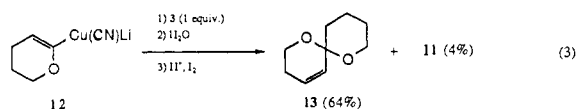


Table I. Cu(I)-Catalyzed Reaction of Organolithium Reagents with **3** and **9**

entry	α -lithio enol ether	organolithium	equiv CuCN	quench	product (% yield) ^{d-f}
1	3 ^a	<i>n</i> -BuLi	0.1	D ₂ O	X = D, R = <i>n</i> -Bu (82%)
2		<i>s</i> -BuLi	0.1	H ₂ O	X = H, R = <i>s</i> -Bu (88%)
3		<i>t</i> -BuLi	0.1	D ₂ O	X = D, R = <i>t</i> -Bu (77%)
4	9	MeLi	0.1	H ₂ O	X = H, R = Me (52%)
5		<i>n</i> -BuLi	1.0	D ₂ O	X = D, R = <i>n</i> -Bu (78%)
6		PhLi	1.0	D ₂ O	X = D, R = Ph (25%)
7		CH ₂ =C(Me)Li	0.07	H ₂ O	X = H, R = CH ₂ =C(Me) (79%)
8		PhCH ₂ MgBr	1.0	D ₂ O	X = D, R = PhCH ₂ (60%)
9		PhMe ₂ SiLi ^b	0.2	H ₂ O	X = H, R = PhMe ₂ Si (92%)
10		Me ₃ SnLi ^c	0.2	H ₂ O	X = H, R = Me ₃ Sn (78%) ^g

^a Reaction performed in one pot by adding 2,3-dihydrofuran to a mixture prepared from the alkylolithium (2.4 equiv) and CuCN. ^b Fleming, I.; Newton, T. W.; Roessler, F. *J. Chem. Soc., Perkin Trans. 1* **1981**, 2527. ^c Tamborski, C.; Ford, F. E.; Soloski, E. J. *J. Org. Chem.* **1963**, *28*, 237. ^d Yields refer to products purified by column chromatography and Kugelrohr distillation. ^e All products were characterized by ¹H NMR (270 MHz), ¹³C NMR (67.5 MHz), IR, and high resolution EIMS. ^f Isomeric purity ($\geq 97\%$) was ascertained by NMR spectroscopy and capillary GC. ^g Yield refers to product purified by column chromatography only.

coupling. In this case the lithiated enol ether **3** reacted with itself¹² to give a coupling product which cyclized to 1,7-dioxaspiro[5.4]dec-4-ene (**11**) on treatment with a trace of *p*-toluenesulfonic acid in the presence of I₂.¹³ This procedure can also be used to achieve a cross-coupling of enol ethers. Thus, treatment of the cyanocuprate **12**¹⁴ with lithiated dihydrofuran **3** gave an intermediate which underwent chemoselective cleavage of the more reactive dihydrofuran ring affording 1,7-dioxaspiro[5.5]undec-4-ene (**13**) preferentially.



In conclusion, the Cu(I)-catalyzed coupling of α -lithiated cyclic enol ethers with organolithium reagents has several commendable virtues: it is connective, stereoselective, easy to do, generally

(12) 6-Lithio-3,4-dihydro-2*H*-pyran (**9**) also couples with itself in the absence of other organolithium reagents but attempts to spirocyclize the product have failed to return a stable spiroacetal.

(13) Whitby, R.; Kocięński, P. *Tetrahedron Lett.* **1987**, *28*, 3619.

efficient, and broad in scope. It provides a welcome addition to the meager repertoire of synthetic routes to the versatile alkenyllithiums.¹⁵ The value of the method is presaged in this work by stereoselective syntheses of alkenylsilanes, alkenylstannanes, trisubstituted alkenes, and unsaturated spiroacetals.

Acknowledgment. We thank the Science and Engineering Research Council of Great Britain for a CASE Studentship and Christopher Barber for some additional experiments.

Supplementary Material Available: Experimental and spectral data (IR, ¹H NMR, and ¹³C NMR) for **6**, **8**, **11**, **13**, and other compounds (5 pages). Ordering information is given on any current masthead page.

(14) Organocuprate derivatives of enol ethers have been prepared previously: Kocięński, P.; Yeates, C. *Tetrahedron Lett.* **1983**, *24*, 3905; Kocięński, P.; Street, S. D. A.; Yeates, C.; Campbell, S. F. *J. Chem. Soc. Perkin Trans. 1* **1987**, 2189. Boeckman, R. K.; Bruza, K. J.; Baldwin, J. E.; Lever, O. W. *J. Chem. Soc., Chem. Commun.* **1975**, 519. Chavdarian, C. G.; Heathcock, C. H. *J. Am. Chem. Soc.* **1975**, *97*, 3822.

(15) Wardell, J. L. *Comp. Organometallic Chem.* **1982**, *1*, 91.

Book Reviews*

The Chemistry of Inorganic Homo- and Heterocycles, Volumes 1 and 2. Edited by Ionel Haiduc and D. B. Sowerby (Babes-Bolyai University, Cluj-Napoca, Romania, and University of Nottingham). Academic Press: Orlando, 1987. Volume 1: xxiv + 416 + XI pp. \$108.00. ISBN 0-12-655775-6. Volume 2: xxiv + 471 + XI pp. \$117.00. ISBN 0-12-655776-4. \$196.50 the set.

The chemistry of inorganic ring systems was admirably reviewed in an earlier monograph by Haiduc (Haiduc, Ionel, "The Chemistry of Inorganic Ring Systems", Wiley-Interscience: New York, 1970), and he has restarted his reviewing of the topic in 1979, as a series of annual events. A 10-year gap in comprehensive reviews of the topic exists, however. It is the purpose of the present volumes to fill that gap, and the job has been as well done as Haiduc has led us to expect from him.

The "Introduction" in Volume 1 defines inorganic rings for us ("an inorganic ring is a finite polynuclear system of atoms other than carbon, arranged to form a closed (planar or close to planar) structure, made up of identical atoms (homocycle) or different atoms (heterocycle)"—the definition is applied only to main-group elements in these volumes) and gives an account of the different nomenclature systems used to describe

these rings. What a collection of reviews then follows for almost 900 pages! A total of 25 authors, all experts in their own areas, give us chapters on B homocycles (2 pp, 8 ref); B-N heterocycles (73 pp, 414 ref); B-P and B-As heterocycles (6 pp, 22 ref); B-O heterocycles (22 pp, 420 ref); B-S and B-Se heterocycles (21 pp, 78 ref); Al-N rings and cages (21 pp, 113 ref); Si homocycles (26 pp, 183 ref); Si-N heterocycles (49 pp, 237 ref); Si-P heterocycles (9 pp, 35 ref); Si-O heterocycles (33 pp, 936 ref); Si-S heterocycles (9 pp, 56 ref); Ge homocycles (4 pp, 20 ref); Ge heterocycles (8 pp, 76 ref); cyclostannanes (4 pp, 10 ref); Sn-N and Sn-P heterocycles (17 pp, 46 ref); Sn-O, Sn-S, Sn-Se, and Sn-Te heterocycles (15 pp, 59 ref); N homocycles (4 pp, 46 ref); P homocycles (38 pp, 207 ref); P(111)-N heterocycles (29 pp, 164 ref); cyclophosphazenes (87 pp, 1057 ref); cyclophosph(V)azanes (37 pp, 149 ref); P-O heterocycles (18 pp, 129 ref); P-S and P-Se rings and cages (17 pp, 115 ref); As homocycles (9 pp, 59 ref); As-N, As-O, As-S, and As-Se heterocycles (15 pp, 75 ref); Sb and Bi homocycles and heterocycles (6 pp, 41 ref); S homocycles (26 pp, 160 ref); Se homocycles and S-Se heterocycles (21 pp, 101 ref); S-N heterocycles (65 pp, 476 ref); and S-O, Se-O, and Se-N heterocycles (6 pp, 34 ref).

The references in these articles are about 90% from the 1969-80 time span, with 1% from before that period and the remainder from 1980 on. The chapters are highly individual in their presentation of material and

* Unsigned book reviews are by the Book Review Editor.

their emphases, though I must say that theoretical studies of the compounds seemed uniformly underemphasized: we get mostly synthesis, structure, and reactivity, with some spectroscopy thrown in.

