

## Book Reviews\*

**Advances in Polymer Science. Volume 33. Electric Phenomena in Polymer Science.** Edited by H.-J. Cantow et al. (Institut für Makromolekulare Chemie der Universität, Freiburg, BRD). Springer-Verlag, Berlin and New York. 1979. 174 pp. \$47.30.

The four chapters that comprise this book can be conveniently partitioned into two independent sections: electroinitiated polymerizations, in which the products are deposited as coatings on electrodes, and physicochemical aspects of electrical phenomena in polymers.

In the first division, G. Mengoli has written a chapter titled Feasibility of Polymer Film Coating Through Electroinitiated Polymerization in Aqueous Medium. Concerned with polymerization *in situ* to form corrosion resistant coatings economically, the author has largely confined his account to systems containing large fractions of water. Electrochemical aspects of the polymerizations that are novel to most polymer chemists are emphasized, and practical considerations of film formation are addressed. While R. V. Subramanian's similar but somewhat more general review, Electroinitiated Polymerization on Electrodes, overlaps with Mengoli's chapter to some extent, it stresses polymerization, polymer structure, and polymer properties. Polymerization across carbon-nitrogen and carbon-carbon triple bonds and graft polymerization onto graphite fibers are among the more unusual and interesting reactions reported.

G. Williams in Molecular Aspects of Multiple Dielectric Relaxations in Solid Polymers has given a detailed analysis of the mechanisms of these relaxations for amorphous polymers in terms of equilibrium and dynamic auto- and cross-correlation effects as applied to specific models for polymeric molecular motion. Studies of crystalline polymers have revealed that molecular chains within crystals are surprisingly mobile. H. Block in The Nature and Applications of Electrical Phenomena in Polymers has presented a broad (296 references), fairly qualitative survey that only modestly overlaps with Williams' chapter. Other topics include dielectric properties in solution, thermally stimulated discharge of electrets as a characterization tool, piezo- and pyro-electric polymers, conducting polymers, and photoconducting polymers. This last chapter contains ample references to polymer structure and conformation. Practical applications are mentioned where appropriate.

Those who wish to broaden their knowledge of the physical aspects of electrical phenomena in polymers will find this book to be very useful. It should also be beneficial to those interested in the more specialized topic of electroinitiated polymerization on electrode surfaces. In the opinion of this reader, however, the editors of this volume of this highly regarded series have been somewhat remiss. Mengoli's chapter is deficient in usage of words, grammar, and style to the point that the meanings of some sentences are obscured. The other chapters were well written, but typographical errors are evident throughout. The form of bibliographical references is inconsistent among the chapters. If the book were reorganized so that the more general chapters preceded the specific ones, the reader would be better served. A subject index would enhance the utility of this book.

Michael H. Theil, North Carolina State University

**Coordination Chemistry of Metalloenzymes. The Role of Metals in Reaction Involving Water, Dioxygen and Related Species.** By I. Bertini, R. S. Drago, and C. Luchinat. D. Reidel Publishers, Dordrecht, Holland. 1983. xxii + 400 pp. \$56.50.

This volume is the collected lectures of the NATO Advance Study Institute held in Pisa, Italy, in the summer of 1982. The organizers chose to focus the Institute on zinc enzymes, copper oxidases, cytochromes, and cytochrome oxidase. There are 31 contributions, most of them fairly condensed summaries of the authors' recent research results. Several of them, however, are more general reviews, which serve as useful status reports on topics of wide current interest. These include the articles on zinc enzymes by I. Bertini, on carbonic anhydrase by S. Lindskog, et al., on blue copper-containing oxidases by B. Reinhammer, on activation of molecular oxygen by R. S. Drago, on peroxidase and cytochrome P-450 mechanisms by J. T. Groves and T. E. Nemo, and on cytochrome P-450 coordination chemistry by D. Mansuy. Also of considerable general interest are the articles on cytochrome oxidase by S. I. Chan et al., catechol dioxygenases by L. Que et al., and NMR studies of cytochromes by A. V. Xavier, a provocative theory of "ligand sphere transitions" in the mechanism of liver alcohol dehydrogenase by H. Dutler and A. Ambar, and a cautionary tale by S. H. Koenig and R. D. Brown III on

the complexities of water relaxation by paramagnetic ions in proteins, and the resulting dangers of using relaxation rates to count bound water molecules. The volume belongs in research libraries and makes good browsing for aficionados of the metals-in-biology field.

