Rastetter, Department of Chemistry, Harvard University, Cambridge, Massachusetts 02138, and N. Neuss, L. L. Huckstep, and N. De La Higuera, Lilly Research Laboratories, Eli Lilly and Company, Indianapolis, Indiana 46206.

Although the stereochemical diagrams **3–7** correctly depict the true absolute configuration of all these compounds, the chiral isopropyl group in **6** and the title compound (**7**) is correctly defined as *R*, according to the Cahn–Ingold–Prelog nomenclature.

Book Reviews[*]

An Advanced Organic Laboratory Course. By M. S. Newman (Ohio State University). Macmillan, New York, N. Y. 1972. xvi + 229 pp. $10.75.

Professor Newman's special talent for improving synthetic methods and laboratory techniques is very evident in this book, which is designed for a course for chemistry majors and graduate students. There are but eleven experiments, plus a chapter on report writing, but a real wealth of valuable information is packed in everywhere. An experiment on the preparation of mesitylene from 3,3,5-trimethylcyclohexanone, for example, includes nearly ten pages of down-to-earth practical discussion of techniques of making and handling Grignard reagents. In another chapter, there is even a drawing and discussion of how to open the valve on a hydrogen fluoride cylinder safely.

Good laboratory practice in research makes use of many techniques that are easily taken for granted and are often omitted from textbooks, so that they have to be learned by experience, observation, and word of mouth. This book is a gratifyingly rich compendium of such information, and even very experienced chemists will find much to learn in it. Professor Newman's philosophy of research gives material balance a priority over yield, and it is embodied throughout this book. His hope, expressed in the Preface, to encourage students "to become *superior* laboratory workers", should certainly be requited; he has presented organic chemists with a little gem.

Comprehensive Chemical Kinetics. Edited by C. H. Bamford and C. F. H. Tipper (University of Liverpool). Volume 6: Reactions of Non-metallic Inorganic Compounds. Volume 9: Addition and Elimination Reactions of Aliphatic Compounds. Volume 10: Ester Formation and Hydrolysis, and Related Reactions. Volume 12: Electrophilic Substitution at a Saturated Carbon Atom. Volume 13: Reactions of Aromatic Compounds. American Elsevier Publishing Co., New York, N. Y. 1972 (Vol. 6, 10, and 13) and 1973. Vol. 6: xv + 517 pp. $51.75. Vol. 9: xiii + 515 pp. $54.50. Vol. 10: x + 309 pp. $32.00. Vol. 12: xiii + 256 pp. $31.50. Vol. 13: xi + 508 pp. $53.50.

This important series consists of treatment in depth of kinetic studies that have been published on the various topics indicated by the titles. Each volume consists of contributed chapters, which exhaustively survey the material and present vast amounts of data in both tabular and discursive form. These surveys are done with competence by outstanding investigators, and the chief criticisms that can be made are that not all authors have stated when their coverage of the literature was completed, and many chapters are unnecessarily out of date (1969 cut-off or submission dates, for example). In some instances, supplementary pages have been added to cover more recent results. Each volume has its own, very detailed, index. It should be noted that the chronology of appearance of these volumes does not follow the order of the volume number.

Dictionary of Chemistry and Chemical Engineering. Volume 2. English to German. By L. De Vries, H. Kolb, and J. Thuss. Academic Press, New York, N. Y. 1973. vii + 644 pp. $39.00.

One can judge a cross-language dictionary on two grounds: the selection of words and terms, and the adequacy of the translations. This work includes terms as recent in origin as "nucleophilic", but very recent ones such as "suprafacial" or "disrotatory" are missing. Anglo-Saxon four-letter words are also missing, although they surely must be used by chemical engineers, if not by chemists. On the other hand, we learn that "madder red" is "krapprot" in German. There are all sorts of terms included that seem really too far from the subject to belong in such a work, such as "pith helmet", "racing tire", and "stone wall". The coverage is in general gratifyingly complete, however, and the type is easy to read, so that this may well be a preferred choice for technical libraries. Translations appear to be accurate and are generally concise unless alternatives are required.

Dynamical Aspects of Critical Phenomena. Edited by J. I. Budnick and M. P. Kawatra (Fordham University). Gordon and Breach, New York, N. Y. 1973. ix + 628 pp. Libraries, $32.00 ($22.50 prepaid); individuals, $16.00 ($12.80 prepaid).

