with clonidine (2.0×10^{-10}–2.0×10^{-8} M) were established before and after the antagonist.

Calcium Antagonism on Depolarized Pig Coronary Artery. Antagonism of calcium-induced contraction was measured on depolarized pig coronary artery, as described by Godfraind and Kaba.[39] Helically cut strips of pig coronary artery, 2–2.5 cm long and 3–4 mm wide, set up at a resting tension of 0.5 g, were suspended in a modified Krebs–Henseleit solution, composed as follows, in mM: NaCl, 112; KCl, 5; $NaHCO_3$, 25; KH_2PO_4, 1; $MgSO_4$, 1.2; $CaCl_2$, 1.25; and glucose, 11.5. After an hour's stabilization, the pig coronary was suspended in a new calcium-free Krebs solution containing Na_2EDTA at 2×10^{-4} M. Finally, the antagonism of calcium-induced contraction (3×10^{-5}–10^{-2} M) was measured on the coronary artery, depolarized with a solution containing no $CaCl_2$ but with KCl (100 mM) and NaCl (17 mM). Preincubation with the antagonist lasted 30 min.

Acknowledgment. We wish to express our appreciation to Mr. R. Halter, Mrs. D. Schneyder, Mr. J. C. Schneyder, Mr. A. Jundt, and Mr. J. Steger for their excellent assistance. One of us (A.D.) wishes to thank the Comissio Interdepartamental de Recerca i Innovacio Technologica (CIRIT, Generalitat de Catalynya) for their financial support.

Registry No. 4 (3-nitro, R′ = Me), 39562-17-9; 4 (2-nitro, R′ = Me), 39562-27-1; **6**, 112358-09-5; **6**·HCl, 119746-71-3; (*R,R*)-**6a**, 119746-72-4; (*R,R*)-**6a**·HCl, 119746-73-5; (*S,S*)-**6b**, 119746-74-6; (*S,S*)-**6b**·HCl, 119746-75-7; (*S,R*)-**6c**, 119746-76-8; (*S,R*)-**6c**·HCl, 119746-77-9; (*R,S*)-**6d**, 119746-78-0; (*R,S*)-**6d**·HCl, 119746-79-1; **7** (R_3 = Me, R_4 = 2,3-dihydro-1,4-benzodioxin-2-ylmethyl), 119746-80-4; **7** (R_3 = Me, R_4 = 1-phenoxypropan-2-yl), 119746-81-5; **7** (R_3 = Me, R_4 = CH_2-c-C_6H_{11}), 25756-29-0; **8** (R_2 = H, R_3 = Me, R_4 = 2,3-dihydro-1,4-benzodioxin-2-ylmethyl), 119746-82-6; **8** (R_2 = H, R_3 = Me, R_4 = 1-phenoxypropan-2-yl, 119746-83-7; **8** (R_2 = H, R_3 = Me, R_4 = CH_2-c-C_6H_{11}), 119746-84-8; **8** (R_2R_3 = Me, R_4 = 2,3-dihydro-1,4-benzodioxin-2-ylmethyl), 119746-85-9; **9**, 119746-86-0; **9R**, 113826-06-5; **9S**, 70987-78-9; **10**, 119746-87-1; **10**·HCl, 119746-88-2; **10S**, 98572-00-0; **10R**, 62501-72-8; **11**, 119746-89-3; **11**·HCl, 119746-90-6; **11R**, 119746-91-7; **11S**, 119746-92-8; **12**, 119746-93-9; **12**·HCl, 119746-94-0; **12S**, 119816-26-1; **12R**, 119816-27-2; **13**, 119746-95-1; **13**·HCl, 119746-96-2; **13R**, 76093-33-9; **13S**, 76093-34-0; **14**, 119746-97-3; **14**·oxalate, 119746-98-4; **15**, 119746-99-5; **15**·HCl, 119747-00-1; diketene, 674-82-8; 3-nitrobenzaldehyde, 99-61-6; isopropyl 3-aminocrotonate, 14205-46-0; 1-methyl-2-[*N*-methyl-*N*-[(2,3-dihydro-1,4-benzodioxin-2-yl)methyl]amino]ethyl acetoacetate, 119747-01-2; 2-[*N*-methyl-*N*-[(2,3-dihydro-1,4-benzodioxin-2-yl)-methyl]amino]ethyl aminocrotonate, 119747-02-3; 2-bromoethanol, 540-51-2; *N*-(2-hydroxyethyl)-4-(2-oxo-1-benzimidazolinyl)-piperidine, 119747-03-4; 4-(2-oxo-1-benzimidazolinyl)piperidine, 20662-53-7; chloroacetone, 78-95-5; *N*-methyl-*N*-(2-oxopropyl)-(2,3-dihydro-1,4-benzodioxin-2-yl)methanamine, 119747-04-5; catechol, 120-80-9; 2-(dimethylamino)ethanol, 108-01-0; 2-[[(2,3-dihydro-1,4-benzodioxin-2-yl)methyl]methylamino]-1-methylethyl ester 3-amino-2-butenoic acid, 119747-05-6; 2-[[2,3-dihydro-1,4-benzodioxin-2-yl)methyl]methylamino]ethyl ester 3-oxobutanoic acid, 119747-06-7; 2-[methyl(1-methyl-2-phenoxyethyl)amino]ethyl ester 3-amino-2-butenoic acid, 119747-07-8; 2-[4-(2,3-dihydro-2-oxo-1*H*-benzimidazol-1-yl)-1-piperidinyl]ethyl ester 3-amino-2-butenoic acid, 119747-08-9; 2-[(cyclohexylphenylmethyl)methylamino]ethyl ester 3-amino-2-butenoic acid, 119747-09-0; 2-[methyl(1-methyl-2-phenoxyethyl)amino]ethyl ester 3-oxobutanoic acid, 119747-10-3; 2-[4-(2,3-dihydro-2-oxo-1*H*-benzimidazol-1-yl)-1-piperidinyl]ethyl ester 3-oxobutanoic acid, 119747-11-4; 2-[(cyclohexylphenylmethyl)methylamino]ethyl ester 3-oxobutanoic acid, 119747-12-5.