Thomas G. Spiro, Princeton University

**Aromatic Nitration.** By K. Schofield (University of Exeter). Cambridge University Press, London. 1980. viii + 376. \$67.50.

This book is a successor to "Nitration and Aromatic Reactivity" by J. G. Hoggett, R. B. Moodie, J. R. Penton, and K. Schofield (Cambridge University Press, 1971). The treatment is thorough and includes much from the earlier book. The coverage has been expanded by adding 130 pages and several new chapters.

Continuing chapters cover: Nitration in Inert Organic Solvents (2), in Strong Acids (3), and in Miscellaneous Systems (6); Mechanism of Nitration (7); Nitration of Bases (9); Structure and Reactivity in the Nitration of Monocyclic Compounds (12) and of Bi- and Poly-cyclic Compounds (13).

New chapters include: Nitration at the Encounter Rate (4), Heterogeneous Nitration (8), Medium and Reagent Effects on Positional Selectivity (11), Structure and Reactivity in Nitration of Heteroaromatic Compounds (14), and N-Nitration and the Nitramine Rearrangement (15), with special emphasis on *ipso*-Attack in Nitration (10).

The history of nitration is obviously slighted by the self-imposed limitation of space and emphasis on the present status. The cautious reader must be familiar with earlier monographs to derive full benefit from this treatment. Highlights of a large quantity of experimental results are summarized. The tables are extensive and can usually stand alone with adequate titles and headings. For a few, it is necessary to read the discussion to glean essential labels.

The major thrust of each part is not equally clear. The relative significance of various comments is not always evident from the context. Sometimes the best piece of evidence is identified; at other times the reader is left to wonder if there is any good evidence. Judgement has been passed on some questions which deserve further study without bias.

The author knows the subject and should prepare to provide a more comprehensive monograph at the end of this decade.

This monograph deserves to be in every science library. It should be studied by all who have a serious interest in the subject of aromatic substitution.

K. LeRoi Nelson, Brigham Young University

**Structure-Activity Relationships of Antitumor Agents. Development In Pharmacology Series. Volume 3.** Edited by D. N. Reinhoudt, T. A. Connors, H. M. Pinedo, and K. W. Van de Poll. Martinus Nijhoff Publishers, The Hague, Boston and London. 1983. VIII + 293 pp. \$47.50.

This volume represents the proceedings of a workshop on structure-activity relationships of antitumor agents held March 11-13, 1982, in the Netherlands. It covers twelve topics of several aspects of cancer research. The first topic is a review of the National Cancer Institute efforts in the selection and screening of new anticancer agents and the strategy for development of novel anticancer drugs. The subject of quantitative, structure-activity relationship of cytotoxic congeneric groups is also reviewed. Other topics discussed include alkylating prodrugs, structure-activity relationships for platinum complexes, naturally occurring quinones as bioreductive alkylating agents, doxorubicin, quinones including preclinical anthracenediones, and aziridinyloquinones. The mode of action of ellipticine, oxazaphosphorine, open triazines, and nitrosoureas is among the subjects discussed. Antitumor antibiotics, low molecular weight immunomodifiers, and their analogs are also reviewed.

This book is highly recommended to investigators in cancer chemotherapy.

Mohamed E. Nasr, Starks C.P.

**Comprehensive Treatise of Electrochemistry. Volume 6. Electrode Transport.** Edited by E. Yeager, J. O'M. Bockris, B. E. Conway, and S. Sarangapani. Plenum Press, New York. 1983. xxiii + 522 pp. \$67.50.

This volume provides the practicing electrochemist with a much needed reference to the areas of mass transport and current distribution in electrochemical systems. The treatment is largely theoretical, with only a few examples of actual systems discussed in detail, but ample and effective discussion permit ready interpretation of the theory.