A conference on critical phenomena in solids, held in June 1970, provides the content of this book, which consists of 32 papers reproduced from uniform typescript, with illustrations, references, summaries, and, in many instances, the ensuing discussions. There are also short author and subject indexes. The text of a luncheon address, "Political Activism and the Future of Universities," by Professor Elliott M. Lieb, is also included. It is interesting to read, but its concern with the militant, disruptive activism of a few years ago emphasizes the tardiness of publication, a factor that is especially critical for conference proceedings, whose timeliness is generally short-lived.

The pricing scale is interesting; if you have ever had to deal with a library order, you will appreciate it.

Metal–Ammonia Solutions. Edited by William L. Jolly (University of California). Dowden, Hutchinson and Ross, Inc., Stroudsburg, Pa. 1972. xvi + 440 pp. $20.00.

This is the first of a projected series of volumes called Benchmark Papers in Inorganic Chemistry, in which papers selected by the editor as being of critical importance in the development of the subject are reprinted. These papers are reproduced photographically from the original journals, and, although the majority are in English, a number are in German or French. The selection ranges from an 1864 report by Weyl on the first observation of a solution of a metal (potassium) in ammonia, to two 1971 papers, by Brooks and Dewald and Pinkowitz and Swift, on the rate of reaction of the ammoniated electron with ammonium ion, and the solvation number of the ammoniated electron investigated by nitrogen magnetic relaxation. There is both an author and a subject index.

Proceedings of the 8th Meeting of FEBS. Volume 28: Mitochondria, Biomembranes. Volume 29: Enzymes. American Elsevier, New York, N. Y. 1973. Vol. 28: 414 pp. $24.00. Vol. 29: 241 pp. $15.50.

These two new volumes from the Federation of European Biological Societies contain the full texts of the lectures reproduced photographically from typescripts, with illustrations and references. Each volume has a detailed subject index. There is much to interest biochemists in them.

Residue Reviews. Volume 44. Edited by F. A. Gunther and J. D. Gunther. Springer Verlag, New York, N. Y. 1972. vii + 192 pp. $16.50.

Chapters on polychlorinated biphenyls, DDT, pesticides in Argentina, transfer factors in bacterial degradation of herbicides, determination of bioconcentration potential for pesticides, and dichlorovos (DDVP) make up this volume. All are, as usual, detailed essays that include much tabulated information and extensive lists of references. The terminal dates for coverage of the literature are unfortunately not explicitly stated, but some 1972 references are present.

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[*] Unsigned book reviews are by the Book Review Editor.

Advances in Quantum Chemistry. Volume 7. Edited by Per-Olov Löwdin (Uppsala University and University of Florida). Academic Press, New York, N. Y. 1973. xvi + 457 pp. $29.50.

The latest volume in this series is the largest to date, containing 10% more pages than Volume 6 at a price increased by 20%. The high level of relevance and readability is maintained with several quite valuable contributions. K. H. Johnson, Scattered-Wave Theory of the Chemical Bond, reviews his technique for studying the electronic structure of large molecules and solids, costing just a small fraction of the computer time required by conventional Hartree–Fock methods. On aspects of the technology of *ab initio* molecular calculations are Rotation and Translation of Regular and Irregular Solid Spherical Harmonics (Steinborn and Ruedenberg), Molecular Orbitals between Real and between Complex Atomic Orbitals (Steinborn), The Symmetric Groups and Calculation of Energies of n-Electron Systems in Pure Spin States (Gallup), Projection Operators in Hartree-Fock Theory (Huzinaga, McWilliams, and Cantu), Thermochemistry in the Hartree-Fock Approximation (Hurley). A. E. S. Green, An Analytic Independent Particle Model for Atoms, presents a review in three parts: I, on elaborations of the Thomas–Fermi–Dirac statistical method; II (with Bass and Wood), on modified Hartree-Fock calculations for atoms; and III (with Berg), on applications to electron-impact ionization of rare gas atoms. On phenomenological applications of quantum chemistry are Solvent Shift Effects on Electronic Spectra and Excited-State Dipole Moments and Polarizabilities (Amos and Burrows), On Physical Properties and Interactions of Polyatomic Molecules: With Application to Molecular Recognition in Biology (Rein), and Quantum Theory of DNA. Summary of Results and Study Program (Ladik).

S. M. Blinder, *University of Michigan*

Chemical Bonds and Bond Energy. By R. T. Sanderson (Arizona State University). Academic Press, New York, N. Y. 1971. x + 222 pp. $11.50.

