

Book Reviews*

Developments in Polymer Characterization. Volume 4. Edited by J. V. Dawkins, Loughborough University, Applied Science Publishers, London & New York. 1983. x + 269 pp. \$55.50. **Developments in Polymer Stabilization. Volume 6.** Edited by F. Scott, University of Aston in Birmingham, Applied Science Publishers, London & New York. 1983. x + 342 pp. \$74.00.

Applied Science Publishers can be credited with establishing some of the best special topic review collections available in polymer chemistry today. The two most recent in the characterization and stabilization series confirm this reputation.

The respective six and seven chapters of each book contain two basic parts. First is a comprehensive theoretical background section combined with a general discussion of the subject. Second is a survey (but not a comprehensive review) of recent research developments which illustrate and support the discussion section. The coverage of each topic is in-depth and excellent, usually supplying the reader with all necessary information to develop a fundamental understanding of the area. For example, the polymer stabilization chapters approach their individual topics from a mechanistic point of view which is extended into phenomenological discussion.

The characterization volume has chapters dealing with long-chain branching in polymers; thermal analysis studies of polymer blends; FT-IR of synthetic polymers; two chapters dealing with studies of molecular motion by neutron scattering and ultrasound; and a mostly theoretical chapter dealing with polymer orientation phenomena. The stabilization book has three chapters dealing with the mechanism and prevention of autoxidation in polymers; one describing photostabilizers for polypropylene; a very detailed and extensive chapter describing degradation and stabilization of PVC; and two final chapters dealing with polymer stabilization in ozone and at high temperatures, respectively.

The only two criticisms I would have of these books are that the most recent references in general are 1980 and the indices are very short. The former is understandable, however, in view of the care and completeness of the individual chapters, and long indices are not as necessary with such concise subject coverage as they would be in a more general reference work. Overall, I highly recommend purchase of these books for general reference for anyone working with polymers. They should definitely be included in academic and corporate libraries and in personal libraries of anyone concerned with these general subject areas.

Lon J. Mathias, *University of Southern Mississippi*

Hazardous Chemicals: A Manual for Schools and Colleges. Scottish Schools Science Equipment Research Centre. Oliver and Boyd, Edinburgh. 1979. xiv + 226 pp. \$12.95.

This is a manual prepared for instructors at the secondary and college level, designed to facilitate the safe use of hazardous chemicals commonly encountered in teaching laboratories. The book begins with an introduction giving the definition of abbreviations and conventions and a brief discussion of general safety practices. This is followed by an index of alternative chemical names. The bulk of the work is an alphabetical compilation of entries describing the safe handling of specific chemicals. Although the selection of chemicals is extremely limited (slightly over 200), the entries have been chosen to include chemicals most likely to be used in introductory chemical curricula.

The format for these entries is sensible and easy to read. Each page is devoted to a single chemical, whose name is given in boldface at the top of the page. Alternative names, a structural formula, and a brief physical description are followed by a compact commentary which is conveniently divided into seven headings: Hazards, Incompatibility, Handling, Storage, Disposal, Spillage, and First Aid. The inclusion of the last category is particularly welcome since such information is often located in different sources from information in the other categories. Readers are encouraged to add their own notes under a final heading, Local Conditions, for which ample space is provided. Some of this space might have been better used by inclusion of another heading, References, which would have provided citations to more extensive commentaries on each chemical. The attractive format and the highly condensed, imperative prose make what information is included readily accessible.

The book has several minor deficiencies. It is not paginated, which is something of a nuisance when trying to locate previously consulted entries. The loose-leaf binding is meant to encourage readers to insert additional pages according to their individual needs, but the requirement

for special paper is certain to defeat this good intention. The most annoying problem is the almost perverse usage of systematic nomenclature rather than common names. Who, especially in an emergency, would look for acetaldehyde under the entry "ethanal" or for cyclohexene under "1,2,3,4-tetrahydrobenzene"? Fortunately, the small number of entries the book contains and the list of alternative names make it possible to quickly determine whether a given chemical is treated in this manual and, if so, where.

Despite these problems, "Hazardous Chemicals" is a useful, though limited reference for storeroom personnel, technicians, and beginning graduate students as well as for its intended audience of teachers supervising the use of chemicals in teaching laboratories.

L. Lee Melhado, *University of Illinois at Urbana-Champaign*

Amino-acids, Peptides, and Proteins. Volumes 13 and 14. Volume 13 edited by R. C. Sheppard (MRC Laboratory of Molecular Biology) and Volume 14 edited by J. H. Jones (University of Oxford). Royal Society of Chemistry, London. Volume 13: 1982. xxiv + 485 pp. £69. Volume 14: 1983. xxii + 502 pp. £73.

These two volumes, the continuation of an excellent ("Specialist Periodical Report") series, provides a systematic and very detailed review of recent progress in the areas of amino acid, peptide, and protein research. Volume 13 presents the results of research published in the main journals during 1980, with the exception of the biennial survey of metal complexes of amino acids, peptides, and proteins, which covers the 2-year period 1979-1980. Volume 14 reviews the research published during 1981, with the exception of the survey of primary structures, which covers the 2-year period 1980-1981. The overall format and style of both volumes has been established by previous volumes in the series. There is no subject index in either volume. There is an author index in Volume 13 but, unfortunately, not in Volume 14. These volumes contain a fair balance of experimental and theoretical advances in the areas of amino acid, peptide, and protein research. The volume of subject matter covered for each of the yearly periods is indeed impressive, and with its presentation equitably distributed between text and table formats, these reports become highly readable. As such, the material contained therein should be of equal value to the practicing "protein" chemist as well as to those just entering the field.

