

Book Reviews *

Amino Acid Metabolism. Second edition. By David A. Bender (Courtauld Institute of Biochemistry, The Middlesex Hospital Medical School, London). John Wiley & Sons, Ltd.; Chichester, UK, and New York, 1985. xi + 263 pp. \$38.00. ISBN 0-471-90668-9.

This short work carries a welcome title since no book on amino acid metabolism has appeared in recent years. The first three chapters, on nitrogen metabolism, nitrogen balance and protein turnover, and transport of amino acids across membranes, are followed by one on the role of vitamin B₆ in amino acid metabolism and by six on the various amino acids. The work ends with an appendix on the amino acids and one on inborn errors of amino acid metabolism. In the limited available space the book carries a remarkable amount of useful information, culled from a variety of sources. Many sections, such as the discussion of protein turnover and the treatment of tryptophan metabolism (the author's own research field), are elegant. Unfortunately, major editorial treatment is needed to change the work from an adequate to a good one. Text and figures show a profusion of errors or strange expressions that can mislead or confuse the undergraduate and graduate students for whom the work is intended. A few examples follow: p 3, "prokaryotic bacteria"; p 14, methyl tetrahydrofolate is used in the conversion of deoxyuridylylate to thymidylylate; p 15, nucleotide diphosphate and (twice) nucleotide triphosphate; p 18, nucleotidase hydrolyzes guanylic acid to free guanine, inosine is oxidized to hypoxanthine, guanine is oxidized to xanthine; p 23, "transdeamination"; p 22, amino transfer to glycine; pp 40 and 62, Schoenheimer's classic "The Dynamic State of Body Constituents" was published in 1942 (the year after Schoenheimer's death), not 1946; p 44, chymotrypsin is stated to be specific for aromatic esters; lysosomes are mentioned on this page (though not in the index) but the word cathepsin is not to be found; p 76, riboflavin 5'-phosphate is called a "rather unusual prosthetic group", although FMN, which of course is the same substance, was already mentioned on p 11 without special comment; p 104, wrong structures for pyruvate and for 2-amino-3-oxobutyrates; p 106 and 109, wrong structures for glycine and D-glycerate; p 109, D-glycerate kinase is stated to convert D-glycerate to 2-phosphoglycerate (illustrated by Figure) rather than to 3-phosphoglycerate; p 127, proline is the energy source for all insect flight muscles, a statement that a tsetse fly would welcome but that other insects would contest; pp 112 and 166, S-adenosylhomocysteine (printed as two words on one page and as one word on the other) contains a sulfonium sulfur; p 163, cystathionine has a pentavalent carbon; p 209, 6-methyldihydrobiopterin—a substance that does in fact not appear to have been reported—contains three carbons less than dihydrobiopterin (given correctly on p 21); p 209 again, 4- α -carbinolamine is a pterin; p 112, the structures for methionine and for homocysteine and their derivatives contain one CH₂ group too many, while in the amino acid appendix ethionine and methionine are each short of a CH₂ group, carboxylglutamic acid is depicted as a β -amino acid, and oxoproline (pyroglutamic acid), printed almost exactly under proline, has its carboxyl group at the wrong place. The terms ketogenic, glucogenic (or glycogenic), induction, repression, or enzyme are not found in the index. Throughout the book no distinction is made between synthases and synthetases; dehydrase is used instead of dehydratase, and carbamyl phosphate instead of carbamoyl phosphate. Far more serious than the above deficiencies is a lack of coherence. One of the beauties of the field is the utilization of a limited number of substances—except for histidine—in amino acid biosynthesis, and the degradation of the twenty amino acids from proteins to a limited number of compounds, all close to or in the tricarboxylic acid cycle. One looks in vain for this kind of unifying elegance. Again, a number of fascinating topics which belong in a modern treatment of the field and which could be mentioned without materially increasing the length of the book, such as the commercially exploited production of amino acids by microorganisms, the Stickland reaction, the relation between the study of arginine biosynthesis and the enunciation of the one gene, one enzyme relationship, the discovery of coenzyme B₁₂ as a consequence of the study of an aspect of bacterial glutamate metabolism, the role of amino acids as growth factors for bacteria and the related studies of enzyme repression, the biological function of the ATP-dependent proteases, the role of glutamate 1-semialdehyde as a precursor of δ -aminolevulinic acid in organisms that do not contain δ -aminolevulinic acid synthase, are missing. The individual pages carry no running heads or chapter numbers so that the literature citations at the end of the individual chapters are hard to find. There is no author

index. It is most unfortunate that blemishes and omissions detract from the value of what would otherwise be a much needed treatise.

