Book Reviews

Annual Reports in Medicinal Chemistry. Volume 14. Edited by Hans-Jürgen Hess. Academic Press, New York. 1979. ix + 357 pp. 17 × 25 cm. $19.50.

New Editor-in-Chief Hans-Jürgen Hess and his Section Editors have done an excellent job in choosing the reviews and updates that make up the 31 chapters of Volume 14. The usual format of six sections, containing five or six chapters each, is maintained. The first four chapters in the section on CNS agents includes updates of research activity in antidepressants, antipsychotics, and analgetics and brief presentations of antianxiety, anticonvulsant, and hypnotic agents. The final chapter reviews inhibitory and excitatory amino acid neurotransmitters in the CNS. It is apparent that this area of research should be most important in the 1980's as the functions of these neurotransmitters become clarified.

A section on pharmacodynamic agents updates the search for superior antithrombotic, antihypertensive, and antiallergy drugs. A most useful chart displaying structures of 39 β-adrenergic blockers, their current development status, and their tissue and receptor selectivities is presented in Chapter 9. A brief discussion of histamine receptors, perhaps the most reviewed subject in medicinal literature, is concisely presented in Chapter 10.

The section on chemotherapeutic agents has a brief chapter dealing with chemotherapy of venereal diseases and one on immunostimulants, the latter overdue in Annual Reports. Chapters describing recent work on antineoplastic agents, antiparasitic agents, and antibiotics complete this section. A section on metabolic diseases and endocrine function presents chapters updating important work on prostaglandins, hyperlipidemic agents, and drug metabolism, subjects of recent volumes of Annual Reports. A chapter on fertility control discusses the abortifacient prostaglandins and the status of the continuing search for a male contraceptive sufficiently safe for long-term use. A chapter on somatastatin succinctly presents therapeutic areas, biochemical mechanisms, and SAR. The search for drugs effective against rheumatoid arthritis in this volume focuses on inhibitors of neutral proteases.

"Topics in Biology", as in previous volumes, deals with new subjects each year. A fascinating chapter on proteases and cell invasion concentrates on the hypothesis that proteases, particularly plasminogen activator, are involved in tissue remodeling and invasion. "New Developments in the Biochemistry of Viruses" is an excellent update, while the chapter on nonenzymatic glycosylation deals with this less-often discussed, but important route, to endogenous glycoproteins. The discussion deals mostly with the glycosylation of hemoglobin to hemoglobin A_{1c} which accompanies hyperglycemia in diabetic patients and is the only known parameter that accurately assesses long-term carbohydrate control. Chapter 24 discusses liposomal encapsulation of drugs for parenteral administration which could provide different tissue disposition, prolonged plasma clearance, inhibition of metabolic degradation, and enhanced pharmacological efficacy. The role of liposomal encapsulation in providing increased oral absorption seems limited at this time.

In the final section, "Topics in Chemistry and Drug Design", the chapters dealing with "Reactions of Interest in Medicinal Chemistry" and "New Methods in Heterocyclic Chemistry" seem like fillers compared to the complete treatment most title subjects are given. While they are well-written, the superficial treatment necessary in this small volume seems a waste of such expert authors. In an update on pharmacophoric pattern searching and the receptor mapping, a balanced presentation of the value of the minimal energy conformation of drugs for predicting receptor conformation and the danger of assuming drug–receptor "fit" as an "explanation" for drug activity is presented. Exemplary applications are discussed for bacterial peptide synthesis inhibitors, the arylacetic acid antiinflammatory drugs, and dihydrofolate reductase inhibitors. The pharmacokinetic parameter in drug design (Chapter 30) focuses on absorption (increasing or delaying), metabolism (prodrugs and decreasing first pass metabolism), and distribution (tissue/blood concentrations).

A cumulative chapter title index covering all 14 volumes is a welcome addition, serving as a subject index of sorts to this valuable series. However, this is still organized by section only and some subjects are included in different sections over the years. For example, "Neurotransmitters Revisited" (Chapter 25, Volume 3) dealing with CNS neurotransmitters is under "Topics in Biology", but "Amino Acid Neurotransmitter Candidates" (Chapter 5, Volume 14) is included in the section under CNS Agents. A good alphabetic index by key words in titles would be more useful.

