafner, and P. Levitz. The rest of the book consists of 21 papers in typescript form organized under the following headings: Characterization of Chemically Modified Surfaces; Modification of Polymer Surfaces; Chemical Modification of Silica and Related Studies; Chemical Modification of Membranes and Films; and General Topics on Modification and Characterization of Surfaces. These are followed by six abstracts of papers that were presented at the symposium but were not published in the proceedings. There is a subject index; the affiliations of the authors are given in the headings of the papers.

**Surface Science Investigations in Tribology. Experimental Approaches.** Edited by Yip-Wah Chung (Northwestern University) and A. M. Homola and G. Bryan Street (IBM Almaden Research Laboratory). American Chemical Society: Washington, DC. 1992. xvi + 254 pp. \$59.95. ISBN 0-8412-2205-3.

This book was developed from a symposium sponsored by the Division of Colloid and Surface Chemistry at the 201st National Meeting of the ACS in Atlanta, GA, April 14–19, 1991. In the Preface, tribology is defined, according to J. Halling, as "the science and technology of interacting surfaces in relative motion and of related subjects and

practices". The symposium on which this book is based was intended to encourage interdisciplinary interactions among surface chemists, materials scientists, and engineers. After a short Overview by Chung, it consists of 14 chapters in typescript form under the headings Applications of Surface Diagnostic Techniques and Lubricant-Surface Interactions. There are indexes of authors, their affiliations, and subjects.

**An Infrared Spectroscopy Atlas for the Coatings Industry. Fourth Edition. Volumes I and II.** Edited by Darlene R. Brezinski (Consolidated Research, Inc.) and prepared by James M. Julian, Chairman (DSM Desotech Inc.), Dennis G. Anderson (Witco Corp.), Alan H. Brandau (Consolidated Research, Inc.), John R. McGinn (Construction Technology Laboratories, Inc.), and Anne M. Millon (Nalco Chemical Corp.). Federation of Societies for Coatings Technology: Blue Bell, PA. 1992. Volume I, vi + 510 pp; Volume II, vi + 491 pp. \$150.00 per two-volume set for Federation members, \$200.00 for nonmembers. ISBN 0-934010-01-3 (Volume I); 0-934010-02-1 (Volume II); 0-934010-03-X (two-volume set).

Volume I contains the following chapters: I. Theory; II. Instrumentation; III. Accessories for Infrared Instrumentation; IV. Sample Preparation for Infrared Analysis; V. Qualitative Analysis; VI. Quantitative Analysis; VII. Bibliography; and VIII. Catalog of Spectra. (Volume I contains 1224 spectra, three per page.) Chapter VIII is continued in Volume II to a total of 2507 spectra. Volume II contains numerical and alphabetical indexes for both sets.

**Progress in the Chemistry of Organic Natural Products. Volume 58.** By R. D. H. Murray and J. A. Robinson. Edited by W. Herz, G. W. Kirby, W. Steglich, and Ch. Tamm. Springer-Verlag: Vienna and New York. 1991. vi + 343 pp. DM 280.00. ISBN 3-211-82265-8.

This book consists of two outstanding chapters. In the first, Prof. J. A. Robinson of the University of Zurich discusses the chemical and biochemical aspects of polyether antibiotics, a large group of structurally related polyketides mainly of bacterial origin although a small number have been isolated from marine sources. Emphasis throughout is on the biogenesis of these important natural products which can efficiently complex group I and II metal cations.

The second chapter, authored by Prof. R. D. H. Murray of the University of Glasgow, covers naturally occurring plant coumarins discovered between 1978 and 1989 and operates on the premise that the reader will have access to the 1978 review in this same series of monographs. In the earlier review, the 502 naturally occurring plant coumarins known at the time were tabulated. Interestingly enough, the present chapter, covering only a decade's effort, lists an even larger number of coumarins. Extensive tables list the new coumarins on the basis of their substitution pattern. For each coumarin, the trivial name is cited, together with the year of isolation, the structure, formula, physical constants, and plant source(s). All relevant references are also furnished.

Throughout the book, structures are drawn clearly and uniformly, and the printing is impeccable. This book extends the tradition of excellence displayed so far by this series.

Maurice Shamma, *The Pennsylvania State University*

**Chemical Chaos. Volume 24. International Series of Monographs on Chemistry.** By Stephen K. Scott (University of Leeds). Clarendon Press: Oxford. 1991. xv + 454 pp. \$110.00. ISBN 0-19-855651-9.