Herbert C. Friedmann, *The University of Chicago*

Advances in Carbohydrate Chemistry and Biochemistry. Volume 43. Edited by R. Stuart Tipson and Derek Horton. Academic Press, Inc.: Orlando FL. 1985. xi + 459 pp. \$75.00. ISBN 0-12-007243-2.

"Natural-Abundance, ¹³C-Nuclear Magnetic Resonance Spectral Studies of Carbohydrates linked to Amino Acids and Proteins" are discussed by K. Dill, E. Berman, and A. H. Pavia. This relatively young but powerful technique is well suited for structural studies of "intact" glycoproteins and polysaccharides and of their interactions with enzymes, toxins, lectins, and metal ions. The technique complements and expands analytical methods for determinations of carbohydrate types and linkages in such molecules, which first must be isolated in pure form by wet methods. ¹³C signals for certain carbohydrate substructures appear in fairly defined "reporter-group" regions of the NMR spectra. Exploring the subject area from a different viewpoint, H. G. Garg and R. W. Jeanloz discuss "Synthetic N- and O-Glycosyl Derivatives of L-Asparagine, L-Serine, and L-Threonine" with respect to synthesis, chemical reactivity, and characterization. The laboratory of the authors has been especially productive in this area, and the account can be considered comprehensive and authoritative. Unusual carbohydrate linkages to other amino acids are only briefly mentioned. Tables with properties for the three types of compounds are included, and an addendum covering the most recent work is promised. B. Casu, in "Structure and Biological Activity of Heparin", discusses biosynthesis, purification, characterization, structure, cleavages, conformation, chemical modification, polyelectrolyte properties, complexation, and biological activity of this important macromolecule. Over 500 literature references reach well into 1984. This concentrated and highly readable account has obviously benefited significantly from contacts of the author with leading workers in the field.

"The Bibliography of Crystal Structures of Carbohydrates, Nucleosides, and Nucleotides", by G. A. Jeffrey and M. Sundaralingam, brings the subject up to date until 1980. A formula index for years 1935–1980 relates to the Cambridge Crystallographic data bank "refcode" and to previous publications in the "Advances." The subject index of Volume 43 contains only compounds discussed in the main part of the article. Errata for the years 1970–1978 have been meticulously collected.

In summary, Volume 43 is an indispensable addition to the libraries of institutions and individuals with research interests in structural carbohydrate and glycoprotein chemistry.

Paul H. Gross, *University of the Pacific*

Fundamentals and Applications of Chemical Sensors. Edited by Dennis Schuetzle and Robert Hammerle (Ford Motor Company). American Chemical Society: Washington, D.C. 1986. x + 394 pp. \$74.95. ISBN 0-8412-0973-1.

According to a recent survey by Battelle Memorial Institute, sensor technology leads a list of five research topics which industries around the world would like to pursue. It is not surprising that symposia and publications related to sensor technology have increased significantly in recent years. This book is a collection of papers presented in two symposia related to chemical sensors in 1983 and 1984. The text contains 23 papers which are divided into five sections: General Discussion (2 papers), Gas Sensors (10 papers), Sensors for Liquids and Solids (4 papers), Environmental Sensors (4 papers), and Biosensors (3 papers). Most of the authors are well-known researchers in the field, and Japanese researchers are well represented in the gas-sensor section (half of the ten papers are contributed by Japanese researchers). The general discussion section provides a review of Japanese gas-sensor development and a discussion of chemically sensitive electronic devices. The gas-sensor papers concentrate mostly on zirconium oxide and tin-oxide-based sensors with a couple of papers describing the applications of microelectronic fabrication techniques to the production of chemical sensors. A paper on chemically modified electrodes and one on a coated wire ion-selective sensor are included in the sensors for liquids and solids, while the other two deal with IR sensing techniques. The four papers in the environmental sensor section include one dealing with electrochemical sensors, two papers from the same research group dealing with a film coated surface acoustic wave detector and an optical waveguide, and one involving microbial sensors. Papers describing Langmuir-Blodgett film, drug sensors, and subcutaneous-type glucose sensors are included in the

*Unsigned book reviews are by the Book Review Editor.

biosensors section.