The usefulness of the electronegativity concept in describing bonding in molecules and solids appears to have survived the onslaught of the rapid advances in *ab initio* quantum chemistry. Indeed, judging from the contributions presented in this volume and from those to be found in the contemporary solid-state physics literature, the concept is still in a state of refinement, with its full potential for correlating physical properties not yet realized. Following up his "principle of electronegativity equalization," first introduced in 1951, the author presents a semitheoretical analysis of the bonding and heats of atomization for a wide variety of elements, inorganic compounds including binary solids, and organic compounds. Comparisons between calculated and observed energies are presented in tabular form for over 500 compounds, with the compilation of so much experimental data being one of the more useful features of the book. The particular electronegativity scale employed here is that of relative atomic compactness, which is proportional to the average electron density in an atom assuming a radius equal to the observed nonpolar covalent radius. Following Pauling, the observed energies of nonpolar covalent bonds become the key parameters in the scheme for calculating other bond energies. An important feature of the present scheme is that ionic energy is a substitute for, rather than a supplement to, part of the covalent energy. The volume concludes with an engrossing chapter on predicting the enthalpy of reactions, which addresses itself to questions such as "Why Does Methane Burn?" Overall, the author may underestimate his audience as when he says, "No doubt many competent chemists will still cringe at the thought of calcium oxide seriously being described as only 28% ionic." Certainly, semiconductor physicists and others used to the band description of solids should not cringe.

This volume represents a unique and highly readable contribution to the chemical literature and is strongly recommended to both inorganic and physical chemists, as well as to others interested in semitheoretical descriptions of bonding. In particular, the book would be excellent supplementary reading for advanced undergraduates and beginning graduate students.

Lawrence L. Lohr, Jr., *University of Michigan*

Reaction Kinetics in Micelles. By Eugene Cordes (Indiana University). Plenum Press, New York, N. Y. 1973. x + 157 pp. $12.50.

This volume is a collection derived from lectures given at a symposium on reaction kinetics in micelles at the 164th National Meeting of the American Chemical Society in August 1972. Its speedy publication is a welcome contrast to that of many topical publications which take more than a year to appear after submission of manuscripts. The intent of this volume is to summarize the current state of the art, to point out new directions of research, and to excite and direct the interest of new researchers to this relatively new field of chemical research.

Over the last decade, it has become apparent that the rates of many reactions are significantly affected by the presence of micellar surfactants in aqueous solutions. Since some structural similarities exist between globular proteins and certain micellar aggregates (they are both stabilized by hydrophobic interactions), many studies of micellar effects have been initiated in the hope that micellar systems might serve as approximate models for the microenvironment of active sites of enzymes. A rather obvious, if perhaps superficial, analogy exists between enzymatic and micellar catalysis, for example. However, even though micellar catalysis often follows Michaelis–Menten kinetics, and demonstrates competitive inhibition, the kinetic enhancement factors and substrate specificity of micellar systems are not at all comparable to those of most enzyme systems. Nevertheless, the established commercial importance of detergency and solubilization together with the intellectual aspects of these phenomena and the potential of employing micellar systems as reaction media make this book a timely one to stimulate further interest and activity in this field.

The first chapter, by Norbert Muller, summarizes recent advances in the chemistry of micelles. The topics discussed include new techniques which have been applied to determining micellar structure. Recent work in the areas of kinetics of micelle formation, the location of water and of solubilized molecules in micelles, and the thermodynamic variables for micellization are covered.

In the second chapter, by J. Baumrucker and M. Calzadilla, a review of micellar catalysis for carbonium ion reactions is presented. Micellar effects on the hydrolysis of acetal, ketals, and ortho esters are considered, with emphasis on experimental tools to determine the interactions of these species with micelles. The effects on kinetics of hydrolysis, due to surfactant structure, substrate structure, and organic additives are discussed. A detailed discussion of the micellar catalysis of fading of crystal violet, a stable triaryl carbonium ion, concludes this chapter.

In Chapter Three, J. H. Fendler, E. J. Fendler, and their students show how micellar systems may provide a microenvironment for radiation-induced reactions in biological systems. In particular, they present some systematic studies using micellar systems to provide a simple model environment for radiation-induced radical reactions of e_{aq}, $HO\cdot$, $Cl_2\cdot$, and $H\cdot$.

In Chapter Four, C. A. Bunton discusses micellar effects on the mechanisms of phosphate ester hydrolysis and of decarboxylation reactions. In particular, this chapter is concerned with the manner in which added electrolytes can perturb micellar structures and control micellar catalysis.