With this set, the earlier Haiduc volumes, and the reviews now appearing, the chemistry of inorganic cycles is seen in its broadest perspective, and has the legitimacy that sweep and grandeur can lend. These current volumes are an excellent starting point for a person just entering the field, or for an established worker in the area to widen his view.

Robert M. Kren, *University of Michigan—Flint*

Handbook of the Thermodynamics of Organic Compounds. By R. M. Stephenson (University of Connecticut, Storrs) and S. Malanowski (Warsaw University) (with a section by D. Ambrose, University College). Elsevier Science Publishers: Amsterdam and New York. 1978. xi + 552 pp. \$69.00. ISBN 0-444-01240-0.

This photooffset book is a collection of data on over 5000 compounds. The first table gives the melting and boiling points, molar volume (liquid), and the Antoine constants *A*, *B*, and usually *C* for organic compounds. CA registry numbers, common synonyms, and both solubility and toxicity accompany many species as well. That it is 470 pages long is hardly surprising though the absence of data for some "normal" compounds simply says that more basic research in thermochemistry is still needed. The second table, some 50 pages long, presents the corresponding data for organometallic compounds wherein the authors consider any hetero atom save N, O, P, S, and the halogens as a metal. These two tables follow the Chemical Abstracts (Hill) sort scheme. The third table, 23 pages in length, gives the critical temperature, pressure, volume and compressibility factor and acentric table and is sorted by the class of species (e.g. element, oxyhalides, alkynes, heterocyclic nitrogen compounds.) The major shortcoming of this book is the absence of reference citations to either the primary source or even to one of the secondary sources that the authors list early on. However, the utility of having all of these data consolidated in a single, affordable source makes this omission less frustrating and so I recommend this book to anyone interested in thermochemical data or its use.

Joel F. Liebman, *University of Maryland, Baltimore County Campus*

Current Topics in Membranes and Transport. Volume 27. The Role of Membranes in Cell Growth and Differentiation. Edited by L. J. Mandel (Duke University Medical Center) and D. Benos (Harvard Medical School). Academic Press: Orlando, FL. 1986. xi + 306 pp. \$89.50. ISBN 0-12-153327-1.

Although the title of this book is rather misleading (only one function of cellular membranes is treated (ion translocation), with little attention directed to other important areas such as protein kinases and membrane-cytoskeletal interactions), this is an excellent sourcebook for a comprehensive review of the currently known roles of ion translocation in cell function, with attention directed to cell growth and differentiation. The major accomplishment of this work is to bring together a rather diverse collection of approaches from biophysical, cell biological, and related areas in response to an increasing recognition of the importance of ion translocation in cellular biological phenomena. The contributions are well-written and directed in such a way so that in most (although not all) cases nonspecialists in membrane ion translocation phenomena can receive a "tutorial" in this fast-moving field.

J. R. Lancaster, Jr., *Utah State University*

Digital Simulation in Electrochemistry. By Dieter Britz (Aarhus University). Springer-Verlag: Berlin. 1988. x + 229 pp. \$41.20. ISBN 3-540-18979-3 and 0-387-18979-3.

In the second edition of this work on digital simulation methods of mass transport problems in electrochemistry, Dr. Britz states that he wants to deal with criticisms made of the first edition and to include newer developments in the area. He has been quite successful in attaining both of these goals. The new edition is highly readable and is an excellent treatment of the application of finite difference methods in electrochemistry. The author has included a clear description of the orthogonal collocation and other important techniques, which were omitted in the first edition. There is an expanded discussion on coupled homogeneous reaction simulation. The book is especially useful as an introduction to the subject and contains numerous practical applications and Fortran 77 demonstration programs. I therefore think that the book is a valuable addition to any electrochemist's library.

On the negative side, the author tends to be somewhat critical of any technique that is more complicated than finite difference methods because of the extra mathematical expertise required. The situation is perhaps not as bad as the author might suspect in light of the really excellent numerical analysis and computing texts that are now almost standard reading in most American physical-analytical research groups. For instance, the author spends a lot of time treating Runge-Kutta

integration, while ignoring the simpler and more powerful Bulirsch-Stoer method (see Press et al. "Numerical Recipes: The Art of Scientific Computing"). I also point out that there is little attention to the recent advances in obtaining analytic solutions to the partial differential equations in question; there is much elegant work going on in this area that will have a bearing on the direction simulations will take.

The value of the book, however, cannot be questioned, and it is a pleasure to recommend it.

Stanley Pons, *University of Utah*

Colloidal Systems and Interfaces. By Sydney Ross (Rensselaer Polytechnic Institute) and Ian D. Morrison (Xerox Corporation). John Wiley and Sons: New York, NY. 1988. xviii + 422 pp. \$49.95. ISBN 0-471-82848-3.

This book is an excellent, four-part introductory text and sourcebook for those who want to acquire a quick background in, or brush up on, the physical properties and behavior of colloidal dispersions and interfaces. Part I covers properties of particles and techniques for determining particle size and surface area. Part II concentrates on the properties of interfaces, with brief subsections on insoluble monolayers, surface active solutes in aqueous and non-aqueous media, and the thermodynamics of adsorption at interfaces. Part III considers attractive and repulsive interactions, colloid stability (DLVO theory), and kinetics of coagulation. Part IV applies these concepts to emulsions, foams, and suspensions. The sections on colloid rheology, interfacial tensions, Marangoni effects, and calculation of Hamaker constants are particularly good, as are Part IV and the numerous examples of practical applications used throughout the book to illustrate the concepts.

The strong feature of the book is its sourcebook character. Thus, the text is in reality a subtly integrated collection of related topics. The essential concepts, equations, and techniques are presented in a brief, clear, didactic, and largely self-contained manner. Ample references to recent monographs or other appropriate key sources are provided for those interested in more detailed treatments. A good Index and Table of Contents and cross references to related topics provide continuity and reduce redundancy. The result is a book that manages to present an enormous amount of material in a very economical and highly usable format.

Although the book is largely free of serious errors, some laxity in proofreading is evident in the final parts of the text, as well as in the equations. Thus, equation [A.18] is misprinted, several others contain obvious typesetting errors, and three of the four different definitions of the inverse Debye length (an uncharacteristic redundancy in itself) contain some sort of error.

Frank H. Quina, *Instituto de Química, Universidade de São Paulo*

Biotechnology. Volume 7a. Enzyme Technology. Edited by H.-J. Rehm and G. Reed; volume editor John F. Kennedy (The University of Birmingham). VCH Verlagsgesellschaft mbH: Weinheim and New York. 1987. XII + 761 pp. \$298.00. ISBN 3-527-25769-1 (Weinheim), 0-89573-047-2 (New York).

Enzymes provide potential solutions to many biotechnological processes. In recent years, the area of enzyme technology has grown very significantly. This book is the 7a volume of Biotechnology, a comprehensive treatise in 8 volumes. It is a well-planned, well-written, up-to-date text book written by 29 individuals from universities, institutes, and companies having expertise in their respective topics. The subject matter has been carefully organized in five sections. All these sections are justifiable. In section 1, entitled Fundamentals, there are 2 chapters—one covering the chemistry of enzymes and the other one on the biology of enzymes. Both these two chapters describe fundamental aspects of enzymes. Section 2 deals with the production of enzymes in four chapters—Production of Enzymes by Fermentation, Laboratory Techniques of Enzyme Recovery, Large Scale Industrial Techniques of Enzyme Recovery, and Genetic Engineering in Relation to Enzymes. All these chapters are significant with respect to production of enzyme and its recovery. Section 3 has three chapters on production of modified and synthetic enzymes—Enzyme Immobilization, Immobilized Cell Systems, and Synthetic Enzymes. The inclusion of the chapter on synthetic enzymes is important and timely because synthetic enzymes may offer exciting possibilities as novel non-enzymatic catalysts. Enzymes are used in a variety of applications. The next section deals with the application of enzymes. There are four chapters with one having two subchapters—Biocatalyst Reaction Engineering, Enzymes in Food and Feed Processing, Application of Free Enzymes in Pharmaceutical and Chemical Industries, Application of Immobilized Biocatalysts in Pharmaceutical and Chemical Industries, and Analytical Applications of Enzymes: Enzyme Sensors for Clinical, Process, and Environmental Analyses. Finally, the last section which is one chapter is on Safety in Enzyme Technology. Each chapter gives a comprehensive review of the

topics and subtopics. The book contains many tables and diagrams to amplify the text, a separate detailed contents at the beginning of each chapter, and a most relevant reference section at the end of each chapter. There is also a 19-page subject index at the end of the book. In conclusion, this book provides a helpful guide to broad understanding both of the basic principles of enzyme technology and of the current status of the industrial applications of enzymes. In my opinion, it is a valuable contribution for those chemists, biochemists, food scientists, biotechnologists, engineers, and other scientists in academic institutions as well as in industry involved in enzyme technology.