It would seem that Annual Reports would not suffer by reviewing certain of the CNS subjects biannually rather than annually. However, the overall selection of subjects, the areas of concentration within subjects, and the references to related reviews in each chapter make Volume 14 indispensable to medicinal chemists.

McNeil Laboratories **Richard J. Mohrbacher**

The Botany and Chemistry of Hallucinogens. By Richard Evans Schultes and Albert Hofmann. Charles C. Thomas, Springfield, IL. 1980. xxv + 437 pp. 16 × 23.5 cm. $28.75.

This is the second, revised, and enlarged edition of what could fairly be called the definitive work on the subject which appeared 7 years ago. The revision is justified on the basis of a rapid increase in the knowledge of the chemistry of many of the well-known psychoactive plants, as well as numerous additions to the list of them which ethnobotanical studies have created in the interim.

Setting aside for the moment the historical accounts of man's use of hallucinogenic plants and the detailed botanical descriptions of the species he has selected for the purpose, and noting but briefly the ceremonial practices and paraphernalia associated with this use in primitive societies, the reader is still left with a respectable introduction to what we do not know about chemical alteration of mental processes. This lack of knowledge is due, in part at least, to a "dearth of sound proposals" for the neurobiological investigations necessary to dispel current differences of opinion on the medicinal value of these compounds in our own society [*Science*, **209**, 256 (1980)].

The book thus presents a challenge in suggesting a number of areas in which research is sorely needed. The medicinal chemist or pharmacologist prepared to accept it will find this volume an excellent place to start.

Northeastern University **Robert F. Raffauf**

Advances in Biochemical Psychopharmacology. Volume 23. Ergot Compounds and Brain Function. Neuroendocrine and Neuropsychiatric Aspects. Edited by Menek Goldstein, Donald B. Calne, Abraham Lieberman, and Michael O. Thorner. Raven Press, New York. 1980. xviii + 414 pp. 16.5 × 24 cm. $39.00.

This monograph is a collection of papers presented in May 1979 covering the pharmacological actions and clinical applications of ergot compounds. Four general subject areas are covered: biochemistry and pharmacology, neuroendocrinology, parkinsonism, and geriatric disorders. The publisher's promotional information states that "this volume will be of interest to endocrinologists, neurologists, pharmacologists, and gerontologists". Medicinal Chemists should also find the book worthwhile, although people specializing in areas covered in this book may find some material is dated, a problem inherent in most symposium-based mono-

graphs. The synopsis by B. Berde is a very good overview of ergot compounds. For those interested in receptor architecture, H. P. Weber's "The Molecular Architecture of Ergopeptides" will be stimulating. Most medicinal chemists will find the various chapters in the Biochemistry and Pharmacology Section and the Neuroendocrinology Section be of more immediate interest to their research than the clinical applications discussed in the latter two sections. Chapters on interactions of ergot compounds at catecholamine receptors, central monamine synapses, dopamine agonist and antagonist sites, cortical and striatal dopaminergic and serotonergic receptors, multiple CNS receptors, and the pituitary dopamine receptor will certainly peak the interest of drug receptor buffs. The sections on the clinical applications of ergot applications to parkinsonism and geriatric disorders show the value of the drugs, the limitations which exist, and point the need for further research.

Technically, the monograph is well-done. This book can be recommended to those actively engaged in research on ergot alkaloids and to those contemplating studies in the area.

University of Iowa **C. F. Barfknecht**

Drugs Affecting the Respiratory System. ACS Symposium Series. Number 118. Edited by Davis L. Temple, Jr. American Chemical Society, Washington, D.C. 1980. x + 396 pp. 15.5 × 23.2 cm. $33.25.

This book is based on a symposium sponsored by the Division of Medicinal Chemistry, which was held at the 175th Meeting of the American Chemical Society in Anaheim, 1978. It is divided into two sections: "Mediator Release Inhibitors", Chapters 1–10, and "Bronchodilators and other Pharmacodynamic Agents", Chapters 11–15.