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

Chapter 1, by Ibl, is entitled, *Fundamentals of Transport Phenomena in Electrolytic Systems*. The fundamental equations describing flux in terms of diffusion, migration, and convection are introduced. Sections are included on charge transport, the elimination of the migration contribution to transport, and the meaning of such terms as overpotential and mass-transfer control. Specific problems involved in treating experimental data are looked at; in particular the appropriateness of the diffusion coefficient and the problem of speciation. The chapter ends with a historical sketch of the development of transport theory. Chapter 2, by Marchias and Arvia, is an encyclopedic treatment of purely diffusional problems. After a brief repeat of the material in Chapter 1, steady-state diffusion problems are solved for planar, cylindrical, and spherical geometries under varying conditions of reversibility. Galvanostatic conditions are covered, as well as situations involving time-dependent boundary conditions such as potential sweep methods. The third chapter is concerned with convection, and is written by Ibl and Dossenbach. A clearly written introduction illustrates concentration profiles and gives a definition of the diffusion layer. The theory of convective mass transport is then presented, with emphasis on the dimensionless Sherwood, Reynolds, and Schmidt numbers. The effects of turbulence and migration are considered, followed by discussion of several specific geometries and systems of interest primarily to industrial situations. Chapter 4, by Ibl, covers current distribution, dividing the subject into primary, secondary, and tertiary distribution. The term, "throwing power", is introduced as a measure of the uniformity of current distribution, and is used repeatedly. Experimental methods for determining distribution are mentioned but not discussed. Chapter 5, by Chizmadzev and Chirkov, and Chapter 6, by Goodridge and Wright, are concerned with porous, porous flow-through, and fluidized-bed electrodes. The unique aspects of mass and charge transfer are discussed as they relate to the structural and physical properties of the electrodes. The final chapter, by Vogt, covers gas-evolving electrodes, focusing on the processes of bubble nucleation, growth, and departure. Illustrative photographs are included.

The volume is well edited, as indicated by few errors (one appears in the important general flux equation in Chapter 1) and considerable cross-referencing between chapters. The bibliography is extensive, with citations from as early as 1834 to as recent as 1980. A helpful table of notation is included in the front of the book, and several chapters have tables of auxiliary notation. The first four chapters should be of general interest to electrochemists of any perspective, while the remainder of the book would be of particular interest to persons involved in electrochemical engineering. As with the earlier volumes of this treatise, this one is intended for the serious electrochemist, for whom it should prove a valuable reference.

Royce C. Engstrom, *University of South Dakota*

**The Chemistry of Functional Groups. Supplement C: The Chemistry of Triple-bonded Functional Groups.** Edited by S. Patia and Z. Rappoport. John Wiley & Sons, New York. 1983. xiv + 1522 pp (two volumes). \$385.00 (the set).

With the near completion of the originally planned scope of this highly acclaimed series, the editors have embarked on a program of supplementary volumes, of which this is the third, to bring up to date subjects that were covered, in many cases, more than a decade ago. This approach is to be commended on economic grounds, for to rewrite the earlier volumes would be very costly, and the purchase of the rewritten volumes would be a crushing burden (and it might be impossible to recruit suitable authors).

In this 2-volume supplement, new information relating to three earlier volumes is included: *The Chemistry of the Carbon-Carbon Triple Bond*; *The Chemistry of the Cyano Group*; and *The Chemistry of Diazonium and Diazo Groups*. There are 28 chapters, written by 35 contributors, among whom many experts of world renown may be recognized. The chapters range in length from 9 to 249 pages, but the level of treatment is uniformly comprehensive and of the high quality characteristic of the series. Many of the chapters cover subjects that were not explicitly included in the original volumes; two examples are *Photoelectron Spectra of Cyano Compounds and Acidity* and *Protein Transfers of Cyanocarbon Acids*.

A point of nomenclature merits brief comment. The title of one chapter correctly uses *Arenediazonium*, whereas another used *Aryldiazonium*, an understandable, but superfluous name without IUPAC sanction. The chapter having the latter term in the title actually skips back and forth in the text, and uses each name several times on the very first page, without explanation. It would have been nice to see a more consistent choice or a justification for a lack of one. Happily, the chapter on "alkenediazonium ions" never lapses into "vinylidiazonium".