Robert A. Moss and his students present an interesting chapter on the role which micelles can exert in controlling the kinetics and stereochemistry of the nitrous acid deamination of amines.

The final chapter, by E. J. Fendler, J. H. Fendler, and their students, discusses catalysis by inverse micelles in nonpolar solvents. An "inversed micelle" can be formed in solvents of low polarity, such as cyclohexane. These micelles contain "pools" of aqueous solutions in an essentially hydrophobic environment. An argument is made that "inverse" micelles might be more pertinent and suitable models for biological systems such as enzymes and membranes than are the usual micelles formed by surfactants in aqueous solution. Some sizable rate enhancements are noted in reactions such as mutarotation and the decomposition of a Meisenheimer complex.

In conclusion, this volume represents a timely addition to the chemical literature and achieves its goal of summarizing significant recent research on reaction kinetics in micelles and should serve as a stimulus to excite new researchers into this field.

Nicholas J. Turro, *Columbia University*

Organic Chemistry of Nucleic Acids. Part A and B. Edited by N. K. Kochetkov and E. I. Budovskii (Institutes of Organic Chemistry and Chemistry of Natural Products, Academy of Sciences of USSR). Translated from Russian by Basil Haigh. Translation edited by Lord Todd and D. M. Brown (Cambridge University, England). Plenum Press, London and New York. 1972. Part A: xvi + 268 pp. $19.50. Part B: xv + 350 pp. $23.50.

This new, two-volume work on nucleic acid chemistry fills an important gap in the chemical literature by gathering together a series of chapters that cover the field in greater breadth than any previous work. The first volume, Part A, contains the Introduction (brief history of nucleic acids, organization of material, recommended general bibliography, nomenclature rules) and four chapters dealing with the general properties of nucleic acids and their monomer units. The titles of these chapters are: Chapter 1, The Structure of Nucleic Acids; Chapter 2, The Conformation of Nucleosides and Nucleotides; Chapter 3, The Electronic Structure and Reactivity of the Monomer Components of Nucleic Acids; Chapter 4, The Secondary Structure of Nucleic Acids.

The second volume, Part B, contains eight chapters dealing with the reactions of nucleic acids and their component parts. The titles of these chapters are: Chapter 5 (the first chapter in Part B), Substitutions and Additions in Heterocyclic Rings of the Basic Nucleic Acids and Their Derivatives; Chapter 6, Exocyclic Substituents of the Bases of Nucleic Acids and Their Derivatives; Chapter 7, Reactions Involving the Cleavage or Regrouping of Heterocyclic Rings of Bases of Nucleic Acids and Their Derivatives; Chapter 8, Hydrolysis of N-Glycosidic Bonds in Nucleosides, Nuceotides, and Their Derivatives; Chapter 9, Reactions of the Carbohydrate Residues of Nucleic Acids; Chapter 10, Cleavage of Phosphodiester Bonds and Some Other Reactions of Phosphate Groups of Nucleic Acids and Their Derivatives; Chapter 11, Some Reactions of Minor Components of Nucleic Acids; Chapter 12, Photochemistry of Nucleic Acids and Their Components.

Most of the chapters are written in review article style. Only in a few cases is the discussion complete enough for self-study, and the new student to the field may require considerable extra assistance. This is particularly true of Part A, where some difficult fundamental concepts are presented. In spite of chapters on electronic properties, conformation, and secondary structure, treatment of physicochemical properties of nucleic acids is inadequate. There is also no discussion of the very important strategy developed by Khorana and his colleagues in their elegant work on polynucleotide synthesis. The editors justify these omissions by stating that this information is available in other monographs. This is only partly true, and it is unfortunate that this material was omitted since it is impossible to present an accurate picture of either nucleic acid structure or their chemical synthesis without this information.

The compendium contains many valuable tables of data describing physical and chemical properties of nucleic acids and their components. These should be very useful to workers in the field. Most of the information is presented uncritically. This is unfortunate because many of the reactions or properties described are of limited value in a practical sense, and this will not be easy for the uninitiated to discern.

Literature coverage is always a problem in a rapidly moving field. The reader is taken through 1969 by good, but not exhaustive, bibliographies at the end of each chapter. The work is already seriously out of date in several important areas, including sequencing, synthesis of polynucleotides, and the chemistry of minor components.