(39) Godfraind, T.; Kaba, A. *Br. J. Pharmacol.* **1969**, *36*, 549.

Book Reviews

Amino Acids and Peptides. Volume 19. Specialist Periodical Reports. J. H. Jones, Senior Reporter. Royal Society of Chemistry, Burlington House, London. 1987. xi + 333 pp. 14 × 22.5 cm. ISBN 0-85186-174-1. $136.00.

The 19th volume of this series continues with the format set by previous volumes. It is a detailed survey of a number of topics related to amino acid (β-lactam) and peptide chemistry. In particular, the review references publications from 1986 on the occurrence of known amino acids; discovery of new natural amino acids; chemical synthesis, resolution, physical and stereochemical studies of amino acids; complete and partial peptide syntheses; synthesis methodology; peptide analogues for physical and medicinal chemical studies; β-lactam chemistry; and metal complexes of amino acids and peptides. The coverage of protein chemistry ended with Volume 16.

Given the nearly hemorrhagic growth of these areas one can sympathesize with the problems of attempting "exhaustive coverage" of a field. This review is not exhaustive, e.g., Chapter 2, Peptide Synthesis "covers the majority of all published literature in this area and only those papers of particular interest are discussed in the general text." Nevertheless, the review is highly representative of the topics covered, and therefore a good starting point for leading references.

The condensed style and paucity of structures and figures make for rough reading, even for the devotee. The level of condensation increases with each volume. In future volumes readability may be enhanced with a simple outline format. Unfortunately, an outline would lack the reporters' editorial comments which can be quite useful and thought provoking.

Readers desiring to scan the 19 volumes to see what has been published through the years on a specific topic, e.g., the synthesis and employment of α-methyl amino acids, will be confronted with the necessity of reading an entire section. Fortunately, each section is only a few pages long. Still, a keyword index would significantly enhance the utility of this series.

Despite these drawbacks the volumes are essential for the practicing peptide chemist. For the novitiate these volumes will become increasingly important. A library cannot be considered a resource for peptide chemistry without these volumes.

Smith Kline & French Laboratories **James Samanen**
P.O. Box 1539
King of Prussia,
Pennsylvania 19406-0939

The Alkaloids. Chemistry and Pharmacology. Volume 30. Edited by Arnold Brossi. Academic Press, Inc. San Diego, CA. 1987. ix + 387 pp. 15 × 23 cm. ISBN 0-12-469530-2. $95.00.

It is really not possible to conduct research in the field of alkaloid chemistry without consulting the appropriate volumes of *The Alkaloids*, edited by A. Brossi. The exceptional high value of this series is again well represented in its Volume 30. This treatise provides three comprehensive reviews on three different alkaloid classes covering the developments on their isolation, structure elucidation, biosynthesis, synthesis, reaction, spectroscopy, and pharmacology.

Chapter 1, The Bisbenzylisoquinoline Alkaloids by K. T. Buck, pp 1–202, reviews the titled alkaloids in a very broad sense including the biogenetically related bis alkaloids (e.g., benzyliso-

quinoline–proaporphine, benzylisoquinoline–aporphine, and bis aporphine dimers), degraded derivatives such as thaliadine and only formally related alkaloids (e.g. cancentrine, toddalidimerine, jolantinine, etc.). The chapter contains helpful tabulations on the bisbenzylisoquinoline alkaloids and many key references to leading reviews and monographs. Chapter 2, The Alkaloids from *Pauridiantha* by R. A. Jacquesy and L. Levesque, pp 203–247, deals with the harman and indole/pyridine-type alkaloids and their alkoyl and glucosyl derivatives found in the plant genus *Pauridiantha*, which until now has received limited attention. Chapter 3, The *Amaryllidaceae* Alkaloids by S. F. Martin, pp 253–369, emerges as a well-written comprenhensive review. The alkaloids covered are lycorine, lycorerine, narciclassine, galanthamine, crinine, norbelladine, mesembrane, augustamine, and montanine alkaloids; a formidable list. The key features of this chapter are the good organization, visual immediacy, the update information, and the clear presentation.