Some of the chapters have titles beginning *Recent Advances...* or *Recent Developments...* Regardless of such titles, one should realize that

the literature appears to have been covered only through 1980. Some contributors have thoughtfully stated their cut-off date; it is a pity that the editors did not insist that all do so.

This is a highly valuable work, and all libraries serving chemists on a broad front of interest will need to have it. However, the arrangement of the chapters may cause libraries serving specialized needs to hesitate, for the subjects are scattered without obvious reason. Material on cyano groups, for example, is found in Chapters 2-9, 17, 19, and 26. Suitable collecting of similar subjects together would have made it feasible to price the volumes of this supplement separately, with the probability of increased sales.

**Methods in Enzymology. Volume 87. Enzyme Kinetics and Mechanism. Part C.** Editors-in-chief: S. P. Colowick and N. O. Kaplan. Edited by D. L. Purich (University of California, Santa Barbara). Academic Press, New York. 1982. xxii + 830 pp. \$74.50.

This is the third volume in the continuing "Methods in Enzymology" series to be devoted to enzyme kinetics and mechanism. As is true for other volumes in this series, the book consists of a collection of contributions from experts in the field. The earlier volumes addressing enzyme kinetics and mechanism (Volumes 63 and 64) emphasized initial rate methods, inhibitor and substrate effects on rate, and isotopic probes of mechanism. The current volume extends the coverage substantially. Of the four sections of this book, two are devoted to new topics. The papers in the first section treat the characterization of enzyme covalent intermediates. The second section examines the determination of enzyme stereochemistry. The remaining two sections include contemporary trends in the topics covered in the earlier volumes.

This book will certainly be of interest to practicing enzymologists and biochemists. It also has much to recommend itself to chemists interested in mechanistic problems. Many of the techniques could be of general utility to chemists. Unfortunately, the organization of these volumes may not make finding such techniques easy.

Alan M. Stolzenberg, *Brandeis University*

**Patty's Industrial Hygiene and Toxicology. Third Revised Edition in Three Volumes. Volume 2C: Toxicology.** Edited by G. D. Clayton and F. E. Clayton. John Wiley & Sons, New York. 1982. xx + 1295 pp (pp 3817-5112, with cumulative index). \$100.00.

This hefty volume, at a cost of less than 8¢ per page, is well worth the price. Volume 2 actually consists of three books, each of which encompasses the toxicology of various classes of compounds. Volume 3 or the fifth book was published in 1979 and treated the theory and rationale of industrial hygiene practice, while Volume 1, published in 1978, dealt with general principles. The complete compilation provides an excellent overview and a reference source for industrial practice and occupational safety and health. It is, to use an accurate cliché, a most worthy updating of Frank Patty's original compilation of 1948.

The volume under review consists of the following ten chapters: *Glycols*; *Derivation of Glycols*; *Inorganic Compounds of Oxygen, Nitrogen, and Carbon*; *Aliphatic Nitro Compounds, Nitrates, Nitrites*; *Polymers*; *Alcohols*; *Ketones*; *Organic Phosphates*; *Cyanides and Nitriles*; *Aliphatic Carboxylic Acids*. Each chapter systematically describes the physical and chemical properties, sources, uses, and routes of industrial exposures; accepted analytical methods; physiologic responses; toxic effects of acute and chronic exposures to single and repeated doses; effects on experimental animals and humans; biochemistry; pharmacology; permissible exposure limits; and so-called "no-effect" levels and includes numerous well chosen and highly informative tables. The expressions of toxicity often include mutagenicity, carcinogenicity, and teratogenicity.

One of the best chapters is devoted to polymers and was written by Ruth Montgomery of DuPont's Haskell Laboratory. Her chapter is practically a volume all to itself, consisting of 317 pages with 971 references. It provides an enormous amount of information on polymers of nearly all types and includes data on production, analyses, flammability, and physical characteristics and valuable compilations of data—all this aside from toxicologic data not easily available in a single volume. Each type of polymer and its various physical and chemical derivatives is given a separate, systematic treatment. Interesting bits of information are strewn throughout the chapter, such as the dose-response curves in rats for combustion atmospheres of Douglas fir and the growth responses of rats fed different nylon resins.