A survey of the field of antiallergy agents, initiated by the discovery of disodium cromoglycate (DSCG), is presented in Chapter 1. Chapter 2 discusses the role of the release of histamine in mast cells. The structure of the mediator SRS-A, unknown at the time of the writing of Chapter 1, and inserted by the editor, has recently been shown to have a different amino acid residue. It also appears that SRS-A, although briefly mentioned in the book, will be the subject of considerable research in the near future.

Most of the chapters in the first section discuss a variety of the more interesting series of antiallergy agents derived from or related to DSCG. These include dioxamic acids, chromones, and the development of potent purinones and pyranamines utilizing QSAR. In the middle of Chapter 3 on pyrimido[4,5-*b*]quinolines, one finds an excellent and current review of antiallergy agents. This could have been a separate chapter. Oxatomide, a compound differing in mode of action and structure from DSCG, is reviewed in detail in the final chapter of this section.

In the second section, "Bronchodilators and other Pharmacodynamic Agents", there are comprehensive reviews on β_2-stimulants, phosphodiesterase inhibitors (theophylline-like drugs), and prostaglandin derivatives. Chapter 12, which presents a very good overview of chronic obstructive pulmonary disease, would have been more suitable as the introductory chapter on the respiratory system.

In summary, the book presents an excellent, current survey of the field of drugs affecting the respiratory system. It can be understood by the novice in this area and is well worth having as a reference for the experienced chemists and pharmacologists working in the allergy/bronchodilator field.

Wyeth Laboratories, Inc. **Stanley C. Bell**

Drug Action and Design: Mechanism-Based Enzyme Inhibitors. Edited By Thomas I. Kalman. Elsevier/North Holland, New York. 1979. xvii + 309 pp. 16.5 × 24.5 cm. $40.00.

This book is a collection of lectures which were presented at the 20th annual Medicinal Chemistry Symposium held at the State University of New York at Buffalo. The book is divided into four main topics: (1) "Transition State Analogs", (2) "Suicide Inactivators", (3) "β-Lactam Mechanisms", and (4) "Molecular Design".

The specific topics covered in the papers on transition-state analogues are the role of solvent water, potential specific inhibitors of group transfer enzymes, and interactions with neuraminidase. The section on suicide inactivators is by far the largest section of the book. Papers are presented on inactivators of decarboxylases, transaminases, pyridoxal phosphate dependent enzymes, thymidylate synthetase, monoamine oxidases, and several other enzymes. The section on β-lactam mechanisms presents papers on variations in the mechanism of antibacterial effects, the synthesis and proposed mechanism of action of some nuclear analogues of β-lactam antibiotics, and a discussion of acyl-enzyme intermediates. The final section on molecular design presents papers on the inhibition of serine proteases and exopeptidases, and a paper on a proposed method to determine receptor-site conformation of enkephalins.

The advances that have occurred over the past 20 years in understanding the mechanisms of drug action and of enzyme inhibition are clearly evident from the papers presented in this volume. The authors have done a superb job in presenting comprehensive studies in a lucid and concise manner. In addition, the book is practically error free. Anyone who reads this book will gain a deeper understanding of enzyme inhibition. The data presented is a compilation of the state of the art in this field, and it hopefully will serve to stimulate new research in the area of drug design.

Finally, as a brain teaser, examine the structure on the cover of the book and attempt to decipher it.

Burroughs Wellcome Co. **Howard J. Schaeffer**

Drug Level Monitoring. Analytical Techniques, Metabolism and Pharmacokinetics. By Wolfgang Sadee and Geertruida C. M. Beelen. Wiley, New York. 1980. xii + 495 pp. 15.5 × 23.5 cm. $35.00.

Interest in pharmacokinetics and the relationship of blood concentrations of drug to its therapeutic effect has increased greatly in recent years and has stimulated the publication of several new journals, textbooks, and treatises on this subject. This book on monitoring drug levels attempts to cover broadly drug metabolism, pharmacokinetics, clinical pharmacokinetics, and therapeutic drug level monitoring in three brief chapters. The remainder of the book covers analytical techniques (Chapter 4) including gas, high-performance liquid, and thin-layer chromatography, spectroscopic methods, polarography mass spectrometry, and competitive protein-binding assays. Included also in this chapter is a discussion on the preparation of biological material for drug analysis. The final chapter (Chapter 5) reviews in a series of monographs approximately 100 selected drugs containing analytical, pharmacokinetic, and biotransformation data with current references.