In general, *The Alkaloids, Volume 30* continues the excellent presentations for which this series is well-recognized. It clearly belongs in every research library concerned with natural product chemistry.

Central Research Institute for Chemistry **Gábor Blaskó**
Hungarian Academy of Sciences

Gastric Protection. Edited by R. Cheli. Associate Editors F. Berri, F. Molinari, and M. C. Parodi. Raven Press, New York. 1988. xii + 300 pp. 14 × 24 cm. ISBN 0-88167-436-2. $86.00.

This volume represents, as far as I am aware, the second publication by Raven Press in this field. The first was based on the proceedings of an international conference held in England in 1983; whereas, this current volume is a collection of chapters from invited authors. The chapters are collected under four headings: (1) physiological concepts of gastric protection, (2) aggressive factors, (3) antisecretive drugs, and (4) protective drugs. The range of subjects under each heading is, in general, what one would predict. For example, under aggressive factors are chapters on acid/pepsin, bile reflux, ethanol, steroids, aspirin and NSAID's, stress, food allergy, and *Campylobacter pylori*.

Overall the book is like the proverbial curate's egg, good in parts with considerable inconsistency in the quality of the contributions. Comparison with the previous volume would suggest that the field has not greatly advanced since 1983. While this may be true in part, it also reflects shortcomings in the volume. For example, although there is a chapter on cellular turnover, it is only concerned with methodology and does not consider the process of rapid epithelial repair and the importance of the mucoid cap. The failure to address more recent advances is reflected in the reference lists which in a number of the chapters stops at 1986.

In general the chapters on drugs are more valuable than those on basic mechanisms (the chapters on prostanoids and bicarbonate excepted) since they provide a good overview of current knowledge, although the omission of comments on omeprazole and mucosal protection and the effects of bismuth salts on *Campylobacter* are surprising. Even here a more critical appraisal of the evidence would have been useful and it might be of interest to potential buyers of this book to know that, at a recent international meeting held in Lausanne, a group of world experts in this field concluded that antisecretory drugs such as the H_2 antagonists probably had no "true" mucosal protectant properties other than by inhibition of acid secretion. It would also have been useful to include a chapter addressing the *relevance* of acute mucosal protection to chronic ulcer disease.

Two further minor criticisms. In some cases the English language of the chapters could have been improved, for example, on page viii in the contents the use of the term antisecretive drugs could be interpreted as truth drugs. Also the use of somewhat obscure words, at least to this reviewer (e.g., page 213 pathognomic), should be avoided.

Overall the volume, which is adequately indexed, will be of value to a newcomer to the field since it pulls together a great deal of data in a readily digestible form. It will be of somewhat less value to the active researcher in the field unless he or she requires a ready reference source to help in writing their own review of the subject.

Smith Kline & French Research Limited **Michael E. Parsons**
Welwyn, Hertfordshire, England

Reviews of Physiology, Biochemistry and Pharmacology. Volume 110. Edited by H. Grunicke et al. Springer-Verlag, New York. 1988. 292 pp. 17 × 25 cm. ISBN 0-387-18736-7. $89.50.

The first review, The Atrial Natiuretic Factor: Its Physiology and Biochemistry, edited by Jacques Genest and Marc Cantin, in this volume deals with the discovery in 1981 by de Bold et al. of diuretic and natriuretic activity in atrial homogenates and the explosive progress, since then, in all areas of research on the peptide(s) (ANF) responsible for this activity. Due to the intense research activity in many laboratories in this field some new developments have not been included. However, the review which covers the period from the discovery till part of 1987 is very comprehensive and will, due to the extensive list of references (654) and a reasonably adequate subject index, without doubt serve a need for some time. Being multiauthored the review expertly covers all areas of research on ANF from basic biochemistry, including molecular biology, to the pharmacology and pathophysiology both in animals and humans. Being multiauthored, however, also results in some repetition and nonuniformity of terminology in various sections. The review succeeds very well overall and can be read with benefit both by newcomers and specialists in the field.

The second review, The Organization of Cardiovascular Neurons in the Spinal Cord, by John H. Coote is complementary to the first one in that it deals with aspects of the nervous regulation of the cardiovascular system. It evaluates a large body of work on the organization of cardiovascular neurons in the spinal cord with a view, in part, to assessing the extent to which the various features of this system are target cell—or function—specific. Reviewed are the unique morphology and electrophysiology of the sympathetic preganglionic neurons (SPN) and their topography; extensive interactions with segmental and, especially, excitatory and inhibitory supraspinal pathways; activation by chemical neurotransmitters; and subtypes of receptors. Evidence for target specificity is noted for some aspects of topography, interactions with segmental and supraspinal pathways and neurotransmitter use. The review forms a coherent whole covering work from the beginning of the century till the present (718 references) and is provided with a fair subject index. Researchers in neuroanatomy, neurophysiology, and neurochemistry will find much useful information in this review.