Another excellent chapter among many others is that by Rodney R. Beard, Emeritus, Stanford University School of Medicine. It is a valuable and comprehensive mine of information. It includes especially useful and important data on the toxicologic and physiologic effects of ozone, carbon monoxide, and oxides of nitrogen. Many chemists may not be aware of the numerous sources of carbon monoxide, as, for example, the hazards arising from compressed air for respiratory devices. These include "scuba" diving equipment using reciprocating compressors from

which CO may be produced by overheating of lubricating oil, or that CO exposure occurs upon inhalation of the paint stripper methylene chloride because of its metabolism to CO.

As might be expected in such a comprehensive treatise, occasional careless or meaningless or uncritical statements are expressed. For example, without carefully designed long-term follow-up studies, assertions of an apparent lack of intoxication (acute and/or chronic not specified) of a given chemical have no substance. Mention of the degradation of a substance is sometimes given without mention of the nature of the degradation products. Sometimes "no-effect" levels of a chemical are cited uncritically and without statistically stated limits, thus rendering the validity of the stated values unreliable. One can always find "no-effect" levels with too few animals and/or a limited time of observation. Inasmuch as most permissible levels are "established" as if simultaneous exposure to other potentially toxic agents does not occur, I would have preferred to include available data on the toxicity of combinations.

I recommend that a set of these volumes be available in every chemistry department. They may answer questions or serve as a key to the literature on the actual or potential hazards of the myriad chemicals to which chemistry students and faculty are exposed so that protective or preventive measures can be initiated. Often the appropriate antidotes are cited—a good general guide to a physician who may be called upon during an emergency.

These volumes serve as excellent reference and background material for courses in toxicology, and for any professional coping with toxicologic problems.

Jack Schubert, *University of Maryland Baltimore County*

**Essential Oils Analysis by Capillary Gas Chromatography and Carbon-13 NMR Spectroscopy.** By V. Formáček (Bruker Analytische Messtechnik GmbH) and K. H. Kubeczka (Universität Würzburg). John Wiley and Sons, New York. 1982. xiii + 373 pp. \$112.00.

This collection of capillary gas chromatograms,  $^{13}\text{C}$  NMR spectra, and tables giving the composition and quantitative analysis of 50 essential oil samples from 35 types of oils is intended to serve as a guide and help to students and professionals concerned with essential oils, perfumes, and flavors. In this aim it can hardly fail, as the chromatograms and  $^{13}\text{C}$  NMR spectra are of good quality, run under well-defined conditions, and labeled with substance codes identifying a large percentage of the observed peaks. The data presented support the idea that in most cases a satisfactory quantitative analysis of a previously characterized oil could be carried out with the capillary GC.

A second purpose, stated in the introduction, is to introduce the technique of  $^{13}\text{C}$  NMR spectroscopy to the field of essential oils. While the virtues of  $^{13}\text{C}$  NMR are extolled, and rightly so, little is said regarding how the essential oils chemist inexperienced in  $^{13}\text{C}$  NMR might best apply this relatively new technique to the analysis of these complex mixtures. The procedure for qualitative analysis, based on comparison of the spectra of the pure oil components with the oil spectrum under nearly identical conditions, is outlined, and spectra of 134 pure oil components are provided for reference, but the types of problems in which  $^{13}\text{C}$  NMR offers clear advantages over other methods are only hinted at but not specified. The ability of  $^{13}\text{C}$  NMR to yield useful information from mixtures without preliminary separation is brought out, but the reader is left to determine what information might be obtained and how to make use of it, either by examining the spectra presented in this book or going to the literature. A bibliography with 14 references aids in the latter undertaking.

A descriptive account of the sources, methods of extraction, main constituents, uses, substitutes and adulterants, and commercial importance is provided for each of the essential oils.

There appears to be little doubt that the large amount of high quality data provided in this book will render it quite useful to anyone, student or professional, specializing in or frequently encountering natural products or commercial mixtures containing odor or flavor components.

James N. Shoolery, *Varian Associates*

**Organotransition Metal Chemistry. Applications to Organic Synthesis.** By S. G. Davies (University of Oxford, UK). Pergamon Press, Oxford and New York. 1982. xv + 411 pp. \$85.00.