In spite of these criticisms, which are almost inevitable in any undertaking of this magnitude, the work represents a valuable addition to the chemical literature. This reviewer knows of no other place where so much information in this field has been gathered together. The editors are to be applauded for undertaking this monumental task. Anyone interested in nucleic acids from either a chemical or a biological point of view will find a great deal of valuable information in these two volumes. Perhaps the editors will give us a third part presenting some of the new and exciting advances that have been made in this rapidly moving field since the preparation of these two volumes.

Robert W. Chambers, *New York University School of Medicine*

Basic Organic Chemistry. Part IV. By J. M. TEDDER (University of St. Andrews), A. NECHVATAL (University of Dundee), A. W. MURRAY (University of Dundee), and J. CARNDUFF (University of Glasgow). John Wiley and Sons Inc., New York, N. Y. 1972. xii + 528 pp. $14.50 (paperback).

This book is Part IV in the series Basic Organic Chemistry, and, while the first three parts are concerned more with a mechanistic approach to organic chemistry, this book deals solely with the area of natural products chemistry. The title is somewhat misleading for this is not a basic organic textbook but is essentially an advanced text for students who are pursuing graduate work. A general representation of the various types of natural products is presented with considerable emphasis being placed on their biogenesis. It is an approach which is well conceived and very well done.

The work contains nine chapters which cover carbohydrates, compounds derived from shikimic acid, acetate-derived compounds, terpenes, amino acids, proteins, alkaloids, nucleic acids, and pyrrole pigments. While this is still a textbook of organic chemistry, the mechanisms and reactions necessary in the origin of natural products are the main thrust of the discussion. For instance, there is a good analysis of the process of photosynthesis in the chapter on carbohydrates while in the alkaloid section a short note is presented on the postulated mechanism of O-methylation, N-methylation, and methylenedioxy formation. Different methods of structure determination are distributed throughout the text from classical chemical degradations (quinine and codeine) to nmr and X-ray analysis. In a time when nucleic acid chemistry and pyrrole pigments occupy positions in the forefront of organic chemistry, these subjects are presented in a very concise and readable fashion and will enable the reader to much better understand the relevant topics in both these areas.

There is a subject index in the book and a list of problems at the end of each chapter. Also an average of 12 references are listed at the end of each chapter for further reading. There are a few minor errors in spelling but none of any great consequence.

This is an excellent book for chemists who are pursuing research in a specific area of natural products but who wish to know more about the other areas. It would also appear to be a must for anyone conducting courses in natural products or in biosynthesis.

James M. Cook, *University of Wisconsin, Milwaukee*

Progress in Bioorganic Chemistry. Volume 2. Edited by E. T. KAISER (University of Chicago) and F. J. KÉZDY (University of Chicago). Wiley-Interscience, New York, N. Y. 1973. xiii + 258 pp. $16.50.

This is Volume 2 of the series and is divided into four chapters which are concerned with the effects of micelle-forming surfactants on reaction kinetics, the apolar bond, the mechanism of action of folic acid cofactors, and the catalytic activity of pepsin.

The book begins with a discussion of amphipathic molecules and micelle formation. There is a good description of the factors which influence the kinetics of reaction in the presence of micelle-forming surfactants including effect of surfactant structure, effect of substrate structure, reaction site, and salt effects. Several examples of synthetic and natural compounds which form micelles are presented as well as a discussion of enzyme interactions with amphipathic molecules and surfaces with respect to catalytic activity.

The second chapter deals with the apolar bond. It is an attempt to reexamine the experimental and theoretical results obtained after the original formulation of the apolar bond in the hope of providing a framework for a quantitative application to proteins. However, the author finishes the chapter by stating he no longer believes this is possible and perhaps a new approach to the thermodynamics of protein–solvent interactions may be necessary.

The section on folic acid cofactors presents a concise description of methyl transfer reactions and the oxidative–reductive interconversions of folic acid cofactors. It is not a complete review of all known reactions of folic acid cofactors, as the authors point out, but is meant to acquaint the reader with the present state of the science. The emphasis here is on the model work which has been carried out.

Chapter Four is devoted to the catalytic effect of pepsin. The author describes in a logical manner the chemistry previously performed on pepsin and makes several suggestions on areas demanding additional work. Several possible mechanisms for pepsin action are presented; however, the conclusion reached is that, to abolish mechanistic uncertainties, pure pepsin will be required for future investigations.