Overall, this book attempts to cover a very wide field and, therefore, suffers from a lack of depth in some areas. For example, the chapters on drug metabolism, pharmacokinetics, and drug level monitoring are very brief. Perhaps, the authors should have considered more on the problems of drug level monitoring and the significance of blood or tissue drug concentrations in relationship to disease states and the optimization of therapeutic drug regimens.

The main strength of this book is the review of methods of drug analysis in biological tissue and the individual drug monographs. In these chapters, the authors have performed an excellent service in gathering information on many of the more popular drugs used therapeutically. The literature on these drugs, including the therapeutic drug levels, methods of drug analysis, biotransformation products, and analogous compounds, are well reviewed and referenced.

In spite of the drawbacks mentioned, I would recommend this book to those investigators who are involved in clinical pharmacokinetics or drug analysis in biological tissue who would like to have current data and methods easily available.

Northeastern University **Leon Shargel**

The Peptides. Analysis, Synthesis, Biology. Volume 2. Special Methods in Peptide Synthesis. Part A. Edited by E. Gross and J. Meienhofer. Academic Press, New York. 1980. xix + 596 pp. 15 × 23 cm. $55.00.

This second volume in the open-ended series on the chemistry and biology of peptides continues to uphold the high standards of its predecessor. Heading the list and comprising nearly half the total number of pages in the book is a masterful review of the solid-phase technique, by G. Barany and R. B. Merrifield. This chapter must surely be viewed as the definitive word on the subject, with approximately 1000 references up to 1978. A shorter chapter by M. Mutter and E. Bayer presents the current status of the less known liquid-phase method, which utilizes soluble polymers such as polyethylene glycol as supports. This technique offers some advantages over the solid-phase approach, in that it eliminates inherent problems of heterogeneous reactions and allows the growing polypeptide chain to exist continuously in the solution conformation. In Chaper 3, M. Fridkin discusses briefly an "unconventional" procedure which he helped to develop with A. Patchornik, namely, the use of polymeric coupling reagents. Examples of such reagents include polystyrene-bound *N*-hydroxysuccinimide and 1-hydroxybenzotriazole, to name but two. A potential advantage of this approach is that since the polypeptide remains in solution after each coupling it can be monitored easily on an ongoing basis, throughout the course of the synthesis, by methods which do not require cleavage from a solid support. Chapter 4 (by I. Ugi) and Chapter 5 (by T. Mukaiyama, R. Matsueda, and M. Ueki) describe the stereoselective four-component synthesis and the oxidation–reduction synthesis, respectively. Elegant chemistry characterizes both techniques, and readers who may not be familiar with them will find these concise chapters intellectually rewarding. In the sixth chapter, L. Kislafudy further elaborates on the theme of solution synthesis as an alternative to the solid-phase strategy, especially in terms of its advantages for the preparation of medium-sized peptides. This is followed by a timely and perceptive review by R. C. Sheppard, in which attention is called to the importance of partial synthesis as an approach to both structural proof and, potentially, large-scale preparation of peptides and proteins. The basic concept here is that if a segment of known amino acid sequence can be excised from one readily available peptide or protein and utilized as a building block in the synthesis of another peptide or protein, much time and effort may be saved. Excision is possible by chemical or enzymatic means, and a number of examples are given to reinforce the author's thesis that this is, indeed, a practical approach. Finally, in Chapter 8, J. Kovács provides a theoretically oriented treatment of the problem of racemization during coupling reactions of N-protected amino acid and peptide active esters. This chapter should be read in conjunction with a similar one by D. S. Kemp in Volume 1.

The editorial work by E. Gross and J. Meienhofer deserve the highest compliments for its thorough attention to detail and for the way the challenge of assembling a multiauthored treatise has been met. There is a wealth of clearly drawn illustrations, the paper and binding are of high quality, and both subject and author indexes are supplied. It is a pleasure to add this book to one's library.

Sidney Farber Cancer Institute **Andre Rosowsky**

Advances in Biochemical Psychopharmacology. Volume 21. Receptors for Neurotransmitters and Peptide Hormones. Edited by G. Pepeu, M. J. Kuhar, and S. J. Enna. Raven Press, New York. 1980. xxvii + 516 pp. 16 × 24 cm. $48.00.