Volumes 13 and 14 contain six and five chapters, respectively. The first chapter of both volumes (G. C. Barrett) deals with amino acids and discusses some of the newly found natural amino acids, the chemical synthesis and resolution of amino acids, recent physical and stereochemical characterization of amino acids, novel amino acid reactions, and recent progress in the analysis of amino acids (Volume 13: 374 references; Volume 14: 388 references). The second chapter of both volumes presents an up-to-date comprehensive and critical review of structural aspects of peptides and proteins. Topics include protein isolation and characterization (Volume 13: M. D. Scawen, R. F. Sherwood, D. A. P. Small, P. M. Hammond, P. Hughes, A. Electricwala, S. Alwan, and T. Atkinson, 322 references; Volume 14: M. D. Scawen, R. J. Sherwood, P. M. Hammond, A. Electricwala, and T. Atkinson, 450 references), chemical modification of proteins (Volume 13: A. J. Garman and R. A. G. Smith, 710 references; Volume 14: R. Cassels and R. A. G. Smith, 666 references), X-ray studies on various classes of proteins, hormones, viruses, muscles, and other biological structures (Volume 13: W. D. Mercer, 210 references; Volume 14: W. D. Mercer, 237 references), conformation and interaction of peptides and proteins in solution as studied by theoretical conformation calculations, NMR, IR, Raman, circular dichroism and Mossbauer spectroscopy (Volume 13: Edited by R. H. Pain, with contributions by B. Adams, A. Benson, T. Brittain, D. P. E. Dickson, P. D. Jeffrey, L. W. Nichol, H. W. E. Rattle, B. Samraoui, R. M. Stephens, M. J. E. Sternberg, and D. J. Winzor, 912 references; Volume 14: Edited by R. H. Pain, with contributions by B. Adams, T. Brittain, R. Devonshire, D. P. E. Dickson, P. D. Jeffrey, L. W. Nichol, L. W. Nichol, H. W. E. Rattle, N. K. Rogers, R. M. Stephens, M. J. E. Sternberg, and D. J. Winzor, 1256 references), and, finally, in Volume 14, a survey of primary structures (J. Gagnon and D. L. Christie, 634 references). The third chapter of both volumes (I. J. Galpin) gives an extensive review of peptide synthesis, both methods employed and syntheses achieved (Volume 13: 373 references; Volume 14: 548 references). The fourth chapter of both volumes (P. M. Hardy) presents a survey of peptides with structural features not typical of proteins, including cyclic peptides, cyclic depsipeptides, peptide alkaloids, linear peptides, and glycopeptides (Volume 13: 137 references; Volume

*Unsigned book reviews are by the Book Review Editor.

14: 142 references). The fifth chapter of both volumes presents an excellent survey of chemical structure and biological activity of hormones and related compounds, including the hypothalamic hormones, the anterior pituitary hormones, the posterior pituitary peptides, the pancreatic hormones, the gastrointestinal peptides, the vasoactive peptides, and the enkephalins and endorphins (Volume 13: H. C. Beyerman, D. Brandenburg, D. H. Coy, G. W. Hardy, W. A. Klis, M. Manning, J. Ramachandran, P. D. Roy, D. Saunders, W. H. Sawyer, and D. Voskamp, 561 references; Volume 14: D. Brandenburg, D. H. Coy, G. W. Hardy, M. Manning, A. Olma, J. Ramachandran, P. D. Roy, D. Saunders, W. H. Sawyer, and A. Schuttler, 421 references). The sixth and final chapter of Volume 13 presents a biennial survey of metal complexes of amino acids, peptides, and proteins (R. W. Hay and W. R. Williams), including results of recent studies in the following areas: equilibria, synthesis and spectroscopy, stereochemistry and stereoselectivity, reactivity and kinetics, and the Schiff bases (379 references).

In general, the reports are very well written by outstanding investigators in their associated areas of research. The large number of references alone make these volumes extremely valuable source documents for investigators desiring to keep abreast of the very latest developments in the areas of amino acid, peptide, and protein research.

D. J. Nelson, *Clark University*

Fast Methods in Physical Biochemistry and Cell Biology. Edited by Ramadan I. Sha'afi and Salvador M. Fernandez (Department of Physiology, University of Connecticut Health Center, Farmington, CT 06032). Elsevier Scientific Publishing Co., Amsterdam and New York, 1983. xii + 374 pp. \$106.50.

A total of 18 authors have contributed to this volume that reviews in 11 chapters various methods of studying "fast" chemical reactions or photophysical processes of biological interest. Depending on the experimental procedure employed, the time resolution available for such studies ranges over eight decades, from millisecond in stopped-flow methods to picosecond in absorption and fluorescence laser photolysis methods. Chapter one introduces the book with a general discussion of signal analysis in terms of periodic signals, correlation functions and deconvolution procedures. Chapter two introduces the theory of enzyme kinetics and fundamentals of analysis based on the stopped-flow method and faster relaxation methods such as temperature-jump. Chapters three through eleven discuss the following topics entitled: (3) recent applications of the stopped-flow and pressure-jump relaxation techniques in the biological sciences; (4) rapid-quench methods in fast biochemical processes; (5) application of pulse radiolysis to biochemistry; (6) flash photolysis studies in heterogeneous systems; (7) time-resolved X-ray scattering from solutions using synchrotron radiation; (8) electrophoretic light scattering; (9) time-resolved fluorescence spectroscopy; (10) picosecond spectroscopy; and (11) fluorescence photobleaching as a probe of translational and rotational motions.

The editors have chosen to exclude NMR and ESR methods because of adequate coverage of these areas in the recent literature. Noteworthy is the fact that they have omitted a discussion on picosecond to nanosecond time-resolved resonance Raman spectroscopy, as this method has recently emerged as one capable of providing valuable structural information on molecules and processes of biological interest.

Generally, both the beginning and established researcher in the biological and physical sciences should find this book to be valuable in providing current information on state-of-the-art methods and applications for studying fast reactions and photophysical processes. Each chapter is well written containing necessary descriptive and mathematical detail as well as recent applications including adequate reference lists.

Lewis J. Noe, *University of Wyoming*

Proton and Carbon NMR Spectra of Polymers. Volume 2. By Quang Tho Pham (Laboratoire des matériaux organiques et Conseiller scientifique au Service central d'analyse), Roger Petiaud (Service central d'analyse Centre National de la Recherche Scientifique), and Hughes Waton (Service central d'analyse Centre National de la Recherche Scientifique). John Wiley and Sons, New York, 1983. XI + 223 pp. \$125.00.

This is the second volume of a collection of ^1H and ^{13}C NMR spectra in only a little region of polymer field in which the authors have completed some fundamental studies. The purpose of this collection according to the authors is to enable the users to have access to the resonance features, recorded in good experimental conditions, of some organic polymers. Spectrometers working at different frequencies were used, but ^1H and ^{13}C could not be examined simultaneously for all polymers. As in the first volume, the experimental conditions under which the spectra were obtained are reported and most of the ^1H and ^{13}C resonances are assigned. Compositional data and quantitative tacticity information are also given, whenever possible. The contents for both volumes comprise

208 spectra which are grouped under the following names: acrylics, dienes, esters, ethers, olefins, styrenes and derivatives, vinyls and vinylidenes, and miscellaneous. There are 191 references given, which according to the authors are not exhaustive but sufficient to provide a good knowledge of the assignments of resonances. The examined nuclei and the frequencies of the spectrometer(s) used in each reference are noted.