Department of Biochemistry **F. Moller**
Queen's University
Kingston, Canada K7L 3N6

Pharmaceutical Chemistry. Volume 1: Drug Synthesis. By H. J. Roth and A. Kleemann, in collaboration with T. Beiswenger. Translated by M. D. Cook. Ellis Horwood Ltd., Chichester, U.K. 1988. 407 pp. 17 × 24.5 cm. ISBN 0-470-21037-0. $59.95.

This compact volume is a newly revised and translated edition of the original German edition entitled *Arzneistoffsynthese*, first published in 1982. The ambitious goal of the two-volume work is to review the entire spectrum of modern pharmaceutical chemistry (Volume 2: *Drug Analysis* is in preparation). The material is organized according to chemical family, with chapters on phenylalkylamines, aromatic–aliphatic compounds, substituted aromatics, sulfonamides, β-lactams, polycyclic aromatics, heterocyclics, alkaloids, and peptides. Drugs were selected by frequency of prescription and relative market importance. Each chapter indicates useful points of substitution and variation on the basic carbon skeleton and then outlines specific reaction schemes used to prepare the most important drugs of the class. The authors presume a working knowledge of synthetic organic chemistry. A remarkable number of drug syntheses are described logically and

concisely. The use of trivial chemical names and generic drug names is complemented by liberal use of structural formulas, which results in a very readable narrative. Many well-constructed tables allow rapid structure–activity comparison. A diligent effort was made to identify chiral centers and to indicate whether a drug is used in racemic or enantiomeric form. An introduction provides an excellent overview of the pharmaceutical market, interrelationships of bulk intermediates used in drug production, and the role of optical isomerism on drug activity. An exhaustive index is a welcome feature.

While the book is well laid out and organized, a significant weakness is the complete lack of literature citations in the text. The jacket notes indicate readership by "pharmaceutical technologists, pharmaceutical R & D scientists, organic chemists and biochemists". Medicinal chemists, for whom the book's heavy emphasis on synthesis would be most appealing, will feel this deficit keenly. The reader who desires to brouse through preparative descriptions of structurally related drugs will find the book enjoyable, but those who wish to use the book as a reference tool will certainly be frustrated. The latter reader should have copies of the *U.S. Pharmacopeia* and *The Merck Index* close at hand. The book's cost will permit individual purchase by those who need a broad, albeit undocumented, survey of modern drug synthesis.

Research Biochemicals Inc. **Richard A. Milius**
Natick, Massachusetts 01760

Neuropeptides and Their Peptidases. Edited by A. J. Turner. VCH Publishers, New York. 1987. 295 pp. 17 × 25 cm. ISBN 0-895.73-559-8. $85.00.

This multiauthored book of 12 chapters does not attempt to deal comprehensively with the subject of neuropeptides. Instead, it aims to use selected examples to illustrate some principles of neuropeptide metabolism. The book is divided into three approximately equal sections: (1) molecular biological studies, (2) reviews of the physiological and pharmacological characteristics of selected neuropeptide families, and (3) discussions of various possibly relevant peptidases and their inhibitors. Many individual chapters contain interesting and valuable insights. The book as a whole, however, reads as a collection of disconnected essays rather than as a unified view of the subject.

In the opening chapter, L. L. Iverson offers a brief overview of the complexity of peptides in the nervous system. This is followed by a historical review by J. E. Dixon and colleagues discussing the roles that molecular genetics studies played in revealing the structures of three neuropeptide gene families, i.e., the endogenous opioid, gastrin/cholecystokinin, and the pancreatic polypeptide gene families. R. Ivell presents an overview of the oxytocin and vasopressin gene family and makes a compelling case that the neuronal and nonneuronal cells expressing these peptides are excellent models for studies of neuropeptide gene expression. The final chapter in this first section is by Y. P. Loh and D. C. Parish, who review the strategies, criteria, and current enzymological data regarding posttransitional processing of peptide precursors.

The second section contains three reviews on the identification, localization, biochemistry, physiology, and pharmacology of selected neuropeptides. These include chapters by P. C. Emson and colleagues on mammalian tachykinins; by N. Bunnett on gastrin, cholecysokinin, and gastrin releasing peptide; and by T. G. Flynn et al. on atrial natriuretic factor. This section concludes with a very short chapter by P. C. Emson on neuropeptides in neurological illnesses.