In the past decade, the use of transition metal complexes has had an overwhelming influence on the way organic synthesis is carried out. More and more, we see pictures of classical organic reactivity change drastically upon catalytic and stoichiometric influence of a transition metal. Judging from recent events in C-H activation chemistry, we are seeing only a diffuse image of things to come. Professor Davies fills a need for the introduction to this subject; it is a concise, carefully selected, and highly visual text which will be welcomed by the student and practitioner of organic synthesis alike. I have come to praise everything about this book but the price.

After a perhaps too brief introductory chapter on bonding, electronic and stereochemical effects, a logical sequence of chapters follow: Complexation and Decomplexation Reactions, Organometallics as Protecting and Stabilizing Groups, Organometallics as Nucleophiles, Coupling and Cyclization Reactions, Isomerization Reactions, Oxidation and Reduction, and Carbonylation and Related Reactions.

Each chapter clearly defines what can and what cannot be done with a given method and gives useful experimental advice. Methods are beautifully exemplified by clear structural equations and described by a minimum of words. The judicious choice of examples from the literature, no easy undertaking, is highly commendable as is the quick access to specific literature citations. Applications range from catalytic one-carbon additions to alkaloid synthesis. The more significant transition metal mediated reactions are given more extensive coverage. Regio- and stereochemical controls are appropriately highlighted and mechanistic discussion, although kept to a minimum, is abundantly referenced.

A comparison with Collman-Hegeudus' "Principles and Applications of Organotransition Metal Chemistry" is inevitable. This volume (twice the size of Davies' book) is a more comprehensive, in-depth treatment of the subject with greater emphasis on bonding, structure, and mechanism. There are differences in the extent of coverage and organization: for example, in Davies' book, diene- $\text{Fe}(\text{CO})_3$  complexes receive thorough coverage with emphasis on diverse synthetic applications, whereas they rate only 5 pages in Collman-Hegeudus. On the other hand, the Fischer-Tropsch process and organocopper reagents are excluded in Davies whereas these subjects receive hefty sections in Collman-Hegeudus. The volumes are complementary: the visual-retrieval-prone synthetic chemist will be partial to Davies' book. It is a book for browsing, application, and overview. Those requiring in-depth mechanistic and structural understanding will turn to the Collman-Hegeudus treatise. May both volumes find places on the shelves of synthetic practitioners!...which brings me back to the price.

Victor Snieckus, *University of Waterloo*

**Developments in Polymer Degradation. Volume 4.** Edited by N. Grassie (The University of Glasgow). Applied Science Publishers LTD., London. 1982. x + 300 pp. \$71.75.

Volume 4 of this continuing series consists of 8 chapters, focussing on four general subject areas: Thermal Degradation (3 chapters), Photochemical degradation and Stabilization (3 chapters), Fire Retardance (1 chapter), and Biodegradation (1 chapter).

Chapter 1, authored by Professors Kryszewski and Jachowicz of the Polish Academy of Sciences, deals with various poly(phenylene oxides) and their thermal degradation kinetics, mechanisms, and the degradation products formed. The authors present a comprehensive review of the field as well as some of their recent results. Chapter 2, authored by Morton Golub of the Ames Research Center, presents the mechanism of the thermal rearrangements of a number of unsaturated hydrocarbon polymers under both pyrolytic and nonpyrolytic conditions. The emphasis of this chapter is primarily on the work of the author in the area of unsaturated rubbers. In Chapter 3, Professor Vymazal et al., from the Prague Institute of Chemical Technology, discuss the synergistic effects of cadmium and barium stearates on the thermal stabilization of PVC in air.

Photodegradation and Stabilization is treated in Chapters 4, 5, and 6. In Chapter 4 Professors Hrdlovič and Lukáč of the Slovak Academy of Sciences present a highly detailed discussion of the photochemistry of polymers containing carbonyl groups as pendant group chromophores. Chapter 5, authored by Professor Weir of Lakehead University, Canada, discusses the photolysis of polystyrene and ring-substituted polystyrenes in the presence and absence of oxygen. The effect of the wavelength of the incident radiation on the photooxidative degradation is discussed in detail. The stabilization of polypropylene against photooxidation by hindered amines is discussed by Daryl Hodgeman of the Australian Department of Defence in Chapter 6. Dr. Hodgeman presents a brief review of the mechanism of the photooxidation and stabilization of polypropylene which is followed by a discussion of the mechanism of stabilization of this polymer by a specific class of commercial hindered-amine light stabilizers.