These papers can serve well as reference sources for readers interested in the research subjects, particularly in the field of gas sensors. For readers who expect to learn about the fundamentals of chemical sensors, this book would not suffice. Because of the nature of a research paper, most of the papers would not serve as an overview or comprehensive review of the subject matter. It is also disappointing that only three papers are included in the biosensors section, one of the more interesting research and development areas for chemical sensors. However, this book should be a useful overall reference for chemical sensor researchers.

One research direction on chemical sensors is clearly indicated from this collection of research papers—the application of microelectronic and electronic fabrication techniques to the development of various types of chemical sensors. This should assist researchers in the field to advance their research endeavors.

Chung-Chium Liu, *Case Western Reserve University*

The Mystery of Life's Origins. By Charles B. Thaxton (Foundation for Thought and Ethics), Walter L. Bradley (Texas A&M), and Roger L. Olsen (D'Appolonia Waste Management Services). Philosophical Library: New York. 1984. xii + 228 pp. \$14.95. ISBN 0-8022-2446-6.

At some time in prehistory our loin cloth clad ancestors must have sat around a camp fire and speculated on where they came from and how the world around them functioned. These early intellectuals had little understanding of natural processes and no formal training in scientific thinking. Therefore, they could not explain why the sun produced warmth and light or why there were seasons and lapsed into calling upon supernatural forces to produce these effects, i.e., a sun god, a god of spring, etc. They also made up creation myths to explain their origin and the origin of the world around them. Most of these myths and gods have been chased away from our modern world by the development of scientific explanations for most natural phenomena. However, this book demonstrates that modern men still have the capacity for such fallacious reasoning.

The first ten chapters of *The Mystery of Life's Origin* deal with various "discrepancies" in our present understanding of the processes that produced life on Earth. These chapters are written in a somewhat strident manner with the arguments delivered, bang-bang-bang, like rounds from a machine gun. The logic of most arguments is quite precise, but the premises have been carefully selected so the conclusions discredit the idea that life could have arisen as a result of chemical evolution. In a few cases, particularly those involving nonequilibrium thermodynamics, the authors were nonpulsed and forced to abandon logic altogether. For example, they try to nullify the work of Ilya Prigogine and co-workers with statements such as the following: "Nevertheless, one cannot simply dismiss the problem of the origin of organization and complexity in biological systems by a vague appeal to open-system, non-equilibrium thermodynamics." Chapter 11 summarizes this diatribe and draws the conclusion that life could not have originated on the Earth as a result of natural processes. This conclusion leads into an epilogue that states that, because our present model of the origin of life on Earth has serious shortcomings, we can never develop a scientific explanation for the origin of life; therefore, life on the Earth must be the result of supernatural intervention. The authors further suggest that this proposal of supernatural intervention should be considered as a valid approach for all "origin" sciences (e.g., if a geologist cannot explain how a particular mountain belt formed he should consider the hypothesis "Some metaphysical event produced it"). This proposal (another version of creation "science") calls us back to the intellectual stage of loin cloth times. I cannot recommend this book except to those who wish to be amused by yet another creation "science" myth.

J. Donald Rimstidt, *Virginia Polytechnic Institute and State University*

Orbitals. Terms and States. By M. Gerloch (Cambridge University). John Wiley & Sons: New York. 1986. xii + 176 pp. \$31.95. ISBN 0-471-90935-1.

This textbook deals with atomic structure, angular momentum, and the electronic structure of diatomic molecules, at a level suitable for advanced undergraduate students in a course in physical chemistry. The author has rendered this introductory text readable by supplying the relevant equations and the supporting physical arguments, while omitting proofs and detailed discussions.