Badal C. Saha, Michigan Biotechnology Institute

Electron Spin Resonance. Volume 11A. Edited by M. C. R. Symons (University of Leicester). The Royal Society of Chemistry: London. 1988. ix + 199 pp. \$139.00. ISBN 0-85186-861-4.

This *Specialist Periodical Report* continues the policy, begun with Volume 10, of dividing the applications of electron-spin resonance into two sections. Volume 11A deals with applications to organic, bioorganic, and biological systems; applications to inorganic, bioinorganic, and organometallic systems will be reviewed in Volume 11B. The current volume contains reviews entitled: Organic Radicals in Solution (B. J. Tabner, 378 references); Theoretical Aspects of E.S.R. (A. Hudson, 265 references); Spin Labels and Biological Membranes (C.-S. Lai, 267 references); and Free-Radical Studies in Biology and Medicine (N. J. F. Dodd, 326 references). Except for Hudson's contribution, which covers a three-year period, these chapters review the literature from mid-1985 to mid-1987. Regrettably absent from this volume are planned reviews on Organic Radicals in Solids and E.S.R. Applications in Polymer Chemistry. Four-year reviews of these topics are promised for Volume 12A.

In addition to the four literature surveys, the volume includes an in-depth review, E.S.R. of the Conformation of 5- and 6-Membered Cyclic Nitroxide (Aminoxyl) Radicals (A. Rockenbauer, M. Györ, H. O. Hankovszky, and K. Hideg, 89 references). Rockenbauer et al. present correlations of E.S.R. data (^1H , ^{13}C , and ^{14}N hyperfine couplings, g values, and temperature coefficients) with ring conformations, going well beyond a recitation of papers to an attempt at synthesis of a comprehensive picture.

While the present book is a bit thin compared with earlier volumes in the series, it offers the specialist an invaluable survey of progress in the field and the nonspecialist a very useful entry into the literature of E.S.R. spectroscopy.

Philip H. Rieger, Brown University

Microcomputers and Laboratory Instrumentation. Second Edition. By David I. Malcolm-Lawes (King's College London). Plenum: New York and London. 1988. xi + 272 pp. \$39.50. ISBN 0-306-42903-9.

The task of producing a monograph dealing with computer interfacing presents the author with several difficult choices. If too much attention is paid to specific hardware, general applicability suffers. If the discussions are kept general, little information not available elsewhere may be presented. The rapidly changing fields of computer hardware and software produce massive quantities of new information which must be assimilated. Unfortunately, *Microcomputers and Laboratory Instrumentation* does not provide many insights into this new technology.

In the preface, the author describes the intent of the book as an "attempt to provide an introduction to (computer) communication channels...to scientists who do not specialize in electronics or computers." The monograph is organized in a logical, progressive order. Chapter 1 begins with a general discussion of the measurement process. To illustrate the diversity of hardware usable for interface projects, a dozen microcomputers are listed. Some of these (Archimedes, BBC, and Nimbus) are not well-known in this country.

Chapter 2 deals with the basics of laboratory signals. Topics covered include impedance matching and the importance of shielding. Chapters 3 and 4 illustrate the behavior of analog and digital signals. In keeping with the author's intentions, operational amplifiers, logic gates, and truth tables are located at a level appropriate to scientists with little background in electronics. Readers are introduced to the 7400 and 74LS00 families of TTL devices. The electronic bases for analog-to-digital and digital-to-analog converters are presented. Most examples in the chapter utilize 8-bit devices. Sixteen-bit converters and 32-bit computers are becoming the norm, yet only one 16-bit device (a DAC) is mentioned.

At this point, nearly 100 pages (out of roughly 250 text pages) have been devoted to a review of basic analog and digital circuits. Chapter 5, "The Modern Microcomputer", describes a typical microcomputer as having 20K of ROM and 32-640K of RAM. While any definition of "modern" is necessarily a transient one, these values are too low by a factor of 10. This chapter introduces a variety of number systems (binary, hexadecimal, and binary coded decimal) and attempts to show their

relation to the decimal system. The binary coded decimal (BCD) system is mentioned in the context of other 8-bit codes. In fact, the rationale for the BCD system is that a four-bit coding scheme (1-2-4-8, 1-2-2-4, etc.) may be used to represent one decimal digit. Thus, the fundamental basis for this system is completely overlooked. Chapter 6 deals with the IBM PC family (PC/XT/AT) but only alludes to the existence of the PS/2 line, VGA graphics, and the Micro Channel Architecture.

Chapters 7, 8, and 9 contain useful general information on three common "standard" interfaces: the IEEE488 (HP-IB or GPIB), Centronics parallel, and serial (RS232C). Connector pin-outs and functions are treated in an adequate manner. Some fundamental concepts vital to communication between computers and laboratory equipment are defined. The difference between DTE (data terminal equipment) and DCE (data communication equipment) is made clear. The need for and fabrication of null modems is discussed.

The concluding chapter (Chapter 10) describes a case study in the design and fabrication of a visible absorbance detector for a computer-controlled flow analysis. This chapter presents a structured, logical approach to interfacing. While the case study involves exclusively 8-bit components, the general principle and sequences of actions are clearly applicable to more advanced interfacing projects. At the end of this chapter, the book ends rather abruptly. A concluding chapter, summarizing and projecting concepts discussed, could have been very useful.

This text could serve as a convenient collection of materials suitable for undergraduates interested in a general discussion of electronics. Those readers seeking a thorough treatment of up-to-date interfacing devices should look elsewhere.

Albert C. Censullo, California Polytechnic State University

Kinetic Aspects of Analytical Chemistry. By H. A. Mottola (Oklahoma State University). Wiley: New York, NY. 1988. xiv + 285 pp. \$69.95. ISBN 0-471-83676-1.

Professor Mottola has done an excellent job of summarizing the impact of kinetics and kinetic methods in analytical chemistry. The book consists of eleven chapters that cover a wealth of material without excess detail. The first chapter gives an historical perspective of the role of kinetics in analytical chemistry. The next four chapters cover various aspects of catalytic methods, including both homogeneous and heterogeneous enzyme-based methods. A subsequent chapter focuses on kinetic methods based on uncatalyzed reactions. Differential reaction rate methods are also covered. In each of these chapters, the key points are emphasized, and specific recommendations for selection of the appropriate method are given, depending on the experimental conditions.

Separate chapters cover luminescence techniques and general instrumentation considerations. The focus in the instrumentation chapter, however, is more focused on earlier analog and digital approaches for kinetic-based methods, relative to the more recent developments in microcomputer applications. A thorough coverage of error analysis is given, which is especially appropriate, since kinetic methods are often accused of suffering from lower precision relative to equilibrium methods. A final chapter reminds readers of the importance of dynamics in most analytical methods, including chromatography, electrochemistry, continuous flow analyses, and atomic spectroscopy.

This book is most certainly an important book for anyone involved in research or application of kinetic methods. In addition, the book is also suitable as a source of supplemental material for a graduate analytical course. As Prof. Mottola reminds the reader, dynamics often plays a fundamental role in analytical determinations.

Sarah C. Rutan, Virginia Commonwealth University

Perturbations in the Spectra of Diatomic Molecules. By Helene Lefebvre-Brion (Université de Paris-Sud) and Robert W. Field (Massachusetts Institute of Technology). Academic Press: Orlando, Florida. 1986. 420 pp. \$80.00. ISBN 0-12-442690-5.

The subject of this book, perturbations in the spectra of diatomic molecules, is the deviation in the quantum-number variation of any observable from that predicted by a zero-order structural model based on the Born-Oppenheimer approximation. The authors intend the book to be somewhat less than a rigorous quantum mechanical treatment but more than a descriptive review of perturbation phenomena. The types of perturbations discussed include those due to interactions between different electronic states of the same or different symmetry, interactions between substates belonging to different vibrational levels of the same electronic state, predissociation, and autoionization. The study of these effects involves going beyond the Born-Oppenheimer approximation.