In his seminal work Paul Ehrlich (1845–1915) borrowed the term "receptor" from immunochemistry and defined it as "that combining group of the protoplasmatic molecules to which a foreign group, when introduced, attaches itself"; this definition is still accepted. Long before receptors could be defined as chemical entities, the concept allowed for the birth of quantitative pharmacology through the original work of A. J. Clark. In turn, the studies on the quantitative aspects of drug antagonism offered impressive indirect evidence that receptors are specific and real. In the last decade, receptors began to gain a biochemical identity and in some cases even a morphological identity, through electron microscopic and/or freeze-fracture techniques. However, the single most stimulating step in receptor investigation resulted from the introduction of the ligand binding technique. By this relatively simple procedure, receptors became an easily detectable entity, whose number, location, and affinity could be measured. The number of identified different receptor species has also increased rapidly: β, β_1 and β_2, H1 and H2, DA1 and DA2, opiate receptors, amino acid receptors, peptide and hormone receptors, etc. The membranes of many cells seem endowed with a surprising plasticity to recognize and react to multiple endogenous and foreign substances.

This volume discusses many of the known receptor systems in terms of their structural and biochemical properties, functions, and ligands. The book is divided into six major sections, each containing eight to ten chapters based on presentations at the First International Colloquium on Receptors, Neurotransmitters, and Peptide Hormones held in Capri in 1979. The first section, titled "General and Electrophysiological Characteristics of Receptors", includes a discussion of the histochemistry, microphysiology, and phospholipid and ligand relationships of receptors and the membranes with which they are associated. The section devoted to "Purification and Regulation of Receptors" deals with affinity chromatography methods and receptor effector coupling mechanisms. Significant attention is devoted to regulatory mechanisms, especially those involving phosphorylation, GABA-modulin and calmodulin, and phospholipid methylation. Three sections detail various aspects of "Monoamine Receptors", "Benzodiazepine and GABA Receptors", and "Opioid and Neuroendocrine Receptors". The primary focus of these sections tends to be on localization, regulation, and multiple subclasses of receptors. The final section deals with "Receptor Alterations in Aging and Disease". The relationship between altered receptor function and schizophrenia, Huntington's disease, Myasthenia Gravis, and the aging processes is discussed using much data derived from postmortem human tissue.

This book offers an illuminating look at some of the current concepts of the nature of receptor properties and function. Unfortunately, there is no real effort to identify the common denominators of all receptors in this text. The various chapters do seem to touch all the appropriate bases by identifying likely biochemical effectors of receptors (enzymes, ion channels, and transport systems) and mechanisms for sub- and supersensitization to ligands. However, like most published meeting proceedings, the editors have not added any summary, overview, or concluding chapters. Schemes for the operation of receptors frequently are amenable to schematic diagrams which are helpful tools for understanding and visualizing the process; nonetheless, very few are utilized by these authors. All of the 52 chapters are well written and describe research of high quality, but their length (less than ten pages) often leaves one with a feeling that the chapter is incomplete.

Northeastern University **Jeffrey B. Blumberg**

Dehydrogenases Requiring Nicotinamide Coenzymes. Edited by J. Jeffery. Birkhauser Verlag, Basel, Switzerland. 1980. vii + 275 pp. $36.00.

This book brings together seven chapters relating to structure, function, and mechanism of dehydrogenases requiring nicotinamide coenzymes. With different authors being responsible for each chapter, the style varies from terse summaries of pertinent literature to comprehensive analyses of selected topics; however, a reasonable balance has been achieved. The first chapter on kinetic aspects tends to be an overview, and the reader is directed to the pertinent references (approximately 200 references for the 32-page chapter), rather than having the content or concepts explained in detail. The second chapter on structure and mechanism of liver alcohol dehydrogenase, lactate dehydrogenase, and glyceraldehyde-3-phosphate dehydrogenase is written in a complimentary style with an in-depth discussion of structure and the relationship of molecular mechanism to conformational transitions for these three enzymes. The use of the high resolution structure of holoenzyme complexes with substrates to rationalize catalytic events with conformational changes makes fascinating

reading, particularly when considered in the more general context of how enzymes catalyze reactions by stabilizing the transition state.