Chapters 1–4 concern the atomic Schrödinger equation, atomic orbitals and angular momentum, many-electron atoms, and spin-orbital coupling, respectively. The last of these is probably the strongest chapter of the book: the Russell–Saunders and j – j coupling schemes are illustrated for the case of two d -electrons and several figures—a quasimechanical depiction of the two schemes (Figure 4.2), and a correlation diagram (Figure 4.9)—are pedagogically useful. In Chapter 5 the subject

of atomic structure is completed with a discussion of the Pauli Exclusion Principle and atomic coulomb and exchange integrals.

Chapter 6 introduces some of the machinery of quantum chemistry; the topics include the following: Hilbert spaces, the expansion theorem, perturbation theory, the variation method, and the noncrossing rule. One point of possible difficulty for the unsophisticated reader is the use of orthogonal and nonorthogonal bases on successive pages without warning.

Chapter 7 on the molecular orbital theory of diatomics is the weakest chapter of the book. The brief introduction to group theory only applies to the nondegenerate case; this is likely to mislead the student since a good part of the chapter explicitly concerns degenerate π -type orbitals. Compounding this problem, errors occur in the labeling of Figure 7.6 and the accompanying text, which describe the behavior of π -orbitals under reflection. There is also an error in the labeling and discussion of Figure 7.9, which depicts exponential phase factors. The book closes with Chapter 8 on the states of diatomic molecules.

Orbitals, Terms and States provides, except for Chapter 7, a clear and readable descriptive introduction to the quantum mechanics of atomic and molecular structure which is written in a pleasant style. The more advanced student will want to read it in conjunction with other texts as the scope and depth of the book is limited.

Jerome M. Schulman, *City University of New York, Queens College*

Organic Functional Group Preparations. Volume II. Second Edition. By S. R. Sandler (Pennwalt Cort.) and W. Karo (Polysciences, Inc.). Academic Press: Orlando, FL. 1986. xiii + 548 pp. \$99.00. ISBN 0-12-618602-2.

The original edition (1971) contained the same 17 chapters, each on a functional group, from allenes to ynamines, as this second edition, but the chapters now average 10% longer and include some newer references, expanded tables, and additional preparations. The text has generally not been rewritten, but instead, new information has been dubbed in or appended at the end. For example, the chapter on carbodiimides contains five new references in the body of the chapter (denoted a, b, etc., so as not to change the original numbering) and 14 new references at the end referring to as many "miscellaneous methods" described tersely without equations or comment (e.g., "Dehydration of amidoximes"). This method of bringing a book up to date does the job, although minimally, and its use can be understood when one considers the amount of work required for a completely rewritten revision. It has the disadvantage of perpetuating errors (there are some small ones, such as a citation of an article in the mysterious journal "T. prakt. Chem").

The authors have not merely added more recent references but have gone back to resurrect some previously overlooked ones dating before 1970. However, not every new development has been included. In the chapter on imines, for example, the extraordinarily useful method using dibutyltin dichloride is not mentioned. Nevertheless, this is a useful work that will probably pay for itself in saved time. The experimental details described for representative preparations are particularly useful, especially since some of them come from the author's personal experience.

Organic Electronic Spectral Data. Volume XXII. 1980. Edited by John P. Phillips, Dallas Bates, Henry Feuer, and B. S. Thyagarajan. John Wiley & Sons: New York. 1986. xvi + 1068 pp. \$120.00. ISBN 0471-83816-0.

On its 30th anniversary, this series rolls relentlessly on, taking the great increase in the amount of published research in stride. The system remains the same: a list of compounds in formula-index order, with numerical values of λ_{\max} and $\log \epsilon$ and identification of the medium. All entries are accompanied by references, which are to publications appearing in 1980. Specific compounds of the same molecular formula are distinguishable, since every compound is named. Unfortunately, the names are not those that are usually used for communication from chemist to chemist but are the inverted names used in Chemical Abstracts indexes. These are designed solely for use in an alphabetical index, which is not present. On the other hand, it is gratifying to find trivial name equivalents cited along with the cumbersome CA names (e.g., tansanin, the CA name of which occupies four lines).