After defining perturbations and briefly outlining the construction of molecular structural models, the authors discuss the Born-Oppenheimer approximation and the neglected terms in the Hamiltonian which are responsible for perturbations. The authors then describe deperturbation methods, the construction of physical models to account for perturbations.

These can provide an explanation of level patterns, transition intensities, radiative lifetimes, linewidths, and systematic variations of coupling matrix elements with quantum numbers. The authors emphasize the insights into molecular structure which can be obtained from a study of perturbations. To this end, they show how measurable quantities can be related to calculable quantities, and how important information about molecular structure can be extracted from them.

This is an excellent book, which anyone wishing to learn about perturbation phenomena will find extremely valuable. The subject is treated at a level that provides an excellent and thorough introduction to the subject. The concepts are well illustrated with examples throughout, and an extensive list of references is provided for those wishing to learn about perturbations in more detail.

Mark W. Severson, *Oakland University*

Colloidal Systems and Interfaces. By S. Ross (Rensselaer Polytechnic Institute) and I. D. Morrison (Xerox Corp.). John Wiley and Sons: New York. 1988. xvii + 422 pp. \$45.95. ISBN 0-471-82848-3.

As the authors state in the preface, this book is intended as a quick source of basic knowledge in colloid and interface chemistry for industrial chemists or chemical engineers without formal training in the subject. The book is divided in four parts dealing with particulates, interfaces, stability of dispersions, and dispersed-phase systems. Most of the basic concepts in these areas are presented in a short and simple to understand fashion. The style of writing is such that the book can be used to look for a specific topic without having to read a major section, making it a useful reference for quick consultation.

The book basically accomplishes the main goal that the authors set out to accomplish. However, it could be improved in a couple of ways. As pointed out before, the book is a good reference for retrieving basic concepts in this research field, but it could be even more helpful if it had a good set of references for more in-depth discussions. The book does provide some citations of other articles and papers, but they are few and do not cover the concepts comprehensively. This is particularly true for the first part (particulates).

The study of colloids and interfaces is a mature scientific area, most basic notions are now well established, and the book does a good job at reviewing those fundamental concepts. However, this is also a growing field where new developments occur frequently. This fact is not reflected in the book. Most references cited are quite old, especially in parts I and III. Additionally, very little time is spent in describing new ways of determining surface areas and particle sizes, and there is only one page dealing with the booming field of Langmuir-Blodgett films. These are only a few examples of the things lacking in the book.

In summary, this is a useful book for researchers starting in this area and with little time to go through some form of formal training in the field. It is also good as a quick reference for basic equations and concepts, but not as a source of detailed knowledge or literature citation.

Francisco Zaera, *University of California, Riverside*

The Chemistry of the Actinide Elements. Second Edition. Edited by J. J. Katz, G. T. Seaborg, and L. R. Morss. Methuen: New York. 1987. \$350.00. Volume 1: xii + 891 pp. ISBN 0-412-10550-0. Volume 2: xii + 794 pp. ISBN 0-412-27370-5.

This is an exhaustive, updated discourse on the chemistry of Actinides. Volume 1 contains a systematic coverage of the elements Ac, Th, Pa, U, Np, and Pu, which constitutes Part 1 of the work. The characterization of each element is discussed in terms of its nuclear properties, occurrence, preparation, atomic and metallic properties, chemistry of specific compounds, and solution chemistry.

The first part of Volume 2 follows the same format as Volume 1 but is confined to the elements Am, Cm, Bk, Cf, and Es, plus a more condensed coverage of the Transactinide elements (Fm, Md, No, Lu, and 104-109). Part 2 of this volume is devoted to a discussion of the actinide elements in general, with a specific focus on electronic spectra, thermodynamic and magnetic properties, the metallic state, structural chemistry, solution kinetics, organometallic chemistry for σ - and π -bonded compounds, and some concluding remarks on the superheavy elements.

It appears that of the 1416 references in Volume 1 and the 3089 references in Volume 2 the vast majority do not extend beyond the 1970s. However, I do recall seeing at least two citations as recent as 1986. This, however, is not a major drawback to the work. There is always a problem in exhaustive review-type monographs of having a reference-citation chronology contiguous to the publication date of the book.

The major shortcoming in this reviewer's opinion is the lack of any specific coverage relating to molecular orbital calculations on some select actinide compounds. While it is true that there is not an abundance of such published data, there are several significant publications worthy of attention. In this context, it is particularly important to demonstrate the fact that relativistic effects have a non-negligible influence on the

chemical bonding, and hence the characteristic properties of compounds containing these heavy elements.

In summary, the authors are to be commended in producing the most comprehensive, updated review of actinide chemistry currently available. I can confidently say that these volumes will be a valuable addition to the library of all individuals involved in any aspect of actinide chemistry. It is also recommended just as an encyclopaedic reference source on the subject.

Edward A. Boudreaux, *University of New Orleans*

The Dynamics of Colloidal Systems. By William B. Russel. The University of Wisconsin Press: Madison. 1987. xiv + 119 pp. \$25.00. ISBN 0-299-10530-X.

This is a very nice little book on the dynamics of colloids. "Little" in the sense that it is comprised of four lectures (presented as the 1984 Hougen series at the University of Wisconsin) rather than a comprehensive monograph. And "nice" because it provides an exceptionally readable and yet state-of-the-art introduction to what is presently understood about colloid dynamics. The discussion is *qualitative* insofar as it stresses order-of-magnitude estimates of all relevant physical quantities and *conceptual* in its emphasis on the phenomenological form of all the basic equations involved.

The first lecture introduces several *model* colloids (e.g. "hard rods" and "polyballs"), outlines the various competing interparticle forces (e.g., electrostatic, dispersion, and hydrodynamic), and describes how these interactions can be directly measured. In the second lecture, the subtle distinction between equilibrium phase transitions and irreversible separations (e.g., flocculation) is discussed. Attention is focused on the consequences of de-ionizing aqueous colloidal suspensions vs adding salt or soluble (but nonadsorbing) polymer; recent statistical mechanical theories are applied in a simple but highly instructive way. The final two lectures address some fundamental problems in the *processing* of colloidal systems. The first treats "the two simplest examples of non-ideal dynamics"—sedimentation and diffusion. The relevant constitutive relations are discussed and their microstructural underpinnings presented briefly, with general reference to slip casting, filtration, and other practical processes. In the final lecture, a concise overview is given of the wide range of rheological behavior (from newtonian liquids to elastic solids) typical of colloidal systems. Again the emphasis is on "classification according to the dominant forces", on model systems, and on the direct connections between molecular interactions and macroscopic phenomena.

This is a book that I can easily imagine pulling down from the shelf from time to time, to catch and recapture overviews of various aspects of colloidal system fundamentals. For graduate students and other newcomers to the field it should serve as a highly valuable addition to their library. I know of no other monograph that bridges so effectively the gap in language and viewpoint between engineering and statistical mechanical approaches to physical problems.

William M. Gelbart, *University of California, Los Angeles*

Detection in Analytical Chemistry. Importance, Theory, and Practice. ACS Symposium Series 361. Edited by L. A. Currie. American Chemical Society: Washington, DC. 1988. viii + 335 pp. \$64.95. ISBN 0-8412-1445-X.

Volume 361 of this ACS Series results from a symposium sponsored by the Analytical Chemistry, Environmental Chemistry, and Nuclear Chemistry and Technology Divisions of the American Chemical Society during the 191st National Meeting. The book consists of 17 chapters in the general subject areas of Sociopolitical Perspectives (2 chapters), Fundamentals and Comparative Aspects of Detection (7 chapters), Detection Limits in Practice (5 chapters), and two chapters devoted to summaries of panel discussions.

Chapter one is a general introduction by the editor. While Currie presents an overview of historical, social issues of detection, a strong review of general definitions for establishing detection limits is presented. Chapters 2 and 3 are devoted to the role detection limits play of the political and regulatory decision making process.

Chapters 4 through 10 present fundamentals for establishing meaningful detection limits. A tutorial for estimating limits for environmental procedures based on variability of blank response is given as well as a scheme for establishing interlaboratory detection limits. Methods for establishing detection limits for Atomic Spectroscopy and signal-integrating methods and clinical tests are outlined. Models for estimating practical detection limits are also presented.