An intermediate chapter concerns specificity in general and prochiral specificity in particular. This chapter assembles considerable information relating to a variety of enzymes and, hence, by necessity relies on an extensive bibliography for support. Another chapter considers evolutionary characteristics as they relate to functional aspects.

The style changes for the remaining three chapters, which offer comprehensive reviews on more self-contained topics such as pyridine nucleotide-disulfide oxidoreductases, dehydrogenase activities of fatty acid synthesizing enzyme systems, and HMG-CoA reductase. Each chapter considers kinetic and mechanistic aspects, as well as function, and is well referenced. Unlike several of the earlier chapters, the reader is left with a substantial feeling for the topic itself and not primarily for the bibliography supporting that topic.

Overall, "Dehydrogenases Requiring Nicotinamide Coenzymes" is well organized and edited by Jonathan Jeffery and essentially free of typographical errors. It should prove of interest to biochemists and medicinal chemists. It is written by specialists and embodies much of the most recent information available in this area of research.

Merrell Research Center **Brian W. Metcalf**

The Nature of Enzymology. By R. L. Foster. Halsted Press (a Division of Wiley), New York. 1980. xi + 383 pp. 13.4 × 21.6 cm. $39.95.

This work represents a survey of a variety of topics in basic and applied enzymology. It is divided into seven chapters: "The Character of Enzymes", "Enzyme Activity", "Modification of Enzyme Activity", "Mechanism of Catalysis", "Enzyme Physiology", "Medical Enzymology", and "Enzyme Technology". An appendix deals with the numbering and classification of enzymes, another contains four tutorial questions in enzyme kinetics.

The author claims that the book was designed to introduce undergraduates to the broad subject of enzymology and to give an account of the same for other nonspecialists, with an expressed emphasis on the diversification of the field. It remains to be seen whether the book can serve as a text for undergraduates. Those without a prior training in biochemistry may find the language too technical and the technical details overwhelming. On the other hand, anyone with the proper background in biochemistry must have already been introduced to various aspects of enzymology including structure, function, kinetics, mechanisms, and regulation.

The book is well organized and expertly written. Unfortunately, it is not free of factual and conceptual errors, and for the nonexpert readers these may remain undetected. For example, how can the novice tell that the functional residue modified in the acyl-enzyme intermediate of the papain-catalyzed reaction is not serine (page 173) but cysteine? Or how can he recognize that the statement "one step necessary for nucleic acid production is the interconversion of cytidine and uridine, catalyzed by cytidine deaminase" made in the context of "the inhibition of nucleic acid biosynthesis as a means of controlling parasitic infections and rapid division of cells" (page 131) is incorrect and misleading? It is easier, even for the nonchemist, to figure out that 4-methylpyrazole (page 25) is not the right name for the thiazolium moiety of thiamine pyrophosphate. However, since erroneous statements are seldom referenced, tracing the wrong information back to its original source is rather difficult.

Topics of special interest to the medicinal chemist do not share equally well in the book. There is a good overview of the various types of enzyme inhibition including detailed discussion of transition-state analogues and affinity labeling. Microsomal drug metabolism is discussed only as a mechanism of detoxification, without reference to its important role in chemical carcinogenesis. The section dealing with the use of enzyme inhibitors in parasitic and antineoplastic chemotherapy would also be more complete with a discussion of the enzymatic mechanisms of drug resistance. One should remember, however, that this is not a drug-oriented book and the enzymes are in the focus. Indeed, the name allopurinol serves only to identify the ligand used in the affinity chromatographic purification of xanthine oxidase.

To its merit, in the last two chapters, the book puts the frequently ignored area of applied enzymology into the proper perspective. Chapter 6 covers diagnostic and clinical enzymology (enzyme multiplicity is thoroughly treated in Chapter 5) and discusses the therapeutic applications of enzymes. Chaper 7 reviews the industrial uses of enzymes and describes in detail the preparation, properties, and applications of immobilized enzymes, elaborating on both the theoretical and the practical aspects of the subject.