The quality of the reproduced spectra is excellent, and this collection of spectra would make a useful addition to the library of an NMR spectroscopist who is involved in the study of polymeric molecules. For the polymer chemist in general it may be useful for identification and comparison of structures.

George B. Savitsky, *Clemson University*

Principles of Polymerization Engineering. By Joseph A. Biesenberger and Donald H. Sebastian (Stevens Institute of Technology). John Wiley & Sons, New York, 1983. XXIV + 744 pp. \$54.50.

This book deals with processes involved in polymer making. Areas covered include design, scaling, and modification of processes with elucidation of principles. The authors recommend this book for industrial scientists and engineers and as a processing textbook. Useful appendices serving as a "text within a text" covering such areas as mathematical concepts, thermodynamics, and polymerization chemistry are included to augment the reader's background to follow the normal text material. This book serves as a most useful addition to this growing area of instruction and research.

Eli M. Pearce, *Polytechnic Institute of New York*

The Lymphokines: Biochemistry and Biological Activity. Edited by John W. Hadden and William E. Stewart II (Memorial Sloan-Kettering Cancer Center). Humana Press, Clifton NJ, 1981. xv + 437 pp. \$59.50.

In nineteen chapters the important soluble factors influencing polymorphonuclear leukocyte, lymphocyte, and macrophage functions are reviewed by recognized investigators in the field. The emphasis is upon the isolation, biochemical characterization, and biological activity of the factor. The detailed text is judiciously supplemented by figures, primarily illustrating characteristic electrophoretic or chromatographic patterns. Most of the references are pre-1980. Thus the major value of this work will be as a complete summary of research on lymphokines, monokines, thymosin, interferon, and myriad other immunologically important factors prior to that time. As such it represents an excellent introduction to this rapidly expanding field of investigation.

John C. H. Steele, Jr., *Medical College of Georgia*

Chemicals in the Oil Industry. The Proceedings of a Symposium Organized by The Northwest Region of the Industrial Division of the Royal Society of Chemistry, University of Manchester, March 22-23, 1983. Edited by P. H. Ogden (Akzo Chemie UK Ltd.). The Royal Society of Chemistry, London W1V 0BN, 1983. vi + 217 pp. \$12.00

This volume consists of 13 papers presented at the aforementioned symposium which deals with the technicalities associated with oil production with particular emphasis on the use of chemical additives and their role in oil exploration in a hostile environment, such as the North Sea. In general, the presentations are well written and get across the desired points. References are included at the end of each paper. The subject matter covered is as follows: Application of Chemistry to the Drilling Operation, Chemicals for Water-based Drilling Fluids and Their Temperature Limitations, The Development and Application of Oil-base Muds, Chemical Aspects of Oil Well Cementing, The Role of Chemicals in Oil and Gas Production, Chemical Demulsification of Produced Crude Oil Emulsions, Oily Wastewater Treatment in the Production of Crude Oil, The Use of Ethylene-Vinyl Acetate Copolymers as Flow Improvers and Wax Deposition Inhibitors in Waxy Crude Oil, Water Scalling Problems in the Oil Production Industry, The Chemistry of Corrosion Inhibitors Used in Oil Production, Quarternary Ammonium Compounds, Evaluation and Application in the Control of Sulfate-reducing Bacteria, The Role of the Service Company in Offshore Operations, and the Market for Chemicals in the Oil Industry. These proceedings would prove useful to those in the oil-producing industry.

George A. Tsigdinos, *Michigan State University*

Chemical Methods of Rock Analyses. 3rd Edition. Pergamon Series in Analytical Chemistry. Volume 4. By P. G. Jeffery (Laboratory of the Government Chemist, London) and D. Hutchinson (Geochemistry and Petrology Division, Institute of Geological Sciences (N.E.R.C.), London). Pergamon Press Inc., New York. xvi + 379 pp. \$60.00.

In this third edition, there has been an extensive updating of analytical methods that has led to a greater emphasis of spectrophotometric and atomic absorption methods. However, the more "classical" methods of analysis, those that have proven themselves with time, still form the bulk

of the text. A number of "methods of analysis that are directly applicable to geological materials, particularly plasma source emission spectrography, x-ray fluorescence, and microprobe analysis" are not included. However, some of the discussion on AA methods can easily be applied to plasma spectrometry. A chapter on statistical methods which was in the first two editions has been eliminated on the grounds that it is "now a part of the stock-in-trade of the analysts" and also because there is no shortage of readily available books on statistics, ranging from student texts to advanced treatises.

The first four chapters (51 pages) are of a general nature and are entitled: 1. The Composition of Rock Material. 2. Sample Decomposition (covering decomposition with mineral acids and fusion procedures). 3. Classical Scheme for the Analysis of Silicate Rocks; and 4. The Rapid Analysis of Silicate Rocks. The remaining chapters are devoted to the determination of individual elements or groups of elements, such as the alkali metals or zirconium and hafnium.

The authors refer to this book as a specialist text, and indeed it is. It is also an excellent text that is concise, well written, and up to date. The format used in the chapters on the determination of the various elements is especially noteworthy. Typically, there is a short review of the various methods followed by recommended gravimetric, titrimetric, colorimetric atomic absorption, and/or flame photometric methods. Shortcomings and interferences in particular methods are duly noted, and helpful suggestions for overcoming or avoiding these problems are given. Pertinent references (up to 1980) are given at the end of each chapter.

This book is highly recommended to the analytical chemist or geochemist who is interested in the analysis of rocks and silicate minerals.

Norman H. Suhr, *The Pennsylvania State University*

Soil Analysis: Instrumental Techniques and Related Procedures. Edited by Keith A. Smith (The Edinburgh School of Agriculture, Edinburgh, Scotland). Marcel Dekker, Inc., New York. 1983. xii + 562 pp. \$69.50.