The third section of this book discusses a still nascent, very important, but relatively underdeveloped area of neuropeptide research, i.e., the identification of peptidases involved in neuropeptide inactivation. Three candidate peptidases are extensively discussed. There are chapters on the angiotensin I converting enzyme by R. A. Skidgel et al. and on endopeptidase-24.11 by A. J. Turner, and an excellent chapter on the calpains and capstatin by Murachi et al. In each case, there is substantial information about the peptidases, but evidence that they are, in fact, inactivators of neuropeptides in situ is circumstantial at best. What is apparent from these chapters is that this area of study is seriously limited by a paucity of specific peptidase inhibitors which could be used in biological experiments. Consequently, the final chapter in the book, by E. D. Thorsett and M. J. Wyvratt, which describes the strategies and tactics of designing specific peptidase inhibitors, is perhaps the highlight of this book. These authors extensively discuss the history of development of 20 effective inhibitors of tha angiotensin-converting enzyme, including captopril and enalapril which have proven so valuable for the treatment of hypertension and congestive heart failure.

U.S. National Institutes of Health **Harold Gainer**
Bethesda, Maryland 20892

Fluorinated Carbohydrates—Chemical and Biochemical Aspects. ACS Symposium Series 374. Edited by N. F. Taylor. American Chemical Society, Washington, D.C. 1988. i + 213 pp. 15.5 × 23.5 cm. ISBN 0-8412-1492-1. $49.95.

This 11-chapter volume was developed from a symposium on fluorinated carbohydrates sponsored by the Division of Carbohydrate Chemistry at the 194th Meeting of the American Chemical Society, New Orleans, LA, August 30–September 4, 1987. Recent research with fluorinated carbohydrates on topics representative of the spectrum of critical roles played by carbohydrates in biological processes are described, including studies on synthetic methods, reactivity, metabolism and transport of fluorinated carbohydrates, and their use as mechanistic probes and biological tracers. The contributors to this volume are leaders in their areas of expertise, and the material presented is current and important.

The first chapter by Professor P. W. Kent consists of a brief review of the role of fluorine in biochemistry and medicine, followed by an historical account of progress in synthetic approaches and biological properties of fluorinated carbohydrates. In the first of two chapters dealing with synthetic issues, Randall and Nicolaou review their development of a facile and mild synthesis of glycosyl fluorides. The use of these as glycosyl donors in several complex synthetic schemes is described. In the following review, Wong et al. describe their recent development of several practical enzymatic procedures for the syntheses of fluorocarbohydrates. The use of enzymes as chemical reagents in organic synthesis is demonstrated impressively by this work.

The following three chapters concern interactions of fluorinated carbohydrates with biological macromolecules. Moyer et al. report on their syntheses of fluorinated myoinositols as potential substrates and inhibitors for phosphatidylinositol synthetase, as a strategy to disrupt the link between polyphosphoinositide turnover and receptor-controlled cellular functions. Systematic replacement of sugar hydroxyls with fluorine or hydrogen has received considerable attention as a means to map hydrogen bonding interactions between carbohydrates and proteins. In Chapter 5, Withers et al. provide an effective analysis of the factors involved in this mapping and illustrate this strategy by defining interactions in the glycogen phosphorylase/glucose complex. They also describe their development of a mechanism-based inhibitor of β-glucosidase, based on the electronegative influence of a strategically placed fluorine. In another use of fluorine substitution to map intermolecular interactions, reviewed in Chaper 6, Glaudemans and Kovac studied the mode of binding of a β-(1→6)-D-galactopyranan to a group of monoclonal antibodies.

Chapters 7, 8, and 9 deal with metabolic and transport studies using deoxyfluoro carbohydrates. Taylor et al. present a brief review of several areas of fluorocarbohydrate biochemistry, with a focus on interactions with enzymes, transport mechanisms, and metabolism, followed by a review of their own recent metabolic and enzymatic studies with 3- and 4-fluorodeoxyglucose. Hitz describes the use of fluorinated sucrose analogues and glucosides to determine recognition sites for the plant sucrose carrier. After a review of methods for introducing ^{18}F into sugars, Gatley et al. describe their recent research with isolated perfused hearts to measure fluoroglucose distribution and rates of phosphorylation.

In the first of two chapters concerned with direct chemotherapeutic applications of fluorinated sugars, Fox et al. review the development of several potent antiviral 2′-fluoro-substituted arabinosylpyrimidine nucleosides. In the final chapter, Sharma et al. review their research on the development of antitumor plasma-membrane modifiers and inhibitors, based on disruption of cell-surface glycoconjugate biosynthesis using fluorinated

analogues of cell-surface carbohydrates.

The individual chapters are well written and documented, with sufficient figures for clarity. In presenting their results, the authors have done an admirable job of presenting sufficient background material to allow the reader to place the work in perspective. A spectrum of biochemical systems are represented, and this book should be particularly valuable to carbohydrate chemists, fluorine chemists, and medicinal chemists.

Laboratory of Chemistry **Kenneth L. Kirk**
National Institute of Diabetes
and Digestive and Kidney Diseases,
National Institutes of Health
Bethesda, Maryland 20892

Catalysis of Organic Reactions. Edited by Paul N. Rylander, Harold Greenfield, and Robert L. Augustine. Marcel Dekker, New York. 1988. xi + 441 pp. 16 × 23.5 cm. ISBN 0-8247-7927-4. $99.75.