In Chapter 7, the topic of Fire Retardancy is addressed by Professors Katsuura and Inagaki of Shizuoka University, Japan. They present the results of their work on the effect of phosphorus compounds on the thermal degradation of cellulose fiber. They relate the thermal degradation measurements to fire retardancy evaluations, including micro-burner flame tests and LOI (Limiting Oxygen Index).

The last chapter addresses the design of biodegradable polymers. After a short review of the synthesis of polymers with biodegradable linkages and their behavior both in vivo and in the environment, the authors, Professor Gilbert and Dean Stannett of North Carolina State University and Drs. Pitt and Schindler of Research Triangle Institute,

proceed to discuss these two approaches. The first describes the *in vivo* biodegradation of a series of polyesters. These materials are of interest for subdermal drug delivery. The second approach describes the synthesis and *in vitro* biodegradation of block and graft copolymers of cellulose and the block copolymers of amylose.

The individual chapters of this volume are only related to each other in that they all fall under the field of polymer degradation. This volume will be of interest to those people working in the area of polymer degradation and will be of most value to those chemists with a specific interest in one or more of the topics discussed. It is only the chapter on biodegradation that may be of wide general interest. Considering the above and the very high price, I believe that this volume will only be found in the more affluent libraries.

Stanley C. Israel, *University of Lowell*

**Enzyme Catalysis and Regulation.** By Gordon G. Hammes (Cornell University). Academic Press, New York. 1982. x + 263 pp. \$34.50.

This is an extremely well written and handy guide to the basics of enzyme kinetics that has been prepared by a major contributor to the field. The book maintains a balance between mathematical derivations necessary for the basic understanding of enzyme kinetics and a descriptive handling of peripheral areas. While no single text can cover an area as broad as this in detail, this book is an excellent starting place for those interested in beginning to work in enzymology.

The book is organized such that an introduction to protein and enzyme structure is included prior to the discussion of kinetic methods. This introductory material is especially useful in its description of the use of NMR in enzyme analysis. One of the most applicable areas of NMR to enzymology is in the analysis of the enzyme-substrate complex. Knowledge of the geometry and configuration of this complex can yield major insight into the mechanism of enzymatic reactions. However, the experimental problems involved in obtaining this information are considerable. The chapter on Probes of Enzyme Structure provides one of the best brief overviews of the available methods. It provides the reader a perspective of the more common NMR and EPR techniques, as well as the possible use of each. While not enough detail is provided to make anyone an expert in a particular area, the book will be outstanding in helping to answer the often posed question "What techniques are relevant to solving this particular problem?" The presentation of Case Studies along with pertinent primary literature makes this aspect of the book especially useful.

Since this is the Student Edition, the author has included a set of problems that can be solved after reading the relevant text. Most of the problems are very good representations of the type of work that is done in dealing with real enzymes. Overall, the problems are thought provoking, and solvable with appropriate effort. It might be helpful if answers to some problems were provided since many are multifaceted calculations.

Overall, this is a well-written, timely text that will find use among students of enzymology. It is also a good reference for those wishing to gain a perspective on which techniques are available for solving particular problems in enzyme catalysis.

Sheldon M. Schuster, *University of Nebraska—Lincoln*

**Comprehensive Analytical Chemistry. Volume XII. Thermal Analysis. Part B. Biochemical and Clinical Application of Thermometric and Thermal Analysis.** Edited by Neil D. Jespersen (St. John's University). Elsevier Scientific Publishing Company, Amsterdam and New York. 1982. xv + 254 pp. \$69.75.

This is the most up-to-date review of the use of thermochemical methods of analysis, including thermometric titrations, direct injection enthalpimetry, flow enthalpimetry, thermistor enzyme probes, and differential scanning calorimetry, of which the reviewer is aware. Despite the title, many of the authors review in detail recent advances in methodology, instrumentation, and data handling in the area of solution phase calorimetry. Thus, this book is a very useful reference for those using the above cited techniques whether or not they are applied to biological problems. The chapters by Eatough, Izatt, and Christensen on thermometric titration and flow calorimetry and by Schifreen on flow enthalpimetry are particularly strong in terms of pointing out the fundamental instrumental aspects of the techniques.