Somewhat over 60 years ago, chemistry began to be strongly impacted by a quantum mechanics which postulated that the accuracy with which the energy of a system could be measured might ultimately be influenced by the time available for the measurement. Chemistry is now beginning to be impacted by a new discipline which postulates that the future behavior of some systems cannot be predicted for long no matter how accurately their present states are determined.

We chemists almost instinctively assume that a macroscopic closed system will relax to a stable steady state while any infinitesimal fluctuations from that state will rapidly decay. We are startled when two infinitesimally different states of a macroscopic system diverge until their behaviors become qualitatively different.

The recognition of this sort of behavior in real systems apparently began among meteorologists in the 1960s. It is only a little over a decade since chemists began to try to distinguish the seemingly oxymoronic term "deterministic chaos" from the "random noise" which we all know we must live with.

Dr. Scott has written what I consider to be the best available book to introduce chemists to this esoteric field. I believe one could list on the fingers of one hand the number of individuals in the whole world who could combine the mathematical and chemical experience necessary to have produced this volume.

The first half-dozen chapters are basically mathematical with titles like Mappings, Flows in 2-Variable and 3-Variable Systems, Forced Systems, and Coupled Systems. Those chapters expose a reader to terms like Lyapounov exponent, strange attractor, canard, fractal object, concatenation, Devil's staircase, and Farey sequence which are certainly unfamiliar to most chemists.

The two longest chapters deal with Solution-Phase and Gas-Phase Reactions. There, most readers will probably be exposed to more than they really wanted to know about the Belousov-Zhabotinsky Reaction. However, I have been concerned for over 20 years with the experimental study of that very reaction and was delighted to see how well it was handled. A thorough treatment of gaseous combustion reactions could have been expected from somebody with considerable experience at Leeds.

The final three chapters are concerned with Heterogeneous Catalysis, Electrodeposition Reactions, and Biochemical Systems. They are not handled as completely as the simpler(?) processes in homogeneous phase, and particularly the last subject is almost certainly poised for an explosive expansion as the topics discussed in this book become enmeshed with the study of living organisms.

I recommend the delightful 3-page Epilogue as an extension of the first two paragraphs of this review. A potentially major new area of Chemistry is developing rapidly. It is early to forecast whether there will be important "practical" applications, but it is exciting to see how diverse areas of mathematics and chemistry can interact to increase our understanding of the world in which we find ourselves.

Richard M. Noyes, *University of Oregon*

**Computer-Enhanced Analytical Spectroscopy. Volume 3.** Edited by Peter C. Jurs (Pennsylvania State University). Plenum Press: New York and London. 1992. xvi + 320 pp. \$75.00. ISBN 0-306-43859-3.

This book contains the eleven keynote lectures from the symposium on the title subject held at the Snowbird Resort and Conference Center near Salt Lake City, Utah, June 6-8, 1990. There is a list of the contributors with their affiliations, a brief Preface by the editor, and a subject index.

**Bioformation of Flavours.** Edited by R. L. S. Patterson (University of Bristol), B. V. Charlwood (King's College, London), G. MacLeod (King's College, London), and A. A. Williams (Sensory Research Laboratories Ltd., Bristol). Royal Society of Chemistry: Cambridge. 1992. viii + 212 pp. £47.50. ISBN 0-85186-466-5.

This book contains the Proceedings from an international conference on the title subject organized jointly by the Food Chemistry Group of the Royal Society and the Phytochemical Society of Europe held at King's College, London, December 19-21, 1990. After an Overview by P. Schreiber, there are 12 other papers and a subject index. Affiliations of the authors are given in the headings of the papers.

**Directory of Chemistry Software 1992.** Edited by Wendy Warr, Peter Willett, and Geoff Downs. Cherwell Scientific Publishing and the American Chemical Society: Oxford and Washington, DC. 1992. 204 pp. \$34.95. ISBN 0-9518236-0-4.

This book contains an alphabetical listing of the computer software designed for use by chemists with descriptions of the programs, lists of publishers and their addresses, telephone and FAX numbers, and indexes of program functions and systems.

**Instrumentation in Analytical Chemistry, 1988-1991.** Edited by Louise Vores (Senior Editor, *Analytical Chemistry*). American Chemical Society: Washington, DC. 1992. xvi + 478 pp. \$44.95 (cloth); \$28.95 (paper). ISBN 0-84112-2202-9.

The articles in this book are drawn from articles originally published in the A pages of *Analytical Chemistry*. They are organized under the following headings: Robotics, Computers, and Laboratory Data Management; Atomic and Molecular Spectroscopy; Electroanalytical Chemistry and Chemical Sensors; Separations; Mass Spectrometry; and Surface Analysis. There are author and subject indexes; the affiliations of the authors are given in the article headings.