Assembled by several distinguished chemists, this volume is the 33rd in a very useful series dealing with topics that are important to conducting organic chemistry at both the industrial setting and academic lab bench. The 21 chapters were gathered from the presentations of a large number of well-known investigators meeting at the Eleventh Conference on Catalysis of Organic Reactions held in Savannah, GA, in April of 1986.

The volume is conveniently divided into five sections, namely, homogeneous catalysis, preparation of amines and anilines, heterogeneous catalysts, selective reactions, and selected topics. I found two of the book's chapters to be among the most interesting. Chapter 4, written by several Merck chemists, reviewed their work on asymmetric alkylations as promoted by chiral phase-transfer catalysis. The authors also related the optimization of a dual catalyst system whereby a chiral catalyst selectively complexes a substrate in the organic layer, but a less expensive racemic catalyst accomplishes the phase-transfer process. Chapter 11 was written by W. F. Maier and was entitled On the Wizardry of Heterogeneous Palladium Catalysis. It provided valuable insight into the unique qualities of palladium catalysts, especially their surface modification by certain procedures to enhance selectivity. Both the Rosenmund reduction and the cis hydrogenation of alkynes were studied as a function of modified palladium surface characteristics.

Containing numerous figures and tables, this useful volume also has a subject index, and its chapters contain many recent references. I found no typographical errors. This book is recommended for all chemists who deal with the catalysis of organic reactions.

E. I. duPont de Nemours **Crist N. Filer**
NEN Research Products
Boston, Massachusetts 02118

Nitrile Oxides, Nitrones and Nitronates in Organic Synthesis: Novel Strategies in Synthesis. By Kurt B. G. Torssell. VCH Publishers, Inc., New York. 1988. xii + 332 pp. 16 × 24 cm. ISBN 0-89573-304-8. $59.95.

Dipolar cycloaddition reactions have become far more popular in the past decade as a tool in the construction of both heterocyclic and nonheterocyclic products of natural and unnatural origin. As is described in considerable detail by Torsell in this newest addition to the organic nitro chemistry series, nitrile oxides, nitrones, and nitronates can be skillfully employed to produce important building blocks: the isoxazoles, isoxazolines, and isoxazolidines. These heterocycles, which are of interest not only in themselves as products possessing considerable biological activity, serve as important vehicles for gaining access to a myriad of other synthetic intermediates (e.g., 1,3-diketones, aldol products, α,β-unsaturated carbonyl compounds, amino alcohols, etc.).

This monograph is nicely laid out in a sequence of chapters involving certain general considerations (e.g., physicochemical properties, mechanistic aspects, stereochemical and regiochemical issues), chapters dealing with each of the individual dipoles, and their modes of preparation, and a final chapter concerning the use of these dipoles in a variety of synthetic undertakings (e.g., alkaloid, carbohydrate, prostaglandin, and terpene synthesis). Lastly, an addendum has been included which summarizes articles published in this area from December 1985 to August 1987, thus making this review one of the most comprehensive to be published to date.

While the monograph does like many contain its small share of incorrectly drawn structures, and wrongly cited literature references, its weakest point is one of aesthetics. The structures contained in the monograph (of which there are many) are readable, but they lack the quality one would like to find in a $60 book. This is especially disheartening given the availability of easy to use computer-based drawing programs like ChemDraw.

In spite of these few shortcomings, the monograph can certainly be recommended to all graduate and advanced undergraduate students who wish to familiarize themselves with this fascinating realm of cycloaddition chemistry. Additionally, given the author's practical discourse on the preparation and handling of these dipoles, and his encyclopedic coverage of the literature, the book should serve as an inspiration to all investigators actively looking for new solutions to their synthetic problems or even new structural leads for drug development. Such possibilities alone should counter the somewhat high price of this important monograph.

Department of Chemistry and **Alan P. Kozikowski**
Behavioral Neuroscience
University of Pittsburgh
1101 Chevron Science Center
Pittsburgh, Pennsylvania 15260

The Chemistry and Biochemistry of N-Substituted Porphyrins. By David K. Lavallee. VCH Publishers, New York. 1987. x + 313 pp. 16 × 24 cm. ISBN 0-89573-147-9. $39.95.

This monograph is a comprehensive discussion of a class of biomolecules which are of increasing medical importance. N-Substituted porphyrins have been observed in the catabolism of many xenobiotics, including DDT and various suicide inhibitors of cytochrome P-450, and are responsible for the effects of various drugs on heme biosynthesis. They are also finding application in the rapid synthesis of radiolabeled metalloporphyrins for use in medical diagnostic imaging. A good fraction of this monograph is directly related to medicinal chemistry, but it also includes a detailed introduction to the synthetic and spectroscopic properties of N-substituted porphyrins.