Chapters 11 through 15 address detection limit problems pertaining to ultrasensitive methods. Specific chapters are devoted to Ion Chromatography, analysis of *Fusarium* Trichothecenes in blood, and detection of amino acids in environmental samples. Two chapters address radiation measurement at a nuclear power facilities. While each chapter reviews a specific problem, general methods for establishing detection limits are

presented.

Overall this book should be of interest to the analytical or clinical chemist involved in method development or quality control. The book presents a range of approaches and viewpoints in establishing "valid" detection limits and stresses the importance of the overall method in determining these limits.

James K. Hardy, *The University of Akron*

High Performance Liquid Chromatography of Biopolymers and Biooligomers. Part A: Principles, Materials and Techniques. By O. Mikes (Czechoslovak Academy of Sciences). Elsevier: Amsterdam and New York. 1988. xiv + 379 pp. \$150.00. ISBN 0-444-42951-4.

This monograph is the first volume in a two-part series that deals with general chromatographic theory, principles, materials, and techniques. Part B will deal with the separation of individual compound classes and will include a bibliography and a register of chromatographed substances.

This book begins with an introductory chapter that gives a brief history of chromatography and a concise bibliography of HPLC and HPLC separations of biopolymers. Problems of classical liquid chromatography of biopolymers are also discussed. Chapter 2 discusses the terminology and theory of liquid chromatography with a short practical discussion that is thoroughly footnoted. The specific principles of biopolymer and biooligomer separation are then discussed in Chapter 3, including gel-permeation, adsorption, ion-exchange, partition, hydrophobic-interaction, reversed-phase (including ion-pair), and bioaffinity chromatographies. Chapter 4 discusses column packings for HPLC and MPLC of biopolymers and biooligomers, including fundamental support materials, covalent modification of macroporous supports, and a survey of packings for various modes of chromatography. A final section, labeled Home Made Chromatographic Packings, chiefly contains two most useful tables—one is a listing of producers or distributors for chromatographic packings and the second is a listing of laboratory made packings for the chromatographic separation of biopolymers and biooligomers.

Chapter 5 is a discussion of instrumentation used for HPLC and MPLC with a detailed discussion of each component in an HPLC, such as injection systems, solvent reservoirs, tubing, connectors, and numerous detectors including special post-column on-line detectors for enzymes and isoenzymes. The final chapter Chapter 6 discusses laboratory techniques and working methods. Among the topics discussed are selection of chromatographic mode, column-packing techniques, characterization of packed columns, solvents, separation optimization, detection methods, peak identification, trace enrichment, preparative separations and column re-equilibration, maintenance, and miscellaneous techniques.

This book should be a great asset to any interested professional's library. It is clearly written and heavily documented, giving the reader numerous valuable references on most topics. If Part B is of this quality, I believe this will become one of the standard works in the already highly competitive literature of liquid chromatography.

William K. Nonidez, *University of Alabama at Birmingham*

Comprehensive Coordination Chemistry. Volumes 1-7. The Synthesis, Reactions, Properties & Applications of Coordination Compounds. Editor-in-Chief Sir Geoffrey Wilkinson; Executive Editors Robert D. Gillard and Jon A. McCleverty. Pergamon: Oxford. 1987. 7000+ pp. \$2450.00. ISBN 0-08-026232-5.

The appearance of a major reference work in a scientific field, such as the title set, stimulates reflection over the beginnings of that field and the course of its development. The perspective on coordination chemistry offered by this work is a salient one indeed, based as it is on seven volumes averaging 1000 pages each. The appearance of such a reference work is the sign of a mature field, one in which the principles and many many practices are well known.

It is all the more remarkable that this should be the case for a field which owes so much to one towering figure, Alfred Werner, who did most of his work in the first decade of this century. To gain some appreciation and perspective on these eighty-some years of progress, I recommend historian-chemist George Kauffman's excellent introductory chapter in Volume 1. This short chapter encompasses several biographical notes about Werner and his contemporaries and also manages to summarize almost all of what was known about coordination chemistry at that time! Comparison of this review of the early work with the remainder of these reference tomes is striking confirmation of the explosion of knowledge in this field.

Overall, Volume 1, "Theory and Background", will probably not enjoy the readership which the quality of the chapters deserve. This is so because most workers are likely to get information on "Reaction Mechanisms" (M. L. Tobe) or "Ligand Field Theory" (B. N. Figgis) from monographs rather than from a reference series. This is a shame because the chapters are typically excellent. This could be a very useful source for professors to get up-to-date material for course use or to assign

for student reading. For example, the chapter on "Electron Transfer Reactions" (Tom Meyer and Henry Taube) is an authoritative overview of this important area. However, this volume is not the basis for publishing or purchasing this series. This basis is found in Volumes 2-6.

What is the main content of these volumes and how is this mountain of information organized? Obviously in coordination chemistry one might conduct a search based on either the ligand or metal. This series uses both schemes. Volume 2 is entitled simply "Ligands". The chapters are ordered conventionally by the donor atoms and also includes separate chapters for especially important families such as porphyrins. It should be noted that the editors of this series have excluded carbon as a ligand. Such compounds are covered in the complementary series, "Comprehensive Organometallic Chemistry" (1982), by the same publisher. This distinction is admittedly arbitrary, and when mixed complexes (carbon and non-carbon ligands) are considered, a 50% rule is used to parse them. Naturally this leads to some inconsistencies and overlaps, especially with a multi-author work, but for the most part it is a useful distinction.

Volumes 3, 4, and 5 running to nearly 4000 pages comprise the major and most useful section of this work. These three volumes are organized by the metal, or in some cases by family of metals in the periodic table. Each volume includes both a subject index and formula index which can greatly speed comparative searches. It is impossible for a single reviewer to competently assess the quality of so much effort by so many authors. It can be readily seen, however, that the editors have done an excellent job of obtaining reviews from authorities in the field. Almost without exception, the authors' names are those associated with major contributions to the chemistry of the metal being reviewed. Many of the chapters conclude with citation lists numbered into the thousands, suggesting that if the review itself is incomplete, the reader will certainly find adequate entry into the literature. The comprehensiveness claimed in the title of the series is clearly achieved. All metals are covered, including lanthanides, actinides, and some elements whose metallic characteristics are marginal, such as boron, phosphorus, and sulfur. These three volumes provide a very complete and useful reference work on the broad literature of coordination chemistry. This is especially the case when one needs to locate key references to older (which I define as pre-1967 citations not found in CAS-Online) literature.

Volume 6 is titled "Applications". While the quality of this volume appears comparable to the rest of the series, it does not fulfill the same functions and could have been omitted without damaging the reference value of the series. This is so because reviews of the more applied areas cannot remain current very long, and even when they are fresh they lack the depth of most monographs. For example, the chapter on "Catalytic Activation of Small Molecules" (A. Spencer) covers a field which is extremely active at the present time. I spotted no references more recent than 1983 in a list of over 600, and most were from the mid-seventies. This kind of review may be useful to students but cannot be published fast enough in a comprehensive reference work to really help the experts.

The final volume in the series is entitled simply "Indexes". It opens with a useful sixty-page compilation of the review articles published in English on coordination chemistry from 1945 to 1986. The list is cross referenced by a series of tables which include major and minor topic headings. For example Table 6, Clusters, or Table 20, Photochemistry, have subtopics, Mixed Metals and Water Splitting, respectively. Seventeen hundred reviews are cited, and this tabulation provides a very nice way to start a literature search or to see if a review in your field has escaped notice. The remainder of Volume 7 is essentially a repeat of the indexes found at the end of each previous volume. This could save a bit of time but hardly justifies the nearly six hundred additional pages. The lists have been merged but are not really cross-referenced. For that large task one needs a computer.

There is a real question whether reference series such as this one are destined for extinction. While the absolute need for reference materials is inescapable, the cost effectiveness of this form is decreasing. The list price for this series is \$2450.00 US. For this amount of money a substantial number of list-price computer searches could be conducted. They would have the disadvantage of not being edited by an expert, but they carry the advantage of being moldable to suit exactly the wishes of the searcher. For the time being, such searches still return mostly citations rather than the information itself, but that is rapidly changing. In addition, they can be updated regularly at very modest cost. Librarians are rapidly overcoming their nostalgia for hardcopy as the growing power and lower cost of computer-accessed materials become evident. It is very doubtful that this kind of series will sell, even to large libraries, ten years hence. The authors who provide such reviews (gratis) to the scientific community will find other outlets for their work, and the conventional publishers will (in my view) have priced themselves out of the process.