The book is organized in eleven chapters, each devoted to an instrumental method and written by a specialist with research interests in soil science. The methods discussed include atomic absorption and flame emission spectrometry, potentiometry with ion-selective electrodes, continuous flow analysis, elemental analysis (C, S, N), radioisotope techniques, neutron activation analysis, nitrogen isotope ratios by optical emission and mass spectrometry, gas chromatography of the soil atmosphere, and gas and liquid chromatography for pesticides. Each chapter is introduced with a description of the principles of the method as is found in advanced textbooks on instrumental analysis, followed by a review of applications of the method in soil science. For most methods the introductory material is clear and complete, but in a few cases it is based primarily on a review of commercially available instruments. Generally the proper balance among introductory material, technical details, and references to the literature is provided to give a reader unfamiliar with a method sufficient background to make critical judgments about its application.

The book is unique in that it covers many methods of instrumental analysis in a way that would be acceptable in a course in analytical chemistry, and at the same time contains a comprehensive review of applications of interest to soil scientists. The book should be of great value as a textbook in a course on instrumental analysis for soil chemists or as an introduction and overview of the field for practicing scientists. For actual application of a particular method of analysis, the book appears to provide a valuable key to the literature on the subject.

John C. Westall, *Oregon State University*

Chemical Methods in Gas Chromatography (Journal of Chromatography Library. 24). By V. G. Berezkin (Institute of Petrochemical Synthesis, Academy of Sciences of the U.S.S.R., Moscow). Elsevier Science Publishers, Amsterdam. 1983. x + 314 pp. \$73.25.

The extent to which gas-chromatographic analysis has been adopted is clearly stated by the author who emphasizes that its development has been marked by advances in detection methods as much as by improvements in column separations. The former area has been broadened conceptually to include characterization of eluents by chemical means and the overall scope of the technique includes the area of "analytical reaction GC" wherein chemical transformations can be conducted before, during, or after the column separation. A focus on such chemical reaction rather than on separation technology forms the basis of this very useful text. It gathers together a range of information and commentary on practical gas chromatographic applications not readily found in any other single text. Although very exhaustive in the manner of a sound review, it is also critical, and the author makes careful comparisons of procedures and results. It is in the area of literature coverage that the sole notable criticism may be made, the predominance of references is to original literature published prior to the mid-1970s and much comes

from the 1960s and earlier. Thus there is a major lack of reference to current high-resolution capillary gas chromatography. It is clear, however, that many of the analytical methods described for packed columns can be adapted and enhanced with higher resolution systems. Such modifications are certainly to be advocated and, indeed, are already in wide use in pyrolysis, functional group analysis, and carbon skeletal determination.

To many gas chromatographers, the concepts of sample derivatization by chemical means prior to chromatography are quite familiar; the first chapter gives a useful brief review of such techniques. The bibliography of this chapter is particularly exhaustive. Pyrolysis gas chromatography is also well reviewed with a useful appraisal of alternative experimental approaches. The major portions of the text deal with topics which may be less familiar to most analysts. The topics of subtraction techniques, reaction gas chromatography for elemental and trace analysis, and functional group analysis are extensively covered and may open new avenues for research and application to many readers. Shorter chapters on kinetic methods in gas chromatography, chemically selective stationary phases, and carbon skeletal determinations complete the coverage.

Overall, the book is well written and presented. There are few vestiges of ponderous translation and information is accessible and comprehensive.

Peter C. Uden, *University of Massachusetts, Amherst*

Derivatives of Hydrazine and Other Hydronitrogens Having N-N Bonds. By Peter A. S. Smith (University of Michigan). Benjamin/Cummings, Inc.; Reading, MA. 1982. xi + 335 pp. \$49.95.

This book is the first of a projected series of three volumes which represents Professor Smith' heroic attempt to update his previous two-volume set, "Open-Chain Nitrogen Compounds", which was published in 1966. Those volumes represented a modern effort to cope with the voluminous literature on nitrogen compounds and I would imagine any serious researcher in organic nitrogen chemistry has had many causes to refer to these volumes in the meantime. We can only be grateful to Professor Smith for the monumental effort involved in this updating.

Those familiar with the original volumes will recognize the same format. Smith has chosen to begin with the topics that constituted Chapters 9-12 of Volume II of the original work expanding these to seven chapters. He has deleted treatment of azoxy compounds and azine oxides but has added sections on nitrilimines and azamines, reflecting the myriad investigations of these compounds in the intervening years.

This volume (and its successors) provides the student or researcher with a good overview of these fields and a lead to important reviews and monographs. It does not pretend to be exhaustive or all-inclusive. Professor Smith has provided a real service to organic chemists.

Jeremiah P. Freeman, *University of Notre Dame*

DNA Repair: A Laboratory Manual of Research Procedure. Volume 2. Edited by Errol C. Friedberg and Philip C. Hanawalt (Stanford University). Marcel Dekker, New York. 1983. 392 pp. \$49.50.

Living cells contain a number of enzyme systems for the repair of DNA damaged by radiations or chemical mutagens. Since repair enzymes are often difficult to identify and purify, our understanding of these repair processes has followed on the development of the needed methods. Dr. Friedberg and Dr. Hanawalt have chosen a series of articles on methods, many of them written by the authors who developed them. The previous volume, parts A and B, covers many of the methods for measuring structural damage in DNA molecules following exposure to radiations and mutagenic chemicals and methods for demonstrating the repair of damaged DNA in intact cells. The new volume contains a series of articles on the more recently developed methods, particularly enzymatic methods for measuring specific types of chemical damage in DNA molecules and for purifying certain repair enzymes.

This volume is interesting because it contains chapters correcting two important scientific errors of the past and other chapters describing methods for identifying the products of cloned genes and the application of DNA sequencing methods to problems in DNA repair and mutagenesis.

Three chapters describe the purification and properties of the inducible enzymes 3-methyladenine-DNA glycosylases and O6-methylguanine-DNA transferase. Photoreactivation by visible light by photolyase was in 1972 attributed to an RNA-containing enzyme coded for by a gene carried by λ gal transducing phage. This is now known to be incorrect. The gene for photolyase, a flavin-containing enzyme, has been cloned and identified correctly by methods described here.

Similarly, the excision of pyrimidine dimers was incorrectly attributed in 1974 to two small proteins of less than 20 kd. Significant advances have come from the development of a procedure for identifying the product of genes carried on the bacterial cloning vector pBR322, which has allowed the correct identification of the *uvrA*, *uvrB*, and *uvrC* genes needed for excision repair. Moreover, the yields have been increased

through the use of strong promoters, to the point where purification is greatly simplified.