This volume contains an author index as well as a subject index. There are 547 references cited although very few of them are dated later than 1971. The authors have tried to organize a book which is both informative and which emphasizes the breadth of the field that is encompassed by bioorganic chemistry. To this end they have been successful.

James M. Cook, *University of Wisconsin, Milwaukee*

Analytical Profiles of Drug Substances. Volume 2. Edited by KLAUS FLOREY (The Squibb Institute for Medical Research). Academic Press, New York, N. Y. 1973. xi + 575 pp. $18.50.

This second volume in a series, prepared under the auspices of the Section on Pharmaceutical Analysis and Quality Control of the Academy of Pharmaceutical Sciences, provides comprehensive information for twenty-one drugs. Separate chapters for each drug present its description; physical properties including ir, nmr, uv, fluorescence and mass spectra, p*K*, thermal characteristics, solubilities, etc.; chemical synthesis; stability; pathways for metabolism; methods of analysis; and, in some instances, pharmacokinetics and methods for drug determination in body fluids and tissues. The traditional compendia are therefore complemented by these "profiles" which go far beyond a description of methods for establishing identity, purity, strength, and quality of drugs.

Information has been drawn from widely scattered publications and, in many cases, from previously unpublished work. The resulting analytical "profiles" provide the researcher with almost everything he always wanted to know about a drug but was unable to find.

In future volumes, greater emphasis on the pharmacokinetics and biopharmaceutics of the specific drugs, together with a clearer distinction between analytical methods applicable to such studies and those procedures useful for bulk drug and formulation analyses, would be appropriate.

This series provides primary reference material which should be of value to academic, industrial, and governmental investigators in the pharmaceutical sciences.

Arlington A. Forist, *The Upjohn Company*

Chemistry: An Ecological Approach. By ROGER G. GYMER (California State University in Fresno). Harper & Row Publishers, New York, N. Y. 1973. xxi + 801 pp. $12.95.

This freshman chemistry text is intended "primarily for students studying subjects related to chemistry and for students of chemistry who wish to relate chemistry to other disciplines. Its intention is to present, without superficiality, the basic principles of modern chemistry within a loose framework of man's interactions with the natural environment." The author has avoided the pitfalls associated with many of the newer texts. He has written a text which relates chemistry to the ecological concerns of today yet deals with the chemistry in such a way that students will have an excellent background for further studies in the field of chemistry and related sciences.

There are approximately 320 end-of-chapter problems and questions, with answers for about 50% given. Although the quality of the problems and questions is excellent and many have an ecological "flavor," it would appear that several more could have been ecologically oriented to create more student interest.

The success of a text may very well rest with the first 75 pages. If the material in these few pages is presented in an interesting and readable style the chances of a student making the best possible use of the text are greatly enhanced. In the first three chapters the author has captured this style to lead the student through an intriguing review of basics and into a discussion of unfamiliar materials. Don't plan to use your old notes on these chapters!

Chapter Six, dealing with the absorption of energy by molecules, establishes a good background for the spectroscopy experiments that are becoming common to the freshman laboratory. Chapters Seven and Eight, dealing with air pollution and physical properties of water, include strong theory sections which are then related to man's influence on his environment. The teacher who wants to go further into the environmental aspects of these two topics will find it very easy to do so. Chapter Nine, "Solutions and Solubility," does a good job in the traditional manner, but the author has failed to relate the topic to ecological examples. Chapter Ten, "Protons and Electron Transfer," also deserves special comment for establishing a strong theoretical basis for several common laboratory experiments.

Although Chapter Seventeen, "Reaction Kinetics and Enzymes," is well written in the traditional manner, I must still fault the chapter for failing to mention the ecological aspects of many of the examples used. Kinetics is a topic that needs much assistance if it is to be palatable for many beginning chemistry students.

The author has recognized the growing interest in biochemistry and has included five good chapters that are oriented in this direction. The value of the book has been improved by the inclusion of a summary at the end of each chapter.

The book reads well and is worthy of consideration by any school wanting to establish a balance between the coverage of chemistry and ecological concerns.

E. R. Gerlach, *Muskingum College Environmental, Educational and Research Institute*

Process Modeling, Simulation, and Control for Chemical Engineers. By W. L. LUYBEN (Lehigh University). McGraw-Hill Book Co., New York, N. Y. 1972. xviii + 558 pp.

This text is one of a continuing series of attempts to produce a usable book for seniors and first-year graduate students in chemical engineering. The author appears to have profited from previous books, and his own experience, for this appears to be an excellent process control text. The simulation topics are also well covered, and the modeling is the weakest aspect of the book.