As we have noted, coordination chemistry is now a mature field. This comprehensive series gives an excellent review of the achievements of

nearly a century of effort. The identity of coordination chemistry as a field arose from Werner's concept of *hauptvalenz* and *nebenvalenz*. Today the valence theories scarcely need this distinction and the trends toward a fuller theory of valence and physical properties which does not use the idea of coordination are clearly in evidence. Nevertheless, in synthesis and in practical applications, the notions of coordination chemistry will remain extremely useful for a long time. For the practitioners of these arts, this reference work is a welcome and useful tool.

Paul G. Rasmussen, *The University of Michigan*

Crystal Growth Processes. By J. C. Brice. Blackie & Son: Glasgow (distributed by John Wiley & Sons: New York). 1986. x + 298 pp. \$61.95. ISBN 0470-20268-8.

This is a good review book on the subject and it is particularly suited as a text book on crystal growth. The important concepts are developed in a very logical and sequential fashion, and they are easily comprehensible. Unlike many other books on the subject, this book has a balanced mixture of theoretical concepts and their applications in practice. A beginner can learn this field rather effortlessly with the help of this book. For advanced studies one will have to consult additional books and the references provided in Brice's book will be of substantial help. The materials covered in each chapter dealing with specific techniques of crystal growth are rather limited. Perhaps it has been done on purpose in order not to confuse a beginner with a vast amount of detailed information. But each important technique of crystal growth has been covered adequately so that one can get a good concept of its limitations and usefulness. So far as its value as a text book is concerned, the materials covered in this book are just sufficient for one semester course. Unfortunately, the book does not have any problems at the end of each chapter which is typical of the text books in science and engineering. In the future, perhaps, the author can make efforts to eliminate this drawback.

R. K. Pandey, *Texas A&M University*

Isotopic Assessment of Heterogeneous Catalysis. By J. Happel (Columbia University). Academic: Orlando. 1986. xii + 196 pp. \$49.95.

This book provides a very clear and systematic account of isotopic tracing as a method for elucidating chemical reaction mechanisms in homogeneous and heterogeneous catalysis. Kinetic studies, as valuable as they are for evaluation of the global catalytic activity of industrial catalysts, often fall short of providing all the information needed to understand the reaction mechanisms. Isotopic tracer techniques offer an opportunity to get detailed mechanistic information without significantly perturbing the operating conditions of the reaction system.

The introductory chapter of the book starts with a discussion of general problems encountered in modeling of reaction systems, followed by brief overviews of experimental reactors and isotopic studies in heterogeneous catalysis. Chapter two discusses methods for selecting reasonable candidates for reaction intermediates and plausible mechanistic steps. This chapter is followed by a more detailed enumeration of reaction mechanisms based on combinatorial theory. Chapter four deals with superposition modeling of mechanisms for various reactor types and gives an overview of methods of tracer experimentation. Chapter five focuses on steady-state tracing as a special case of superposition modeling for single-path and multiple-path reactions. Then, the problem of identifiability and distinguishability of models is addressed on the basis of systems analysis. Chapter seven describes the use of transient tracing and gives general procedures for data fitting. This chapter also includes examples of transient tracer studies from the recent literature. The book concludes with a chapter on the development of rate equations. At the end of each chapter, a list of literature references is provided.

The book is a valuable addition to the library of catalysis researchers in industry and academia. The book provides a good introduction into the subject matter and offers detailed formal treatment for readers who are interested in experimental applications of tracer methods.

Johannes Schwank, *The University of Michigan*

Fibrinogen, Fibrin Stabilisation, and Fibrinolysis. Edited by J. L. Francis (University of Southampton). VCH Publishers: Weinheim and New York, 1988. 402 pp. \$169.95. ISBN 3-527-26438-8 (Weinheim) and 0-89573-547-9 (New York).

The book is another volume in the Ellis Horwood Series in Biomedicine. In compiling this book, the editor, who is the series advisor in medical laboratory sciences, sought to provide a collection of state of the art reviews on the various aspects of fibrinogen, fibrin stabilisation, and fibrinolysis that would be of benefit to both specialist and non-specialist readers. These reviews deal primarily with the terminal events in the haemostatic mechanism.

The book contains 13 chapters, dealing with fibrinogen and fibrin (174 pp), fibrin stabilisation (47 pp), fibrinolysis (148 pp), and blood coagu-

lation, fibrinolysis, and cancer (25 pp). The chapters are well written and the contributions are generally of a high standard. The contributors are all active workers in the field: several of them are leading authorities. Some of the chapters are extensive reviews of the subject matter, but other chapters are abbreviated and are not critical reviews: not all of the chapters are of the same quality. The reviews deal with publications mainly through 1986, with some 1987 references.

The fibrinogen and fibrin chapters are excellent reviews that include extensive studies on structure, molecular and genetic abnormalities, elucidation of molecular defects in congenital dysfibrinogenemias, acquired dysfibrinogenemias, and haemorrhology. The reviews on fibrin stabilisation and factor XIII deficiency, and detection and measurement of factor XIII, give the reader an excellent overview of the subject. The fibrinolytic enzyme review is extensive and well written, an excellent chapter. The review on hereditary abnormalities of the fibrinolytic system is not an extensive review of the subject; it is selective and abbreviated. The subject of laboratory investigation of fibrinolysis is well written and covers the important tests and methodologies. The chapter on recent advances in thrombolytic agents covers the subject through 1986; however, many important advances have been made throughout 1987-1988 which will have to be researched by the interested reader. The same holds true for the chapter on thrombolysis in myocardial infarction where exciting developments have taken place in 1987-1988. The chapter on blood coagulation, fibrinolysis, and cancer is an important and well written review of a new area for study in clinical medicine.

Overall, the specialized reviews with their extensive references will make this book a useful acquisition for both the basic and clinical scientists with interests in vascular diseases. This volume is an important contribution for the laboratory specialist working on the methodology required for studying patients with thromboembolic diseases, particularly the dysfibrinogenemias, the dysplasminogenemias, factor XIII deficiencies, and patients undergoing thrombolytic therapy.

Kenneth C. Robbins, *The University of Chicago*

Molecular Biology and Biotechnology. Edited by J. M. Walker and E. B. Gingold (Hatfield Polytechnic). The Royal Society of Chemistry: London. 1988. xx + 434 pp. \$69.00. ISBN 0-85186-453-8.

Twenty-six authors have contributed to the eighteen chapters that comprise this book. Two chapters are devoted to fermentation technology and genetic engineering. They are followed by detailed discussions of cloning and biotechnology in relation to bacteria, yeasts, mammalian cells, and plants. The importance of genetic engineering and biotechnology in the food, chemical, and pharmaceutical industries is presented. Examples of the application of molecular biology to medicine are given. Among these are diagnosis of genetic disorders, the molecular basis for inherited disease, DNA fingerprints, and cancer genes. Chapters devoted to biosensors, enzymes, oligonucleotides, and monoclonal antibodies complete this volume. An enormous amount of information is presented which will be of interest of biochemists, biotechnologists, and biochemical engineers. References and an index are included.

M. C. W. Smith, *Ann Arbor, Michigan*

Books on Medicinal and Biological Subjects

Alternatives to Animal Use in Research, Testing, and Education. Office of Technological Assessment. Marcel Dekker, Inc.: New York and Basel. 1988. 456 pp. \$59.75. ISBN 0-8247-7977-0.

This report is intended as a balanced examination of the needs and issues, with a description of various alternatives, such as tissue culture or computer simulation. Eight appendixes include a glossary of acronyms and terms. Indexed.

Directory of On-Going Research in Cancer Epidemiology 1987. Edited by D. M. Parkin and J. Wahrendorf. International Agency for Research on Cancer: Lyon (Distributed by Oxford University Press: Oxford and New York). 1987. xx + 685 pp. \$50.00. ISBN 92-832-1136-3.

This soft-bound volume contains a list of projects by country, with a descriptive paragraph for each project. There are indexes of investigators, terms, sites, types of study, chemicals, occupations, and countries, as well as lists of cancer registries and biological materials banks.