Studies on the mechanism of postreplication repair were for many years held up by difficulties in identifying and purifying the recombination enzyme, *recA* protein. The gene *recA* was first cloned by selecting for a λ transducing phage carrying the linked marker *srI*, which allowed the gene product *recA* protein to be identified.

A chapter is devoted to conditions that sensitize the production of pyrimidine dimers in DNA and one to their measurement by high performance liquid chromatography. Dimers can also be detected in unlabeled DNA by treating it with *M. leuteus* extract, followed by alkaline electrophoresis with ethidium bromide staining.

DNA sequencing methods can be used to determine the site of cleavage in damaged DNA. The fidelity of DNA polymerase can be assayed by measuring the reversion rate of amber mutations in phage ϕX . Methods for synthesizing oligonucleotides of a chosen sequence can be used as primer in conjunction with single strand phage DNA to introduce specific changes in a chosen gene, and thus change specific amino acids in the product. Other chapters discuss the action of S1 and BAL31 enzymes on damage DNA, but they are not sufficiently specific to be very useful.

The best chapters are concerned with the more modern methods. The editors give no preface or appendix to help readers find the more recent methods that are not included, and yet this could be very helpful to the reader who sets out to use the methods. Most chapters give a useful amount of detail of the methods for someone wishing to use them. Overall, it provides a useful compilation of methods, some of which are not readily available elsewhere.

Paul Howard-Flanders, *Yale University*

Chemistry and Technology of Water-Soluble Polymers. Edited by C. A. Finch (Pentafin Associates). Plenum Press, New York and London. 1983. xvi + 358 pp.

Water-soluble polymers (WSP) are important in biological systems, foods, and such industrial products as coatings. This monograph by Finch and coauthors is timely in that the full potential of this class of materials has not yet been realized.

A review chapter on types is followed by a chapter on the important subject of rheology of WSP's, whose concentrated solution behavior leads to problems of distinguishing the onset of gelation.

The third chapter on preparation, one on chemical crosslinking, and one on chemical modification are followed by thermoreversible gelation. The physical chemical aspects only begin at this point, for chapters follow on solution thermodynamics, fractionation and characterization, hydration, polyelectrolytes, interactions with small molecules, and excluded-volume interactions.

Three chapters on WSP interactions (polymer adsorption, stabilization of dispersed systems, and of polymerizations) are followed by two chapters on applications, one on flocculants, and a final one on oil recovery.

Most chapters are too short to cover their subjects in depth. This is an endemic problem with edited monographs that have page limitations, and it is reflected in a paucity of references. The index appears more complete than one usually finds in this type of effort.

Errors seem to be minimal. The figures are crisp and legible. Repetition is unavoidable but is not overdone. The majority of research workers in this field are likely to find useful information in the book.

Raymond R. Myers, *Kent State University*

Nuclear Magnetic Resonance Spectroscopy—A Physico-Chemical View. By Robin K. Harris (University of East Anglia). Pitman Books Limited, London. 1983. 243 pp. \$34.95.

NMR spectroscopy holds a central position in molecular level studies in chemistry, and its versatility as a probe is expanding, rather than solidifying, with time. Within the past decade, several whole new sub-disciplines of NMR have been added to the arsenal of the practicing spectroscopist. Among these are high-resolution solid-state NMR, 2-D and multiple-quantum techniques, and NMR imaging. Professor Harris' monograph is a physico-chemical overview of the field, covering the basic theory of nuclear magnetism and providing up-to-date descriptions of the more widely used experimental techniques.

The treatment of the basic theory of high-resolution spectral analysis is similar to that in the 1969 monograph "NMR Spectroscopy" by Drs. Harris and Lynden-Bell, but much material on relaxation phenomena, Fourier transform techniques, and quadrupolar nuclei has been added. There is one full chapter on solid-state NMR, primarily on the high-resolution CP-MAS technique. Other chapters deal with 2-D NMR, polarization transfer, and a variety of double resonance experiments. The original literature in 2-D and solid-state areas is frequently presented by using formalisms that are unfamiliar to the nonspecialist, and thus these

chapters should be helpful to many. NMR imaging is not treated explicitly, but workers in this field will find the discussion of magnetic relaxation and chemical exchange phenomena highly relevant to their interests.

The book is eminently suitable as a course text at the advanced undergraduate or beginning graduate level. Each chapter is concluded by a problem set and by a list of recommended further readings. Its value as a text is enhanced by the careful referencing of seminal papers and review articles, by glossaries of symbols, by abbreviations and constants, and by numerous useful tabulations of data and theoretical results. Dr. Harris' book is highly recommended to students who wish to develop a basic physical understanding of NMR phenomena.

Robert R. Sharp, *University of Michigan*

Applied Biochemistry and Bioengineering. Volume 4. Immobilized Microbial Cells. Edited by Ichiro Chibata and Lemuel B. Wingard, Jr. Academic Press, New York. 1983. xiii + 355 pp. \$58.00.

Since this series is based on the productive interaction of biology with engineering as related by biochemistry, it should have a wide appeal. Biologists, biochemists, engineers, microbiologists, and chemists should find this volume useful. The subject is introduced by a presentation of the history of immobilized cells. This is followed by two chapters dealing with methods for immobilization and applications of immobilized microbial cells. Chapter four discusses immobilized organelles and include chloroplasts, chromatophores, microsomes, mitochondria, and peroxisomes. The next chapter on immobilized living cells and their applications includes extensive tables of organisms and their products. Biogas production and microbial fuel cells are included in the chapter on energy production. The final chapter presents a chemical engineering analysis of immobilized cell systems such as immobilized cell reactors, single enzyme type reactors, and immobilized live cell reactors. References and an index are included.

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

D'Ans-Lax Taschenbuch für Chemiker und Physiker: Organische Verbindungen. 4th Edition. By Claudia Synowitz. Springer-Verlag, Heidelberg and New York. 1983. xxii + 1129 pp. DM 74.00 (ca. \$28.80 U.S.).

Handbooks for chemists commonly try to be all things for all people and encumber themselves with masses of physical, mathematical, and engineering data, which is not what organic chemists commonly require. In this volume, about four-fifths of the content consists of a very readable table of organic compounds.