Hoppe-Seyler observed a century ago the formation of a green pigment in erythrocytes of animals treated with phenylhydrazine. Very rapidly, the eyes and then the entire rat turns green. Precipitation of the erythrocytes, formation of Heinz bodies, and subsequent hemolytic anemia then occurs. These green pigments are N-substituted porphyrins. They were first reported as chemical species in 1936 by W. K. McEwen, but then languished as chemical curiosities until the 1970s. After that time, extensive work on the chemistry and biochemistry of N-substituted porphyrins appeared from several laboratories, including those of Callot, Lavallee, Mansuy, and Ortiz de Montellano among others. The discovery of their production in vivo in the livers of drug-treated rats increased the interest in and importance of these compounds. In the mammoth Porphyrin Symposium at the recent National ACS Meeting in Los Angeles, for example, N-substituted porphyrins were discussed in perhaps 20% of the papers presented.

The text is subdivided into eight chapters: five on the chemistry and three on the biochemistry of N-substituted porphyrins. The first five cover their structure, spectroscopic properties, reactivity, and synthesis. The biochemical chapters discuss ferrochelatase inhibition, degradation reactions of cytochrome P-450, and reactions of heme proteins with hydrazines. The extensive use of tables of literature data in the first part of the book greatly enhances its usefulness as a reference source. There is a highly detailed table of contents, an author index, and a less detailed subject index. References appear at the end of each chapter and total 519.

This volume was produced from camera-ready form with a standard elite typewriter typeface. The readability of this typeface

is acceptable for only a short time; it becomes wearisome after extended reading. Similarly the figures can be a bit spotty; most are done well, but some are substandard. The price of the volume, however, is relatively low, considering the highly focused topic. In some part this excuses the mediocre quality of the printing production.

By bringing together into one volume a diverse set of literature, this monograph is a major contribution to the field. Workers in this area will wish to have their own copy.

School of Chemical Sciences **Kenneth S. Suslick**
University of Illinois at Urbana-Champaign
Urbana, Illinois 61801

New Methods in Drug Research. Volume 2. Edited by Alexandros Makriyannis. J. R. Prous Science Publishers, Barcelona, Spain. 1988. ix + 272 pp. 16 × 22.5 cm. ISBN 84-404-0917-6. $50.00.

Like Volume 1 (1985), Volume 2 represents a diverse collection of important contemporary topics in drug research. The editor's preface is repeated except for deletion of reference to the First Cyprus Conference in Limassol, a meeting organized by the editor which provided the impetus for this series. Planned biannual publication appears behind schedule, but authors of chapters have provided interesting concise summaries of progress made. Abbreviated chapter titles include Enzymes as Catalysts for Synthesis (G. M. Whitesides and M.-J. Kim), Hormone Receptor Characterization (M. A. Napier and R. L. Vandlen), Two-Dimensional NMR and Drug Active Site Complexes (S. W. Fesik), Noninvasive Metabolism Studies by NMR (W. P. Aue), Ipso Electrophilic Radioiodestannylation (R. N. Hanson), Physicochemical Data and Computer Modeling (B. Maigret, M.-C. Fournie-Zaluski, and B. P. Roques), Computer Graphics and Molecular Modeling (T. J. O'Donnell and C. F. Chabalowski), CHEMLAB-II in Quantitative Molecular Design (R. A. Pearlstein, D. Malhotra, B. J. Orchard, S. K. Tripathy, R. Potenzone, Jr., S. Grigoras, M. Koehler, M. Mablia, D. E. Walters, D. Doherty, R. Harr, and A. J. Hopfinger), Affinity Therapy: Immunotoxins (M. Wilchek), Leukotrienes (Y. Guindon, H. E. Morton, and J. Rokach), Tuftsin Immunostimulation SAR (V. A. Najjar, N. J. Bump, J. Lee, and M. Wleklik), Chemical Gene Synthesis vs cDNA Cloning: Proteinase Inhibitors (H. Appelhans, J. Dodt, C. Bergman, R. Heinzel, and H. G. Gassen), and Genetic Engineering (J. E. Davies). Chapters are referenced mainly into 1985, and a subject index is provided.

Although most of what has been summarized has been discussed elsewhere, by and large the chapters are easy to read, represent a fine source of lecture material for undergraduate and graduate courses, and, depending upon interest, are recommended for students and faculty not expert in the field or needing background information prior to an in depth search. Volume 2, like Volume 1, is a desirable addition to personal and public chemical and biomedical libraries.

The Ohio State University **Donald T. Witiak**
Columbus, Ohio 43210

Searching, Teaching and Writing—What Fun! By Alfred Burger. Copyright by Alfred Burger, 510 Wiley Dr., Charlottesville, VA 22901-3245. 1988. 167 pp. ISBN 0-962211746-0-2 (softback). $9.95.

This is an extraordinarily entertaining autobiography by Alfred Burger, the "father of medicinal chemistry", or perhaps more appropriately, as he suggests the "grandfather of medicinal chemistry". The author's adventures and opinions derived from a long career in teaching, writing, tour lecturing, and researching during almost all of the twentieth century are described in a humorous, insightful, and exciting fashion with amazing recall for detail. His account of the advances in chemistry and drug design during this period is only one of many topics addressed.