It is likely that the author will succeed in impressing the readers with the large amount and variety of enzyme-related information. For those who would like an orientation in the field of enzymology in its current state of "extraordinary diversification", this book may serve as a useful guide.

State University of New York at Buffalo **Thomas I. Kalman**

Carcinogenesis—A Comprehensive Survey. Volume 5. Modifiers of Chemical Carcinogenesis: An Approach to the Biochemical Mechanism and Cancer Prevention. Edited by T. J. Slaga. Raven Press, New York. 1979. 275 pp. 16 × 24 cm. $30.00.

This volume draws together research on many aspects of carcinogenesis. It emphasizes recent results using specific chemicals and drugs to block the emergence of tumors in animals treated with chemical carcinogens. There are also more general contributions dealing with interactions of radiation and chemical carcinogens, tumor formation resulting from activation of endogenous viruses, and nutrition as a factor in chemical carcinogenesis. Given the widening recognition of experimental evidence for two or more biologically and biochemically distinct stages of oncogenic transformation, this volume is particularly timely in that many of the chapters summarize encouraging results in inhibition of the "promotion" or "progression" stages of carcinogenesis.

The chapters vary considerably in length and depth of treatment in this multiauthored volume. Typically, a brief review (in several cases rather speculative) is combined with detailed experimental data from the authors' laboratories. A majority of the chapters cover literature through 1978 or part of 1979, with the remainder covering through 1977. The first two chapters review carcinogens and tumor promoters (especially the phorbol esters). Successive chapters detail the actions of agents that influence monooxygenase enzyme activity; antioxidants; retinoids; antiinflammatory steroids; protease inhibitors; and chemicals found in man's environment and food, such as flavones, antioxidants, polycyclic aromatic hydrocarbons, and chlorinated hydrocarbons.

This material will be of interest to workers doing research in the chemical, biochemical, and biological aspects of carcinogenesis. This volume would also be a useful starting point for nonspecialists who wish to examine the scientific evidence for considering the use of compounds such as vitamin A analogues and antioxidants to block carcinogenesis. This is of particular interest in that the anticarcinogenic properties of these compounds have also been the subject of many reports in the lay press.

Lifesystems Company **Paul E. Driedger**

The Hydrophobic Effect. Formation of Micelles & Biological Membranes. 2nd Edition. By Charles Tanford. Wiley-Interscience, New York. 1980. ix + 233 pp. 16 × 23.5 cm. $18.50.

This book provides a well-written, comprehensive and intelligent account of how the hydrophobic effect of organic molecules in an aqueous environment may be the single most important factor in the organization of such molecules into complex entities. The author describes in both simple and complex terms the structure of water, the solubility of hydrocarbons and amphiphiles in water, and the self-aggregation of amphiphiles in the presence of water to form micelles and monolayers as an introduction to the biological consequences of associating lipids and proteins into

complex structural entities such as lipoproteins, membranes, and organelles.

Several outstanding features of the book are its forward and backward cross-referencing to information in other chapters, its references to the source of the factual knowledge, and its author and subject indexes. In the handling of the biological association between lipids and protein, one would surmise that the author strongly favored the importance of proteins in predicting the extent of the association, whereas, in fact, the opposite—or which came first, the chicken or the egg—may prevail. For example, in describing chylomicrons, the author states (page 166): "Since triglycerides themselves have extremely low solubility in aqueous solutions, the mechanism whereby they can be solubilized by so small an amount of protein is one of the most intriguing problems in the field of protein–lipid interaction." The author in this instance has not taken into account the important contribution of the phosphatidylcholine in the associated complex. Lastly, this reviewer, if wishes were possible, would have appreciated a concluding chapter looking into the future of how hydrophobic effects might act as an organizing force of living matter, i.e., "life".

This reviewer has found this book to be a rewarding experience and would highly recommend this book to both the student and the advanced scientist who wishes to bridge "...the gap between physical and biological sciences".

Arthur D. Little, Inc. **David W. Yesair**

Photochemistry. Volume 10. Specialist Periodical Reports. By D. Bryce Smith, Senior Reporter. The Chemical Society. Burlington House, London. 1979. xxiv + 717 pp. 14 × 22 cm. $103.00.