This is a handbook that deserves to be better known. Over 800 pages of it consists of an unusually readable table of organic compounds, in which is included not only the fully written-out structure, the boiling and melting points, and solubility but also key references, some derivatives, test reactions where appropriate, and crystal form. It could properly be called a poor man's "Heilbron". The fact that it is in German is hardly noticeable; one is only slightly aware that guaiacol is spelt "guajacol", and quinoline, "chinolin", and the vast majority of names show no differences at all. In case of any difficulty, however, there is a comprehensive formula index. In addition, there are supplementary tables of thermochemical data, critical constants, etc., and separate tables listing compounds in order of melting point and boiling point, respectively. In this review, the accuracy and reliability of the data base have not been checked, but casual examination suggests that they are sound. This book is a good candidate for designation as a "best buy".

Advances in Mössbauer Spectroscopy. Applications to Physics, Chemistry and Biology. Studies in Physical and Theoretical Chemistry. Volume 25. Edited by B. V. Thosar (Tata Institute of Fundamental Research), P. K. Iyengar (Bhabha Atomic Research Centre), J. K. Srivastava (Tata Institute of Fundamental Research), and S. C. Bhargava (Bhabha Atomic Research Centre). Elsevier Scientific Publishing Company, Amsterdam and New York. 1983. xxiv + 924 pp.

We are now celebrating the 25th anniversary of Rudolf L. Mössbauer's discovery of the nuclear resonance-fluorescence of recoil-free γ radiation—the effect that almost universally bears his name. The key observation was made in 1958 when Mössbauer was a graduate student, was published in 1959, and he was awarded a Nobel prize in 1961 (in achievement our own graduate students could well emulate!). In the intervening quarter century initial disbelief quickly gave way to intense interest and widespread applications in physics and chemistry, metallurgy and materials science, geology and mineralogy, and the life sciences. The beginning burst of symposia and reviews has not abated, but become a steady stream. The interdisciplinary nature of the enterprise has meant the bringing together of practitioners from widely different sciences and engineering areas whose virtually only common link and language is a shared need for movers, detectors, cryogenic dewars,

and radiochemical sources, the tools of the Mössbauer spectroscopist's trade. Out of this has come significant new advances in these diverse branches of science and engineering.

The book under review contains 17 articles in 15 chapters. The story opens conventionally with the usual theoretical chapter followed by one on the nuts and bolts of recording Mössbauer spectra. But the reader is soon aware that the advances which are being described represent only a subset of the whole. The rest of the chapters are more specialized, and obviously meant for research workers in the respective fields. We have detailed expositions of selective excitation double Mössbauer (SEDM) spectroscopy, studies on metals, the intensity tensor formulation for dipole transitions and its application to finding the electric-field gradient (efg) tensor, crystal-field effects in iron(II), molecular-orbital theory calculations of charge density, efg and the internal magnetic field, paramagnetic hyperfine structure, studies on biomolecules and on magnetic interactions effects on line shapes, spin-lattice relaxation, the theory of zero-field splitting, spin-lattice coupling and nuclear quadrupole interactions of S-state ions, radio-frequency, acoustic, optical, and microwave perturbations of spectra, and studies on the rare earths.

The strong local flavor (over a quarter of the articles originate with Indian authors or co-authors or *ausländer* Indians) and equally strong scientific bias of the editors results in a volume which might be retitled in a number of alternative styles, for example, "the physics of iron-57 Mössbauer spectroscopy—with a brief foray through the rare earths". The editors believe that effective use of Mössbauer spectroscopy demands understanding of topics like the parameters of the spin Hamiltonian of S-state ions, and they have firm ideas about which are the areas holding the greatest promise. Obviously, the widely and easily studied tin-119m nuclide is not one of these, nor are Sb-121, Te-125, I-129 Mössbauer spectroscopies, either. These decisions are the essence of the editorial function, and anyway the discipline is now much too large and varied to allow satisfactory coverage of all the major points in one book, even in a volume the size of this one of nearly 1000 pages. What has been chosen for presentation is carried through at a level sufficiently detailed to please the most critical practitioner. And, as Abraham Lincoln said (to R. D. Owen the spiritualist), "For those who like that sort of thing, I should think that it is just about the sort of thing they would like".

Rudolf Mössbauer's name appears, wherever it appears, which is *alot, sans* umlaut, which means, strictly speaking, that it is everywhere misspelled.

J. J. Zuckerman, *University of Oklahoma*

Annual Reports in Organic Synthesis. 1982. Edited by L. G. Wade, Jr., and M. J. O'Donnell. Academic Press, New York. 1983. xiii + 499 pp. \$29.00.

This volume continues with the successful format that has for 13 years given a large amount of information on synthetic methods in a concise, yet easily recognized, form. The content has been abstracted from 48 major primary chemistry journals and displayed insofar as feasible in the form of structural equations. There is very little text, and aside from the references themselves, only such occasional phrases or short sentences as may be needed to define scope are to be found. The organization remains as before, in six chapters according to type of reaction. The result is a work designed for quick visual recognition and retrieval of information. There is also an index of principal authors and a compendium of Miscellaneous Reviews, which are identified by title.

The Collector's Book of Fluorescent Minerals. By Manuel Robbins. Van Nostrand-Reinhold, New York. 1983. xiii + 289 pp. \$45.00.

This is a more serious book than the title suggests, and it contains a substantial amount of reliable chemical and physical information. There are the expected color plates (quite lovely) of fluorescing minerals and chapters on collecting, but there are also chapters on the phenomenon of fluorescence, including the action of activators and poisons, crystal structure, phosphorescence and thermoluminescence, spectroscopy, and the nature of color perception. An extensive appendix of tables lists minerals according to the color of their fluorescence, and should be useful in identifying mineral particles. Although there are no specific literature citations, a bibliography of books, bulletins, and journal articles, keyed to the respective chapters, fills eight pages.

Volumes of Proceedings

The Multinuclear Approach to NMR Spectroscopy. Edited by J. B. Lambert and F. G. Riddell. D. Reidel Publishing Company, Boston. 1983. 548 pp. \$72.00.

Contains the typescripts of 22 papers given at a NATO Advanced Study Institute held in Scotland in 1982, plus an unusually good 18-page index.

Proceedings of the Fifth Tihany Symposium on Radiation Chemistry, Volumes I and II. Edited by J. Dobo, P. Hedvig, and R. Schiller.

Akademiai Kiadó Publishing House, Budapest. 1983. xix + 1142 pp. \$75.00.