There is excellent balance throughout. Both analog and digital methods are treated well but not overdone. The mathematical theory is explained but does not dominate the practical. There is a good selection of examples and problems. The use of graphics is also in correct proportion, which is most important for the varied illustrative requirements of this subject area. The one exception to this is the reproduction of computer programs and output, which is not good.

The author has elected to omit some topics, such as optimal control and Lyapunov stability. This is probably a wise decision for purposes of the intended audience. Likewise, the notation of linear algebra is used minimally and clearly, as it should be. Useful material is included on feedforward and sampled data systems. Perhaps the weakest area, and somewhat disappointing, is the theoretical emphasis in the material on digital control. A state-of-the-art discussion, with some case histories, would have been desirable.

Overall, there are many improvements over past texts, and this book warrants close inspection by teachers of control, and by those wishing self-study in chemical process control.

Robert H. Kadlec, *University of Michigan*

Electronic Transitions and the High Pressure Chemistry and Physics of Solids. By H. G. DRICKAMER and C. W. FRANK (University of Illinois, Urbana). Chapman and Hall, Ltd., London. 1973. x + 220 pp. $16.50.

Although much of our chemical knowledge concerns properties and processes as a function of temperature at fixed pressure, usually atmospheric, there is a rapidly growing interest in the nature of materials at high pressures. This is a field which has been very much advanced by the many contributions from Professor Drickamer's laboratory at the University of Illinois, with these contributions showing the development and perfection of Bridgman's pioneering methods. The field is of particular interest today because of its relevance to geochemical and astrochemical phenomena. The present volume presents in monograph form a review of the progress in high pressure measurements and their interpretation for a variety of electronic properties of both inorganic and organic solid systems. The authors begin with an elementary account of molecular orbital and ligand field theories, the description of electron donor–acceptor complexes, and the band structure of solids. Less familar to most readers will be the discussions of the energetics of thermal *vs.* optical transitions and the free-energy description of continuous electronic transitions. After a very brief survey of the methods for generating pressures up to several hundred kilobars and for carrying out optical absorption, electrical resistance, X-ray diffraction, and Mössbauer resonance measurements at these pressures, the authors discuss many of the more important and interesting electronic effects which have been observed. Energy shifts for d–d transitions in transition metal complexes, color center excitations in alkali halides, and π–π^* transitions in aromatic systems are featured, as are insulator–metal transitions in simple inorganic solids. However, the largest single topic, to which more than a quarter of the volume is devoted, is that of spin changes in iron complexes. The book concludes with a description of pressure-induced reactions in aromatic molecules and charge-transfer complexes.

This volume is highly recommended to those interested in the electronic structure of solids and is a must for those with specific interests in high pressures. The wealth of data presented, together with the many references, should make this book fertile hunting ground for chemical and solid state theoreticians in search of research ideas.

Lawrence L. Lohr, Jr., *University of Michigan*

Foreign Compound Metabolism in Mammals. Volume 2 (1970 and 1971). By D. E. HATHWAY (University of Essex), S. S. BROWN (MRC Clinical Research Centre), L. F. CHASSEAUD (Huntingdon Research Centre), D. H. HUTSON (Shell Research Limited), D. H. MOORE, (Huntingdon Research Centre), I. P. SWORD (Huntingdon Research Centre), and P. G. WELLING (University of Wisconsin). The Chemical Society, London. 1973. xv + 513 pp. £ 11.00.

This is another of the Chemical Society's specialist periodical reports series. The availability of computerized search available in this country makes one wonder about the value of such series. The reviewer has too often missed important contributions omitted from a report series to be easily enthusiastic about this type of reviewing. However, the increase of volume of metabolic studies on clinically useful drugs and candidates for such purpose singles out this series as most useful to investigators in this branch of chemical investigations. As a matter of fact the series appears to be ideally suited for an organic chemist who has never had any exposure to metabolic studies and has to enter this type of specialization. A special introductory chapter dealing with biological availability, selection of animals, methods of measurement of drug levels, etc., is most useful. The use of tracer techniques, biotransformations of the drug in the body, and classification of different types of drugs are all handled with thoroughness. The use of arabic numerals for structures is most welcome. An omission in cancer chemotherapy in regard to the widely used Vinca alkaloids sheds unfavorable light on the thoroughness of the preparation of this chapter.