The latest in this series of reviews of the literature continues to be indispensable to physical and organic photochemists and makes interesting reading for those active on the periphery of this subject. This volume covers the literature appearing between July 1977 and June 1978, with the exception of two chapters which cover the 2-year period through June 1978. These are chapters on "Developments in Instrumentation and Techniques" (M. A. West) and "Chemical Aspects of Photobiology" (G. Beddard). The enormous activity in the first of these areas is reflected by the 1568 references cited and includes extensive developments in laser technology, picosecond flash spectroscopy, fluorescence spectrometry, new detection devices, and data treatment, among other subjects. The chapter on photobiology is limited to photosynthesis and associated phenomena and a short section on visual photoreceptors and bacteriorhodopsin. Other areas of photobiology, such as the use of photoaffinity labeling to characterize biological receptor sites, the action of light on nucleic acids and related substances, and photoallergic responses, are not covered. One could make a case that these subjects are more in the province of biology than chemistry and, hence, are not appropriate to this volume, but the growing use of photochemical techniques in biological systems suggests that room ought to be found in succeeding volumes of this series for updates on these increasingly important fields of research.

The quality of the reviews continues to be very high, and I found very few errors in areas with which I am familiar. One error involves the wrong literature citation for the well-known work on tetrakis(trifluoromethyl)cyclobutadiene in one of the two places in which the work is cited in the main text. Most citations take the form of a brief one sentence summary, accompanied by clear structural formulas in the sections relating to organic photochemistry. In a few instances, tables and figures are also reproduced from the cited paper. There seems to be less space devoted to critical commentary than in earlier volumes.

However, there is relatively little in this volume of interest to most medicinal chemists. Some new reactions which could be of value in the synthesis of compounds of interest in medicinal research are presented. However, these are scattered throughout Part III ("Organic Aspects of Photochemistry") depending on whether they fall under the photochemistry of carbonyl compounds, olefins and related compounds, compounds containing heteroatoms other than oxygen, photoelimination, etc. Since there is no subject index, the interested reader will simply have to scan the various sections to find reactions which might be of value in a given synthetic study. Other aspects of organic photochemistry which may be of interest to medicinal chemists would involve the susceptibility of pharmaceutical materials to light-induced transformation and/or decomposition, and the interested worker can find pertinent material in this volume by looking through the sections dealing with the pertinent classes of compounds. The other large sections of the volume dealing with "Physical Aspects of Photochemistry", "Photochemistry of Inorganic and Organometallic Compounds", "Polymer Photochemistry", and "Photochemical Aspects of Solar Energy Conversion" are of much less direct relevance to medicinal chemistry.

The cost of book has gone up 20% compared to the previous volume, with only a 10% increase in the number of pages. Only the most dedicated photochemist would want to have this volume in his/her personal collection, while most scientists should be content to consult the copy in their institutional library. The quality of production of these volumes continues at a very high level.

New York University **David I. Schuster**

Carbohydrate Chemistry. Volume 11. Specialist Periodical Reports. By J. S. Brimacombe, Senior Reporter. The Chemical Society, Burlington House, London. 1979. xv + 546 pp. 13.5 × 21.5 cm. $95.00.

The 11th volume in this series reviews the literature in carbohydrate chemistry published during 1977. Part I of the Report, entitled "Mono-, Di- and Trisaccharides and their Derivatives", has been slightly but beneficially reorganized relative to past volumes in order to provide a more natural grouping and avoid repetition. Part II (Macromolecules), however, retains the organization of past volumes. An introduction is also included which highlights what the Reporters consider to be important advances in the field. Drs. Brimacombe, B. J. Catley, and J. M. Williams, who retire as reporters after this Report, deserve high praise for an excellent job.

Staff

Books of Interest

Pharmacology of Antihypertensive Drugs. By Alexander Scriabine, Raven Press, New York. 1980. x + 462 pp. 18 × 26 cm. $37.50.

The International Pharmacopeia. Third Edition. World Health Organization, Geneva. 1979. 223 pp. 16 × 24 cm. Swiss Francs 24.00.

Annual Reviews Reprints: Immunology 1977–1979. Compiled by I. Weissman. Annual Reviews, Inc., Palo Alto, CA. 1980. vii + 466 pp. 15 × 22 cm. $12.00

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