Peptidergic Mechanisms in the Cerebral Circulation. Edited by Lars Edvinsson (University Hospital of Lund) and James McCulloch (University of Glasgow). Ellis Horwood: Chichester. VCH: New York and Weinheim. 1987. 240 pp. \$115.95. ISBN 0-89573-576-8.

This book consists of eleven chapters, which deal with such subjects as vasodilation, neuropeptides, tachykinins, calcitonin, vasopressin, bradykinin, etc.

Tablet Machine Instrumentation in Pharmaceuticals. Principles and Practice. By Peter R. Watt (Beecham Pharmaceuticals). Ellis Horwood: Chichester. John Wiley & Sons: New York. 1988. 346 pp. \$69.95. ISBN 0-470-21088-5.

This book is concerned with monitoring of strain, temperature, weight, etc., and with data handling and interpretation in the manufacture of pharmaceutical tablets (a.k.a. pills). It includes an appendix on suppliers of materials and services.

A Laboratory Manual for Legionella. Edited by T. G. Harrison (Central Public Health Laboratory) and A. G. Taylor (Central Public Health Laboratory). John Wiley & Sons: New York. 1988. \$44.95. ISBN 0-471-91861-X.

The ten contributed chapters describe all aspects of identification by laboratory methods of the affliction known commonly as "Legionnaires' Disease".

Antennas and Reaction Centers of Photosynthetic Bacteria. Structure, Interactions, and Dynamics. Springer Series in Chemical Physics 42. Edited by M. E. Michel-Bayerle (Technische Universität München). Springer-Verlag: Berlin and New York. 1985. xi + 367 pp. \$39.00. ISBN 0-387-16154-6.

This is actually a volume of proceedings, consisting of a large number of typescript papers reporting original research. The general headings are "Antennas: Structure and Energy Transfer", "Reaction Centers: Structure and Interactions", "Electron-Transfer: Theory and Model Systems", "Reaction Centers: Structure and Dynamics", and "Model Systems on Structures of Antennas and Reaction Centers". No subject index.

Instrumental Methods for Rapid Microbiological Analysis. Edited by Wilfred H. Nelson (University of Rhode Island). VCH: New York and Weinheim. 1985. x + 219 pp. \$39.50. ISBN 0-89573-137-1.

In seven contributed chapters, the use of fluorescence, chemiluminescence, flow cytometry, Raman spectroscopy, GC and GC-MS, and electrical impedance is reviewed.

Eye, Brain and Vision. By D. H. Hubel (Harvard Medical School). W. H. Freeman: New York. 1987. 240 pp. \$32.95. ISBN 0-7167-5020-1.

This is a beautifully illustrated book, directed toward "how the brain handles visual information". The approach is essentially physiological, and the chemistry of retinal response is not covered. Nevertheless, it is potentially useful to chemists for the clear exposition it gives of the problems and complexity of the visual process.

Volumes of Proceedings

Pyrolysis Oils from Biomass. Producing, Analyzing, and Upgrading. ACS Symposium Series 376. Edited by Ed J. Soltes (Texas A&M University) and Thomas A. Milne (Solar Energy Research Institute). American Chemical Society: Washington. 1988. xii + 353 pp. \$74.95. ISBN 0-8412-1536-7.

The 27 typescript papers in this volume are from a symposium held at the 193rd ACS meeting in Denver in 1987. They are mostly reports of original research. The subject of the symposium was actually production of liquids (oils) by pyrolysis of wood, municipal wastes, and related materials and includes catalysis, characterization, and up-grading. The subject index is unusually thorough.

Chemical Structures. The International Language of Chemistry. Edited by Wendy A. Warr (ICI Pharmaceuticals). Springer-Verlag: Berlin, and New York. 1988. viii + 472 pp. \$95.80. ISBN 0-387-50143-3.

A conference on the title subject was held in the Netherlands in 1987, consisting of a keynote address (by Michael F. Lynch) and 40 lectures and poster presentations. The central interest was in processing, storage, retrieval, and use of chemical structures. The revolution brought about by personal computers and workstations is clearly presented. A large proportion of the presentations came from industries that have developed their own systems for managing the data used or produced by their research and development programs. "Structures" in this book, therefore, means description and identification of chemical compounds or parts of them, as a type of language that can be used for managing information by electronic means. Applications include matching structures to spectroscopic data, designing synthetic routes, correlating biological activity with structure, etc.

The index is commendably thorough.

Plant and Animal Cells: Process Possibilities. Edited by Colin Webb (University of Manchester) and Ferda Mavituna (University of Manchester). Ellis Horwood: John Wiley and Sons: Chichester and New York. 1987. 307 pp. \$87.95. ISBN 0-470-20853-8.

Culture of animal and plant cells for production of chemical substances is being pursued actively not only in laboratories but in pilot plants. A conference held in 1986 at the University of Manchester included 17 major papers and 9 "supplementary contributions", the texts of all of which are included in this volume. The general subdivisions are

the following: "An Overview", "Bioreaction Design", "Culture Techniques", "Product Possibilities", and "Product Recovery and Special Techniques". Well indexed.

Proteins. Structure and Function. Edited by James J. L'Italien (Molecular Genetics, Inc.). Plenum Press: New York and London. 1987. xv + 817 pp. \$115.00. ISBN 0-306-42299-9.

The typescript articles in this volume are selected proceedings of the Symposium of American Protein Chemists, held in San Diego in 1985. They are reports of original research and are grouped under the following headings: "Chromatographic Methods of Polypeptide Purification", "Electrophoretic Methods of Polypeptide Purification", "Chemical Modification of Polypeptides", "Amino Acid Analysis of Polypeptides", "Mass Spectrometry of Polypeptides", "Microsequence Analysis of Polypeptides by Edman Degradation", "Analysis of PTH Amino Acids", "Computer Analysis of Protein Sequence Data", "Miscellaneous Methods of Polypeptide Characterization", "Site-Directed Mutagenesis", "Active Site Studies", "Domain and Topographical Studies", "Characterization of Proteases", "Identification of Sites of Post-Translational Modification", and "New Sequences". The list of contributors occupies three pages, and there is a substantial subject index.

Chemistry of High-Temperature Superconductors II. ACS Symposium Series 377. Edited by David L. Nelson (Office of Naval Research) and Thomas F. George (State University of New York at Buffalo). American Chemical Society: Washington. 1988. xi + 338 pp. \$64.95. ISBN 0-8412-1541-3.

The rapid growth of research in the field of this book has been matched by the speed with which this volume has been brought to print; it is derived from a symposium that took place at the National Meeting of the American Chemical Society in Los Angeles, September 1988. It contains 24 typescript papers, most of which are reports of original research. After an overview paper come sections on theory, new materials, surfaces and interfaces, and processing. Each paper starts with an abstract. The authors are associated with industries, government laboratories, and academic institutions. The subject index is thorough.

Electrophoresis '88. Sixth Meeting of the International Electrophoresis Society 4th-7th July, 1988. Edited by Claus Schafer-Nielsen (University of Copenhagen). The Protein Laboratory (Distributed by VCH Publishing: Weinheim and New York). 1988. 502 pp. \$95.00. ISBN 0895-73862-7.

In this soft-bound volume are collected the typescripts of the large number of presentations made at the Sixth Meeting of the International Electrophoresis Society, held in Copenhagen in 1988. There were seven general topics: "Theoretical Developments", "Isoelectric Focusing", "Free-Flow Electrophoresis", "Particle/Cell Electrophoresis", "Gel- and Staining Techniques", "Automated Densitometry", and "Electrotransfer/Electrophoresis of DNA". No subject index.

Frontiers of Flavor. Developments in Food Science 17. Edited by George Charalambous. Elsevier Science Publishers: Amsterdam and New York. 1988. xvii + 820 pp. \$247.25. ISBN 0-444-42940-9.

The Fifth International Flavor Conference, held in Greece in 1987, was the origin of the large number of typescript papers in this volume. Among the interesting subjects included is a test of Wright's theory of olfaction, which is based on vibrational frequencies, by comparing deuterated compounds with those of ordinary isotopic composition. Both flour beetles and cockroaches showed behavioral differences toward stimulants and attractants that had been deuterated. Other subjects range from the poetic ("Aroma of Chinese Scented Green Tea") to the mundane ("Study of the Shelf Life of a Dry Pet Food"). The 5.5-page subject index does not include an entry for "Chernoff-faces", which are shown mysteriously at the end of the last paper.