Contains, in two volumes, a very large number of papers, in typescripts ranging from primitive to sophisticated typography, presented at the Fifth Tihany Symposium held in Hungary in 1982, plus a 6-page subject index. The rubrics are as follows: General Problems; Aqueous and Inorganic Systems; Organic Materials; Polymers; and Biological Problems.

Surface Properties and Catalysis by Non-Metals. Edited by J. P. Bonnelle, B. Delmon, and E. Derouane. D. Reidel Publishing Company, Boston. 1983. xiv + 562 pp. \$69.50.

Contains the typescripts of 21 presentations from a NATO Advanced Study Institute held in France in 1982, plus a 7-page index.

Collected Abstracts: Conversation in Biomolecular Stereodynamics III. Edited by Ramaswamy H. Sarma. Institute of Biomolecular Stereodynamics, Albany, NY. 1983. 146 pp.

Contains six papers, set in type, and the collected abstracts, presented at a conference held in Albany, NY, in 1983, plus 9 pages of advertisements, but no index; softbound.

Eurochem '83: Chemical Engineering Today, The Challenge of Change. Institution of Chemical Engineers, Symposium Series No. 79. Pergamon Press, NY. 1983. 616 pp. \$86.50.

Contains 55 papers, in typescript form, presented at a Eurochem Conference held in Birmingham in 1983; not indexed.

Condensers: Theory and Practice. The Institution of Chemical Engineers, Symposium Series No. 75. Pergamon Press, NY. 1983. 509 pp. \$70.00.

Contains 30 papers, in typescript form, from a symposium held at the University of Manchester in 1983; not indexed.

Bioelectrochemistry I: Biological Redox Reactions. Edited by G. Milazzo and M. Blank. Plenum Press, NY. 1983. xi + 348 pp.

Proceedings of the eleventh International School of Biophysics, 1981, consisting of ten lectures plus concluding remarks, set in type.

Computer Applications in Fermentation Technology. Symposium No. 9. Edited by W. B. Arminger. John Wiley & Sons, NY. 1979. vi + 398 pp. \$28.00.

Contains a large number of papers, set in type, presented at Biotechnology and Bioengineering Symposium No. 9, held in Philadelphia in 1978, plus a 2-page index.

Quantitative Approaches to Drug Design, Pharmacology Library, Volume 6. Edited by J. C. Dearden. Elsevier Publishing Company, NY. 1983. x + 296 pp. \$63.75.

Contains a large number of papers in typescript form presented at a symposium held in Bath in 1982, under the rubrics Parameters and Modelling in QSAR, Enzymes and Receptors, Pharmacokinetics and Rate Effects in Relation to QSAR, Series Design for QSAR, and QSAR in Practice, plus a 6-page index.

Systematics and the Properties of the Lanthanides. Edited by S. P. Sinha. D. Reidel Publishing Company, Boston. 1983. viii + 648 pp. \$85.00.

Contains in typescript form the 14 papers and a list of posters presented at a NATO Advanced Study Institute held in Germany in 1982, plus a 12-page index.

Advances in Laser Spectroscopy. Edited by F. T. Arecchi, F. Strumia, and H. Walther. D. Reidel Publishing Company, Boston. 1983. ix + 506 pp. \$69.50.

Contains the typescripts of nine lectures given at a NATO Advanced Study Institute held in Italy in 1981, plus an 8-page index.

Autoxidation in Food and Biological Systems. Edited by M. G. Simic and M. Karel. Plenum Press, NY. 1980. xii + 659 pp. \$65.00.

Contains the typescript papers from an "International Workshop" held in Natick, MA, in 1979, in the rubrics Mechanisms of Autoxidation, Food and Model Systems, Antioxidants, Biochemical Systems, and Biological Systems, plus an 8-page index.

Powtech '83: Particle Technology. The Institution of Chemical Engineers, Symposium Series, No. 69. Pergamon Press, NY. 1983. 448 pp. \$75.50.

Contains a large number of typescript papers presented at a symposium held in 1983 for designers, researchers, and working engineers in industries that use powders or bulk solids; not indexed.

The Hydrophobic Interaction: Faraday Symposia, No. 17. The Royal Society of Chemistry, London. 1982. 240 pp. \$36.50.

Contains the 14 papers given at a symposium held at the University of Reading in 1982, supplemented by remarks and discussion, set in type; softbound, without index.

Nitrogen Fixation: The Chemical-Biochemical-Genetic Interface. Edited by A. Muller and W. E. Newton. Plenum Press, NY. 1983. viii + 379 pp.

Consists of the 14 papers presented at an international meeting held in Germany in 1981, reproduced from typescripts, and a subject index.

Instrumental Analysis of Foods: Recent Progress. Volume 1. Edited by G. Charalambous and G. Inglett. Academic Press, NY. 1983. xi + 437 pp. \$42.00.

Proceedings of the Third International Flavor Conference, held in Corfu in 1983. The papers are reproduced from typescript but have a typeset index. Among the items of interest is the alarming fact that polystyrene food packaging may contain up to 0.5% of styrene, which is transferred readily to the edibles, making them less delectable.

Symmetries and Properties of Non-Rigid Molecules: A Comprehensive Survey. Edited by J. Maruani and J. Serre. Elsevier Scientific Publishing Company, NY. 1983. xv + 520 pp.

Proceedings of a symposium held in France in 1982, consisting of papers on mathematical formalisms, molecular structure and spectroscopy, molecular interactions and dynamics, and liquid, crystal, and nuclear physics, reproduced from varied typescripts and not provided with an index.

Advances in Material Characterization, Material Science Research. Volume 15. Edited by D. R. Rossington, R. A. Condrate, and R. L. Snyder. Plenum Press, NY. 1983. xi + 680 pp. \$89.50.

Proceedings of a conference held in 1982, consisting of a large number of papers in typescript arranged under these headings—Surface Spectroscopy; Surface Techniques; Vibrational Spectroscopic Technique; Electron Optical Methods; Acoustic and Mechanical Properties; General Crystallographic Techniques, and General Glass Characterization Studies—together with author and subject indexes.

Organometallic Compounds: Synthesis, Structure, and Theory. Edited by B. L. Shapiro. Texas A&M Press, College Station, TX. 1983. xxvii + 481 pp. \$35.00.