Natural Resistance of Plants to Pests. Edited by M. B. Green and P. A. Hedin. American Chemical Society: Washington, D.C. 1986. x + 243 pp. \$44.95. ISBN 0-8412-0950-2.

Plant resistance to herbivory by animals and attack by microorganisms is frequently the result of the presence of secondary metabolites within plant tissues. Some of these metabolites, like the phytoalexins, accumulate in response to attack. Many others are constitutive. There is a great variety of these chemicals both within individual plant species and across the plant kingdom. Many of these chemicals are much better known for their benefit to man than their benefit to plants. This book describes attempts to understand the role of secondary plant metabolites

in the defense of plants to attack and herbivory. There have been a number of other books written on this subject, but the particular advantage of this volume is that it considers the chemical basis of plant resistance in a general way, rather than by discipline, as is normally done. The lack of communication between the disciples of plant pathology, entomology, and animal science on this matter is illustrated in this book by the different parallel systems of nomenclature that have been erected to describe the same phenomena. Hopefully, continued efforts will be made to bring together the researchers and literature of the various fields as was done in the symposium that allowed publication of this book. As with most books of this type, the quality is spotty. Some chapters, such as that by A. A. Bell, provide an excellent overview of a particular subject. Other chapters were quite narrow in their scope and would have been more appropriately published in research journals.

N. K. Van Alfen, *Utah State University*

ANNUAL REPORT on the Progress of Chemistry. Volume 81. 1984. Section C, Physical Chemistry. Senior Reporter: M. C. R. Symons (University of Leicester). The Royal Society of Chemistry: London. 1985. xii + 336 pp. \$97.00. ISBN 0-05186-86-22.

Of the eight chapters, besides the introduction, five are primarily concerned with the kinetics and thermodynamics of liquid mixtures. They include both electrolytes and nonelectrolytes. The chapter on entropy of hydration of ions includes a compilation of numerical values. A review of catalysts, primarily heterogeneous, updates similar reviews in previous volumes. The new topic of muonium chemistry is included. The last section describes analytic techniques for calculating derivatives of molecular potential surfaces.

All chapters contain extensive bibliographies. A comprehensive author index is given.

R. C. Wilhoit, *Texas A&M University System*

Progress in Clinical Biochemistry and Medicine 3. By R. Flückiger and W. Berger (University Clinics Basel), H. G. Köppe (Boehringer Ingelheim KG), C. E. Mountford, K. T. Holmes, and I. C. P. Smith (University of Sydney), E. L. Nickoloff (Squibb), and R. M. Wenger, T. G. Payne, and M. H. Schreier (Sandoz Ltd). Springer-Verlag: New York. 1986. xii + 191 pp. \$49.50. ISBN 0-387-16249-6.

This volume contains five review articles that are concerned with a wide variety of topics. These range from simple methodology through drug design to NMR spectroscopy of cancer cells.

The first chapter (Flückiger and Berger) reviews the methods available for metabolic control of diabetes. In covers both methodological and clinical aspects of the subject with references through to 1985. The authors discuss the use of reagent strip methodology for monitoring glucose concentrations, the quantification of hemoglobin glycosylation, an assay for the analysis of C-peptide by RIA after glucagon injection, and methods for monitoring abnormalities in renal function. The review is clear and concise, and it will act as a useful source book for new workers in the field.

The second chapter (Köppe) is a review of recent developments in the field of β -adrenoceptor blocking drugs and covers the literature to 1984 with 269 references. A brief history of structure activity relationships in this field is provided. This is followed by a discussion of recent developments in β -1 antagonists, chiral-antagonists, short acting β -blockers, and β -antagonists as anti-hypertensives. The review is mainly a catalog of drug development with a frustrating lack of a critical overview. For example, the toxicity of the β -1 antagonist practolol is dismissed in one line while little space is devoted to a discussion of the efficacy of this group of antagonists. The section on enantioselective drugs is disappointing, and little attention is drawn to potential differences in disposition that can be observed with enantiomers derived from racemic drugs.

The third chapter on the NMR analysis of cancer cells (Mountford, Holmes, and Smith), covers an enormous amount of ground. Fundamental aspects of NMR are described, followed by sections on the NMR of intracellular compounds, the NMR of plasma membrane, biological considerations in NMR, cancer metastases, and drug resistance. The literature is covered to 1985.