Heterogeneous Catalysis and Fine Chemicals. Studies in Surface Science and Catalysis 41. Edited by M. Guisnet et al. (Université de Poitiers). Elsevier Science Publishers: Amsterdam and New York. 1988. xvi + 418 pp. \$173.75. ISBN 0-444-43000-8.

Nine plenary lectures and invited papers and thirty-five "research papers" make up this volume of proceedings of an international symposium held in Poitiers in 1988. The viewpoints of the papers range from fundamental to applied, and a wide variety of reaction types are considered. The subject index is barely longer than the list of contributors.

Advances in Polyolefins. The World's Most Widely Used Polymers. Edited by Raymond B. Seymour (University of Southern Mississippi) and Tai Cheng (Advanced Polymer Systems). Plenum Press: New York and London. 1987. xi + 568 pp. \$95.00. ISBN 0-306-42682-X.

This volume contains the typescripts of the papers given at the ACS International Symposium on the title subject, held in Chicago in 1985. The papers are grouped into the following categories: "Elastomers", "Stereoscopic Catalysts", "Magnesium Chloride Supported Catalysts",

"Linear Low Density Polyolefins", "Characterization of Polyolefins", and "Polypropylene Film". In the introduction, it is stated that polyolefins, "have become the most widely used polymers throughout the world." Well indexed.

Recent Advances in Thin-Layer Chromatography. Edited by F. A. A. Dallas (Glaxo Group Research Limited), H. Read (BP Research Centre), R. J. Ruane (ICI Pharmaceuticals), and I. D. Wilson (ICI Pharmaceuticals). Plenum Press: New York and London. 1988. xiii + 247 pp. \$59.50. ISBN 0-306-42934-9.

A meeting organized by the Chromatographic Society in 1987, and held in Brighton, UK, generated the typescript papers in this volume. After an introductory lecture (by I. D. Wilson), there follow groups of papers under the following headings: "Instrumentation", "Radio-Thin-Layer Chromatography: Instruments and Applications", "Sorbents and Modifiers", and "Applications". The content reflects the advances in quantitativity, sensitivity, and resolution in TLC that have come about because of instrumentation. Good indexes of both compounds and subjects are provided.

Fluid Catalytic Cracking. Role in Modern Refining. ACS Symposium Series 375. Edited by Mario L. Occelli (Unocal Corporation). American Chemical Society: Washington. 1988. xii + 353 pp. \$79.95. ISBN 0-8412-1534-0.

The 19 typescript papers in this volume are reports of original research. They include papers on zeolites, clay, various metals, and metal oxides. The index is substantial.

Molecular Structure. Chemical Reactivity and Biological Activity. Edited by J. J. Stezowski (Universität Stuttgart), Jin-Ling Huang (Fuzhou University), and Mei-Cheng Shao (Beijing University). Oxford: Oxford and New York. 1988. xxvi + 612 pp. \$75.00. ISBN 0-19-855279-3.

An international symposium on the title subject held in Beijing in 1956 produced the 59 typescript papers in this volume. They range from reports of recent research to summarizing presentations of the state of an area, such as that by Isabella Karle on peptide conformations, and historical accounts, such as that by Dorothy Hodgkin on penicillin. There is a rather short index.

Surface Characterization of Biomaterials. Progress in Biomedical Engineering. 6. Edited by B. D. Rather (University of Washington). Elsevier: Amsterdam and New York. 1988. x + 346 pp. \$121.00. ISBN 0-444-43016-4.

This collection of 21 typescript papers arose from a symposium held in Ann Arbor in 1987. Most of the papers are reports of original research, but two are reviews to give perspective, and three are "tutorial articles": "X-ray Photoelectron Spectroscopy", "The Determination of the Surface Tensions of Solid Films", and "Static Secondary Ion Mass Spectrometry". A 2-page subject index is included.

Flavors and Fragrances: A World Perspective. Developments in Food Science 18. Edited by B. M. Lawrence (R. J. Reynolds Tobacco Co.), B. D. Mookherjee (International Flavors and Fragrances), and B. J. Willis (Quest International). Elsevier: Amsterdam and New York. 1988. xiv + 1108 pp. \$302.75. ISBN 0-444-42964-6.

In 1986, the 10th International Congress of Essential Oils, Flavors and Fragrances was held in Washington. The large number of typescript papers are reports of original research and are grouped into divisions: "Agricultural/Botanical", "Analysis/Composition", and "Chemistry/Technology". Indexes of contributors, species, and subjects are included.

Adhesion International 1987. Edited by Louis H. Sharpe. Gordon and Breach: New York and Montreux. 1988. xiv + 775 pp. \$83.00. ISBN 0-667-21930-X.

This is a collection of, "more than half of the papers presented at the 10th Annual Meeting of the Adhesion Society", which was held in Williamsburg in 1987. The papers, which come from Japan, United Kingdom, Federal Republic of Germany, Israel, Canada, Australia, Switzerland, France, and the United States, were originally published in the *Journal of Adhesion*. Well indexed.

Interfacial Phenomena in Biotechnology and Materials Processing. Process Technology Proceedings. 7. Edited by Yosry A. Attia (Ohio State University), Brij M. Moudgil (University of Florida), and S. Chander (Pennsylvania State University). Elsevier: Amsterdam and New York. 1988. xii + 566 pp. \$168.50. ISBN 0-444-42980-8.

The typescript papers in this volume come from a 1987 symposium held in Boston. They are reports of original research and are organized under four headings: "Interfacial Phenomena in Biotechnology", "Interfacial Phenomena in Advanced Materials", "Interfacial Phenomena in Minerals Processing", and "Colloid Formation and Characterization". There is neither an index nor a list of contributors.

Polymers in Colloid Systems. Adsorption, Stability and Flow. Edited by Th. F. Tadros (Imperial Chemical Industries, Ltd.). Elsevier: Amsterdam and New York. 1988. x + 412 pp. \$155.25. ISBN 0-444-42983-2.

The 29 papers in this typescript volume arose from a conference held in 1987 in The Netherlands. This volume is a "special issue" of the journal *Colloids and Surfaces*, and has presumably been sent to the subscribers. It has a 3.5-page index specific to this volume.

Bromine Compounds. Chemistry and Applications. Edited by D. Price (University of Salford), B. Iddon (University of Salford), and B. J. Wakefield (University of Salford). Elsevier: Amsterdam and New York. 1988. xii + 422 pp. \$150.00. ISBN 0-444-42982-4.

The First International Conference on the subject was held at the University of Salford in 1986. This book is an expanded volume of proceedings, designed to play the role of a monograph on bromine compounds. Its 14 "chapters" consist of 5 substantial reviews and 9 shorter papers. The "Introductory Review" is no less than 120 pages long and covers chemistry, properties, and many applications. The other reviews are on brominated natural products, polybromoalkanes, brominated aromatic and heteroaromatic compounds, and bromide-chloride exchange in phase-transfer catalysis. The index is appropriately detailed.

Molecular Conformation and Dynamics of Macromolecules in Condensed Systems. Studies in Polymer Science 2. Edited by Mitsuru Nagasawa (Toyota Technological Institute). Elsevier: Amsterdam and New York. 1988. xii + 370 pp. \$144.75. ISBN 0-444-42993-X.

A group of 18 lectures given at the 1st Toyota Conference, held in Japan in 1987, were developed into the chapters in this book. They are both reviews and reports of original research and have been reproduced from camera-ready copy. Light scattering, viscoelasticity, diffusion, and phase transitions are among the subjects considered, and both theoretical and experimental approaches are included. Regrettably, there is no index.

Catalysis 1987. Studies in Surface Science and Catalysis 38. Edited by J. W. Ward (Unocal Corporation). Elsevier: Amsterdam and New York. 1988. xvi + 952 pp. \$168.50. ISBN 0-444-42955-7.

The 10th Meeting of the North American Catalysis Society, held in San Diego in 1987, generated the many reports of original research, reproduced from typescript in this volume. The papers are concerned with catalysts of all types and their characteristics, as well as with specific processes, such as oligomerization of olefines, hydrogenation of CO, oxidation of ammonia, production of maleic anhydride from butane, and hydrodesulfurization. Regrettably, there is no index.