Norbert Neuss, *Lilly Research Laboratories, Eli Lilly and Company*

Instrumental Analysis of Cotton Cellulose and Modified Cotton Cellulose. Edited by R. T. O'Connor (USDA, Southern Regional Research Laboratory). Marcel Dekker, Inc., New York, N. Y. 1971. x + 490 pp. $29.50.

Volume 3 of the Fiber Science Series of ACS reviews available information on a range of instruments useful for the analysis of cotton and some of its derivatives. Chapter 1 is concerned with elemental analysis; Chapters 2 and 8 present infrared spectroscopy techniques suitable for the analysis of cotton and modified cotton; Chapters 3 and 4 include the applications of light and electron microscopy for the study of cellulose and its derivatives; Chapter 5 presents different techniques for the study of thermal degradation; Chapter 6 is concerned with X-ray diffraction; and Chapter 7 describes applications of nmr.

This book is well produced and amply illustrated with tables, figures, and photographs. The newer, more useful methods of instrumental methods are described in different degrees of detail. Several chapters present basic instrument requirements rather than attempting to categorize and depict the host of available instruments. A majority of contributors have supported their efforts with outstanding citations of pertinent literature in order to present to the reader greater insight into the techniques and applications as well as theoretical aspects. References range from adequate to superb. Any reader having a need for spectra or other data relating to man-made fibers will find that these are included in the text of the book but not in the subject index.

Analytical textile chemists, as well as advanced technicians, will find this book to be a useful and concise reference work for instrumental cotton analysis. The authors have described many of the common as well as unusual problems arising from the use of, or in conjunction with, sampling and operating the instruments. Sufficient information is included concerning the methods or approaches by which many of these problems may be solved.

This reference work is recommended as a useful tool and should be available to all textile analysts.

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Elucidation of Organic Structures by Physical and Chemical Methods. Part II. Second Edition. Edited by K. W. Bentley (Reckitt and Colman) and G. W. Kirby (Longhborough University of Technology). Wiley-Interscience, New York, N. Y. 1973. xiii + 561 pp. $27.50.

This book is Volume IV of the series "Techniques of Chemistry" (A. Weissberger, Editor). The first edition, now nine years old, has been completely rewritten by a new team of authors. Part II is devoted to methods of chemical degradation: Dehydrogenation and Zinc-dust Distillation (Z. Valenta); Reduction Methods (J. P. Candlin and R. A. C. Rennie); The Fission of Carbon-Carbon Bonds (K. W. Bentley); Alkali Fusion and Some Related Processes (C. L. Weedon); Degradation of Polysaccharides (G. O. Aspinall); and Degradation of Polypeptides and Proteins (A. Fontana and E. Scoffone). It should be noticed that there are some changes from the first edition in topics covered. Some of the methods are of very venerable vintage, and it is surprising that not all of them seem to have been the subject of comprehensive reviews before.

As in other volumes of this series, much practical information about choice and execution of procedures is given, with many examples, and representative experimental procedures. Many hundreds of references are given, and the contributors appear to have been fully alert to the many instances of a newer method or reagent supplanting an old one. Recent references preponderate, but neither the editors nor the contributors state explicitly how recently they searched the literature (some references to 1970 articles can be noticed, but there are apparently none more recent). A book of this quality deserves not to be marred by such an oversight.

Pollution: Engineering and Scientific Solutions. Edited by E. S. Barrekette (IBM Corp.). Plenum Press, New York, N. Y. 1973. xv + 784 pp. $35.00.

This is the proceedings of the First International Meeting of the Society of Engineering Science, held in Tel Aviv in June 1972. The texts of sixty-eight papers are reproduced by photo-offset from typescripts. The topics vary from those that are largely chemical to the physical (noise) and the political, and are impressive in their variety. The primary appeal is to those concerned with engineering problems and their solution, but many parts are not without interest to the chemist, *or*, for that matter, the general reader.

Ultrasonics. By Dale Ensminger (Battelle Columbus Laboratories). Marcel Dekker, Inc., New York, N. Y. 1973. xvii + 570 pp. $24.50.

The statement in the Preface of this book, that it "is intended to highlight the scope of . . . applications", gives a proper idea of the author's aim. It covers chemical aspects of ultrasound in chapters on Determining Properties of Materials, and Applications of Ultrasonics Based on Chemical Effects. The bibliographies, which are far from encyclopedic, emphasize patents and journals not generally read by chemists, although some of the topics, such as accelerated etching, demulsification, and electrolysis and electroplating, should be interesting to various chemists.