The fourth chapter (Nickoloff) is a very basic introduction to radioimmunoassays likely to be used in the clinical laboratory. The article covers basic definitions and types of immunoassays together with an introduction to choice of methods and quality control.

The final chapter, on cyclosporine (Wenger, Payne, and Schreier), discusses the structure-activity relationships and mode of action of this potent immunosuppressive drug. The review provides an excellent overview of recent advances in understanding the mechanism of action of this fascinating compound. The only criticism is that recent references have been omitted from the section on metabolism.

The enormous range of material covered in this volume suggests that it will not appeal to individual investigators. However, it would be a useful addition to the libraries of medicinal chemistry, clinical biochemistry, and pharmacology.

Ian A. Blair, *Vanderbilt University*

The Industrial Uses of Tin Chemicals. By S. J. Blunden, P. A. Cusack, and R. Hill (International Tin Research Institute). The Royal Society of Chemistry: London. 1986. ix + 337 pp.

This book describes the utility of the inorganic and organometallic compounds of tin for industrial and commercial applications. After a brief introduction outlining the range of applications, a concise overview of the industrial methods of preparation of tin compounds is given, followed by a section discussing the toxicological aspects of tin compounds. The succeeding ten chapters cover the applications of tin compounds in antifouling systems: as agrochemicals, wood preservatives, PVC stabilizers, fire retardants, pharmaceuticals, catalysts, reducing agents, and in the glass and ceramics industries. An additional chapter discusses a number of miscellaneous uses of tin compounds which are of specialized interest even though these applications do not account for a major percentage of the quantity of tin compounds used industrially. The final chapter deals with environmental aspects concerning tin compounds, notably the organometallic derivatives. The mode of entry into the environment, the aqueous chemistry of these compounds, their possible transformations, and methods of removal are discussed.

This book is well-written. The extent of discussion of each application is intended to reflect the amount of research being carried out in the field rather than to indicate the application's industrial importance. Each chapter contains a section introducing the industrial application area, followed by examples of specific tin compounds and their modes of action in these applications. The authors have made liberal use of tables and photographs in their presentation, and the lists of references are substantial. This book should provide worthwhile reading for anyone who is interested in tin chemistry.

Arlene R. Courtney, *Murray State University*

Neuromethods. Volume 4. Receptor Binding. Edited by Alan A. Boulton, Glen B. Baker, and Pavel D. Hrdina. The Humana Press Inc.: Clifton, New Jersey. 1986. xxi + 584 pp. \$64.50 US/\$74.50 export. ISBN 0-89603-078-4.

This book is the fourth volume of the neuromethods (Series 1: *Neurochemistry*), which aims to offer a practical guide to everybody in all areas of neuroscience. This volume contains 15 chapters which were written by the active workers in the specified area. The first chapter is concerned with the general principles of receptor binding, including the definition and criteria of the binding specificity, Scatchard plot, and Hill plot in order to obtain the kinetic constants. From Chapter 2 Chapter 14 the current knowledge of the receptor bindings is reviewed, such as on the dopamine, adrenergic, serotonin, tryptamine, and phenylethylamine, muscarinic cholinergic, excitatory amino acids, GABA, nonopioid, multiple opioid, purinergic, benzodiazepine, antidepressant, phencyclidine, and amphetamine. The authors are concerned largely with the pharmacological characteristics of the agonist and antagonist, such as binding constant (K_d), maximum number of receptor sites (B_{max}), receptor subtypes, and localization. The implication of those studies to the physiological function of the receptor is reviewed. The last chapter (Chapter 15) is concerned with the general perspectives of the receptor binding in drug discovery and development. It presents the justification of radioligand binding assays and practical guides, including the sample preparation and data analysis. The references are attached at the end of the individual chapter, and the subject index for all chapters is included.