The scope of the book underlines the principal virtue of thermochemical methodologies, i.e., their universality, thus these techniques have been applied, for example, to organic and inorganic titrimetry and complex formation studies, enzyme kinetics and the measurement of rates and Michaelis-Menten constants, the binding of ions to proteins, and the

study of vesicles and biological membranes. All of these are documented with recent studies from the literature.

The book will primarily appeal to analytical chemists but also to biological chemists interested in the use of thermochemical methods. The editor assembled a group of knowledgeable experts in each of the various methods described in the book. Thus, the list of references is really quite recent in comparison to other reviews of this field.

Peter W. Carr, *University of Minnesota*

#### Books on Allied Subjects of Interest to Chemists

**What's Wrong With Our Technological Society, And How To Fix It.** By Simon Ramo. McGraw-Hill Book Co., New York. 1983. 281 pp. \$19.95.

A wide-ranging book dealing creatively, and occasionally controversially, with the problems besetting technology and society, including nuclear war, information technology, national security, activity in space, regulation vs. free enterprise, etc.

**The Individual's Guide to Grants.** By Judith B. Margolin. Plenum Press, New York and London. 1983. xvii + 295 pp. \$15.95.

Written primarily to help the individual who is not affiliated with an institution and who wishes to obtain a personal grant to pursue invention, a social program, an artistic endeavor, etc. Includes many useful facts about specific funders.

**Matrix Algebra Useful for Statistics.** By Shayle R. Searle. John Wiley and Sons, New York. 1982. xxi + 438 pp. \$29.95.

An introduction to a subject often needed by chemists, and so clearly written that even an organic chemist can read it with pleasure and instruction.

**Pioneer Plastic: The Making and Selling of Celluloid.** By Robert Friedel. University of Wisconsin Press, Madison. 1983. xix + 153 pp. \$19.95.

A history of celluloid from its discovery in 1869 by a printer in Albany to the virtual demise of the industry following World War II!

**Tuning and Control Loop Performance.** By Gregory K. McMillan. Instrument Society of America, Research Triangle Park, NC. 1983. 274 pp. \$35.95.

Addressed to control engineers; provides "simplified algebraic equations that illustrate basic rules of thumb".

**Simplified Digital Automation with Microprocessors.** By James T. Arnold. Academic Press, New York. 1979. 267 pp. \$22.50.

Deals with the application of computer technology to automated industrial processes, chemical and otherwise.

**Plasma Physics for Thermonuclear Fusion Reactors.** Edited by G. Casini. Harwood Academic Publishers, New York. 1982. 491 pp. \$75.00.

Contains the texts of 12 lectures for an introductory course given by the Joint Research Centre of the Commission of the European Communities in 1979-1980.

**Abstracting and Indexing Services in Perspective: Miles Conrad Memorial Lectures 1969-1983.** Edited by M. L. Neufeld, M. Cornog, and I. L. Sperr. Information Resources Press, Arlington, VA. 1983. xi + 300 pp. \$27.50.

Treats the subject of information transfer in general, from traditional means to microprocessors. Contains the texts of 15 Miles Conrad Memorial Lectures, plus a number of shorter contributions. One of the Lectures is by Russell J. Rowlett, Jr., of Chemical Abstracts Service.

**Environmental Law of Non-Lawyers.** By David B. Firestone and Frank C. Reed. Ann Arbor Science Publishers, Ann Arbor, MI. 1983. xiii + 244 pp. \$27.50.

Covers national environmental policy, pollution, land use, solid waste and resource recovery, pesticides, energy, population, and international environmental law in an easily readable way with examples. Contains useful appendices of governmental documents.

**Multivariate Data Analysis in Industrial Practice.** By Paul J. Lewi. John Wiley and Sons, New York. 1982. xi + 244 pp. \$31.95.

This book is written from the point of view of the pharmaceutical industry, and "deals with tables of numbers and how to make visible that information that is contained", but it is a highly applicable treatment of the subject.