Proceedings of the First Symposium of the Industry-University Co-operative Chemistry Program of the Department of Chemistry of Texas A&M University held in 1983. In consists of 18 papers and a list of poster papers, together with a true author index and an "element index". The papers are reproduced from typescripts, inefficiently double spaced.

Polynuclear Aromatic Hydrocarbons: Formation, Metabolism and Measurement. Edited by M. Cooke and A. J. Dennis. Battelle Press, Columbus, OH. 1983. xii + 1301 pp. \$65.00.

Proceedings of the seventh symposium on the title subject, held in 1982, consisting of three keynote papers, a large number of general papers, and a short keyword index.

Laser Spectroscopy VI, Springer Series in Optical Sciences. Volume 40. Edited by H. P. Weber and W. Luthy. Springer-Verlag, NY, 1983. xvii + 442 pp. \$29.00.

Consists of a large number of papers in highly varied typescripts from the Sixth International Conference, held in Switzerland in 1983. No subject index.

Monoamine Oxidase Inhibitors: The State of the Art. Edited by M. B. H. Youdim and E. S. Paykel. John Wiley & Sons, NY. 1981. xvii + 214 pp. \$39.00.

Consists of a substantial number of typescript papers on both basic and clinical aspects of the subject, presented at a symposium held in Gothenberg in 1980. The subject index is shorter than the list of contributors.

Physical Chemistry of Transmembrane Ion Motions. Studies in Physical and Theoretical Chemistry. Volume 24. Edited by G. Spach. Elsevier Scientific Publishers, NY. 1983. xvii + 656 pp.

Consists of a large number of papers in varied typescripts presented at the International Meeting of the Société de Chimie Physique in Paris in 1982. In spite of the size of the book, there is not index.

Electronic and Molecular Structure of Electrode-Electrolyte Interfaces. Studies in Physical and Theoretical Chemistry. Volume 29. Edited by W. N. Hansen, D. M. Kolb, and D. W. Lynch. Elsevier Scientific Publishers, NY. 1983. x + 697 pp. \$134.75.

Consists of papers reprinted from *The Journal of Electroanalytical Chemistry*, being the proceedings of a conference in Logan, Utah, in 1982. The subject index consists of keywords from titles of papers.

Trace Analysis and Technological Development. Edited by M. S. Das. John Wiley & Sons, NY. 1983. x + 407 pp. \$40.00.

Consists of the three special lectures and the many contributed papers presented at a symposium held at the Bhabha Atomic Research Centre, Bombay, in 1981. The rubrics are as follows: High Purity Materials; Environmental Sciences; Life Sciences; Earth Sciences; Nuclear Technology, and Industry. Not indexed.

Biomimetic Chemistry. Studies in Organic Chemistry. 13. Edited by Z. Yoshida and N. Ise. Elsevier Scientific Publishers, NY. 1983. xi + 308 pp. \$78.00.

Consists of 16 typescript papers given at the 2nd International Kyoto Conference on New Aspects of Organic Chemistry, held in 1982, and a short subject index.

Books on Applied Subjects

Phosphates and Phosphoric Acid: Raw Materials, Technology, and Economics of the Wet Process (Fertilizer and Technology Series. Volume 3). By Pierre Becker. Marcel Dekker, Inc., New York. 1983. xv + 585 pp. \$95.00.

Treats the industrial aspects of the subject, from economics and rock grinding to acid concentration and corrosion, including a chapter titled What to do with Gypsum, and two appendices: Phosphate Rock Data Sheets and Useful Tables and Diagrams.

Thin Film Device Applications. By Kasturi Lal Chopra and Inderjeet Kaur. Plenum Press, New York. 1983. xii + 300 pp. \$42.50.

In eight chapters, the authors review the preparation and monitoring of thin films, their optical, electronic, magnetic, and "quantum engineering" applications, thermal detection and imaging, and surface engineering applications for such purposes as passivation, lubrication, decoration, promotion of adhesion, etc.

Instrumentation for Environmental Monitoring. Volume 1. Radiation. Second Edition. Lawrence Berkeley Laboratory Environmental Instrumentation Survey. By R. J. Budnitz, A. V. Nero, D. J. Murphy, and R. Graven. John Wiley and Sons, New York. 1983. xix + 1130 pp. \$150.00.

Reviews sources of radiation, methods of detection and measurement, dosimetry, features of operating and supplying nuclear power plants, and the analytical chemistry of radioactive iodine, krypton, radon, radium, strontium, uranium, thorium, plutonium, and tritium.

Advances in Nuclear Science and Technology. Volume 14. Sensitivity and Uncertainty Analysis of Reactor Performance Parameters. Edited by Jeffrey Lewins and Martin Becker. Plenum Press, New York. 1982. xiv + 371 pp. \$49.50.

Consists of seven contributed chapters on uncertainties in areas related to reactor physics, a 6-page summary, and a subject index.

Acid Deposition, Atmospheric Processes in Eastern North America. A Review of Current Scientific Understanding. By the Committee on Atmospheric Transport and Chemical Transformation in Acid Precipitation, Environmental Studies Board, Commission on Physical Sciences, Mathematics and Resources, and the National Research Council. National Academy Press, Washington, D.C. 1983. \$16.50.

Presents the report of the Committee on Atmospheric Transport and Chemical Transformation in Acid Precipitation, commissioned by the National Research Council. Much information is given in four appendices, but there is unfortunately no index.

Introduction to Material and Energy Balances. By G. V. Reklaitis. John Wiley and Sons, New York. 1983. xiv + 683 pp. \$33.95.

An attempt to fill a perceived gap in chemical engineering education by giving a comprehensive treatment of the calculation of material and energy balances in reacting and nonreacting systems, intended for a first course in chemical engineering. Each chapter contains an extensive set of problems.

Adhesives in Manufacturing (Manufacturing Engineering and Materials Processing Series. Volume 11). Edited by Gerald L. Schneberger. Marcel Dekker, Inc., New York. 1983. xi + 682 pp. \$95.00.

Consists of 26 contributed chapters under the rubrics of Fundamentals, Types of Adhesives, Bonding Practice, and Performance, Durability and Testing, "written primarily to serve production and development people".

Liquefied Petroleum Gases, Guide to Properties, Applications, and Uses: 2nd Edition—Revised and Extended. By A. F. Williams and W. L. Lom. Ellis Horwood Limited, Chichester, UK. 1982. xix + 522 pp. \$108.95.

Covers manufacture, properties, distribution, safety, and industrial uses.