Overall the complete reference and tabulation of the agonists and antagonists for various receptors in this volume are overwhelming. Braun and Sulakhe (Chapter 6) present the experimental protocol in detail for the muscarinic cholinergic receptors and Wood (Chapter 10) includes the computer programs for K_d and B_{max} estimation from the Scatchard plot, which may be helpful for conducting similar experiments. Despite those advantages, it is regrettable not to see a clear description of the theory behind the ligand-receptor interaction and the controversies over the Scatchard plot analysis. The concepts such as cooperativity, sites with different affinity, non-interacting vs. interacting sites, and receptor density need to be defined critically. The chemical formula, rarely seen in this volume, are helpful to the understanding of the structure-action relationship and drug design. There is, however, a good review by Martin (Chapter 12) on the structure-action relationship at the benzodiazepine receptor. The established idea of the localization of D-2 dopamine receptors was contested by the use of quantitative receptor autoradiography (Trugman et al. *Nature* 1986, 323, 267). This method, which was not described in this book, may be important. As most authors predicted,

Goedert (Chapter 9) especially, the genes for the receptors have been cloned, lately for the β -adrenergic receptor (Dixon et al. *Nature* 1986, 321, 75), and the molecular structure of the receptor has been discussed. I look forward to the satisfactory interpretation of the ligand-receptor interaction in terms of molecular structure.

Hideyo Inouye, *Harvard Medical School*

Modern Techniques of Surface Science. By D. P. Woodruff and T. A. Delchar (University of Warwick). Cambridge University Press: New York, 1986. 453 pp. \$89.50. ISBN 0-521-30602-7.

The authors intend this book to serve as an introductory description of current, UHV-based surface scientific techniques and the physical principles important to their application. The topics covered are relatively complete and representative of the field. Chapters on electron diffraction, electron spectroscopies, incident-ion techniques, desorption spectrometries, high-field techniques, work-function measurements, molecular-beam scattering and surface-vibrational spectroscopies are included. The book is suitable for graduate level students entering the field or for more advanced researchers in other areas who need to become familiar with one or more of the techniques covered. As a result of the authors' attempt to be all inclusive, the book is very densely packed and often two or three new concepts are introduced in a single sentence. The book is, therefore, not suitable for all but the most advanced of undergraduate students. Each chapter stands well on its own, and the techniques can be surveyed in any order the reader desires.

Because the book stresses completeness rather than depth, further reading may be necessary for a good grasp of the subject matter. However, additional references are provided by the authors, and all important features of each technique are described at least briefly. The book is amply illustrated, and concepts are introduced within each chapter in logical succession. Only one problem prevents this from being a very readable text; the paragraphs are excessively long, often extending for one or more entire pages. When coupled with the densely packed sentences, the very long paragraphs occasionally become cumbersome. As a whole, however, the book should be useful to readers who want a complete, authoritative introduction to one or more surface sensitive techniques, and to these people the book is highly recommended.

M. A. Langell, *University of Nebraska*

Evaluation of Cyclamate for Carcinogenicity. Committee on the Evaluation of Cyclamate for Carcinogenicity. National Academy Press: Washington, D.C. 1985. xii + 196 pp. \$13.50. ISBN 0-309-03546-5.

The Committee on the Evaluation of Cyclamate for Carcinogenicity consists of 14 members, who, with the assistance of seven members of the National Research Council staff, produced this report in response to a request from the Food and Drug Administration in 1983 to conduct a comprehensive review of the evidence on carcinogenicity. The Executive Summary begins with "The... Committee... concludes that the weight of experimental and epidemiological evidence does not indicate that cyclamate by itself is carcinogenic." The reservations, the methods, and the evidence constitute the bulk of the book.

Medicinal Chemistry Research in India. By Harkishal Singh, A. S. Chawla, and V. K. Kapoor. National Information Centre for Drugs & Pharmaceuticals: Lucknow, India. 1985. xii + 184 pp. \$35.00. ISBN 81-85024-00-4.

This is a typeset collection of 20 reviews on the state of medicinal chemistry in India. The arrangement is by general topic, such as Antiviral Activity, Diuretics, Prostaglandins, etc. The style is to describe new agents, their source, and their application. The references are to papers published by Indians in both domestic and foreign journals. There are subject and author indexes.

Organic Reaction Mechanisms. 1984. Edited by A. C. Knipe and W. E. Watts. John Wiley & Sons: New York. 1986. ix + 696 pp. \$165.00. ISBN 0471-90797-9.

On the occasion of its 20th anniversary, this series can be congratulated for having become firmly established, not only as a valuable resource in keeping abreast of the literature but also as an organizational entity that has been able to preserve its policies and quality through change-overs of editors and contributors. The arrangement into chapters according to type of reaction of reactive intermediate has been successful.

The nature of the writing, a compromise between terse factual statement and critical interpretation that necessarily tends toward the former, is readable as well as efficiently informative.

The literature published between December 1983 and November 1984 is reviewed in this volume, which is thus as much up to date as is reasonable to expect in a book of this nature. Current awareness is served, and access to the literature of longer time-span is provided by the cumulative indexes (authors and subjects) for 1980-1984. A cumulative index for the entire series of 20 volumes would be useful, but it would necessarily be large and would probably be uneconomical to produce.

It is gratifying to see that the series continues to use typesetting and to present structural formulas that are exceptionally clear and tidy; corners have not been cut.

Annual Review of Pharmacology and Toxicology. Volume 26. Edited by Robert George, Ronald Okun, and Arthur K. Cho. Annual Reviews, Inc.: Palo Alto, CA. 1986. x + 604 pp. \$31.00. ISBN 0-8243-0426-8.

This typeset volume contains 23 reviews, some on broad topics and some narrowly focussed. One of them is a Review of Reviews, which not only lists recently published reviews but also describes them in an interesting and useful way. The subject index (20 pp) makes access to hidden information simple. There are also cumulative indexes of chapter titles and authors for Volumes 22-26.

Annual Reports in Medicinal Chemistry. Volume 20. Edited by Denis M. Bailey. Academic Press: Orlando. 1985. xiv + 352 pp. \$37.50. ISBN 0-12-040520-2 (paperback).

This annual volume of reviews contains 32 contributions under these several headings: CNS Agents; Pharmacodynamic Agents; Chemotherapeutic Agents; Metabolic Diseases and Endocrine Function; Topics in Biology; Topics in Chemistry and Drug Design; and Worldwide Market Introductions. There are a compound and code number index and cumulative indexes of chapter titles and contributors for Volumes 1-20.

A Clinical Companion to Biochemical Studies. Second Edition. By Victor Schwarz. W. H. Freeman & Co.: New York. 1984. 162 pp. \$14.95. ISBN 0-7167-1601-1 (paperback).

This small book is written for medical students. It is not intended to be a comprehensive book on biochemistry; instead, it takes up important topics, such as fat metabolism, pyrimidine biosynthesis, etc., and illustrates them with case histories. Questions for study, a glossary, and an index are included.

Instrumentation in Analytical Chemistry, 1982-1986. Edited by Stuart A. Borman. American Chemical Society: Washington, DC, 1986. 321 pp. Clothbound: \$39.95 (U.S. and Canada), \$47.95 (other). ISBN 0-8412-0969-3. Paperbound \$24.95 (U.S. and Canada), \$29.95 (other). ISBN 0-8412-0970-7.

This book is the third in a series of reprints selected from the Report and Instrumentation columns of *Analytical Chemistry's* A pages (magazine section) published between April 1982 and March 1986. These articles are written at a level intended to acquaint nonspecialists with the most recent instrument and separation advances in analytical chemistry. Accordingly, the articles span a broad range of topics, including new sensors, chromatography advances, electroanalytical chemistry, hyphenated techniques, atomic and molecular spectroscopy, mass spectrometry, and a number of miscellaneous topics. Because the articles are usually solicited by the editors, with advice from a knowledgeable advisory panel, they are authoritative and avoid duplication.

I have personally found these articles an ideal source of teaching materials, both at the undergraduate and the graduate level. They serve equally well for the practising professional chemist who wants an efficient overview of new analysis techniques presented in a clear understandable manner. I know of no other source of such information which achieves that goal so well. The editor has done chemists, particularly those who do not read *Analytical Chemistry* monthly, a valuable service in bringing together the current collection. It is well worth the investment and, for those who want to economize, it is available in a less expensive paperback edition.

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