The author, as a result of his broad range of experiences and worldwide travels, offers insightful opinions that range from religion to politics to humanitarian advice. The easy flowing nontechnical style of this autobiography reveals the likeable nature and subtle sense of humor of the author. This pocket book will provide several hours of truly enjoyable reading for all, but especially those who have had the privilege of knowing "the professor".

Nova Pharmaceutical Corporation **Carl Kaiser**
6200 Freeport Centre
Baltimore, Maryland 21224

Neurotransmitters and Cortical Function. From Molecules to Mind. Edited by M. Avoli, T. A. Reader, R. W. Dykes, and P. Gloor. Plenum Press, New York and London. 1988. ix + 621 pp. 17 × 25.5 cm. ISBN 0-306-42729-X. $110.00.

The publication edited by Avoli et al. is based on a symposium of the same title held in Montreal on July 21–23, 1986. The meeting was arranged to honor the pioneering contributions made to the neurosciences by Dr. Herbert H. Jasper. In keeping with the lifelong approach of this eminent neuroscientist, the volume is dedicated to the proposition that the complexity of central nervous system function is the consequence of the interaction of a diversity of processes and substances at the molecular level. The treatment of various topics range from broad overviews (e.g., epilepsy) to detailed discussions of the anatomy, physiology, biochemistry, pharmacology, or function of neurotransmitter systems.

The 39 chapters in book are informally divided into seven core sections, the first being a tribute to Jasper's contributions to the neurosciences (chapters 1 and 2). Most of the remaining sections contain five to seven chapters focusing respectively on glutamate, γ-aminobutyric acid (GABA), acetylcholine, biogenic amine, adenosine, and peptide-using neurotransmitter systems. The final paper by Jasper and colleagues integrates the individual themes of the symposium. Chapter lengths range from 10 to 31 pages inclusive of references, and individually, any one chapter can be read in a reasonable period. References are extensive, 75–150 per article, and current, with the most recent works being listed as "in press". Sections devoted to historical overviews cite contemporary works as well as the sometimes hard to locate classic papers. The index (8.5 pages) seemed to be brief for a work of over 600 total pages.

Because of my own research interests, most attention was paid to the first third of the book devoted to amino acid neurotransmission. Although the focus of the chapters was different, each was clearly introduced with an appropriate historical background. Chapter 3 provided an excellent summary of the current understanding of excitatory amino acid processes (uptake, release, localization, physiology, and effector mechanisms) and would be good reading for a novice to the field. Chapter 4 reiterates portions of chapter 3 but begins to introduce methological aspects. Chapters 5–7 are notably for the biochemically and physiologically oriented discussions of excitatory amino acid receptors and receptor pharmacology. Chapter 8 is of importance for providing an overview of excitatory amino acid receptors as complex structures possessing multiple points of regulation.

The section on GABA is more narrowly focused than that on excitatory amino acids, perhaps because of the intense scrutiny that GABA has received in the last decade and a half. For example, chapter 9 centers on anatomy, chapter 10 deals exclusively with metabolism, chapter 11 describes the role of GABA in visual processes, chapter 12 deals with GABA in epilepsy, and chapter 13 reviews the complexity of the GABA receptor and the multiple sites that can be targeted for attack when developing new therapeutic entities. This general organization is carried over to the next two sections of the book (acetylcholine and biogenic amines), each of which contains a varied set of papers discussing the history, anatomy, synthesis and metabolism, physiology, specific function, and molecular effectors of the neurotransmitters. I was pleased to see a substantial portion of the book devoted to the neurotransmitter/neuromodulatory role of adenosine in the brain. This section, in particular, highlights the growing recognition of the importance of adenosine to central nervous system function and, again, provides a quick overview for those not familiar with the field. Likewise, the chapters dealing with peptides focus attention on an area that is currently at the

forefront of contemporary neuroscience.

Overall, I found the contents of *Neurotransmitters and Cortical Function* to be useful and informative. Although the book could be viewed as a introduction to neurosciences for advanced students, it would also be useful to the experienced investigator who wished to gain insight into areas outside their expertise or to update themselves on events in a particular area of research. My chief reservations were two-fold: (1) The conclusions to the chapters offered little in the way of suggesting novel research; (2) With the exception of a portion of the final chapter, there was little attempt to integrate the various sections into a coherent picture of "From Molecules to Mind". These criticisms are minor in scope and detract little from the overall value of the book; the work would be a worthwhile reference for most students of the neurosciences.

CNS Pharmacology **John William Ferkany**
Nova Pharmaceutical Corporation
Baltimore, Maryland 21224-2788

Peptides: Chemistry, Biology, Interactions with Proteins. Edited by B. Penke and A. Török. Walter de Gruyter & Co., Berlin, Germany. 1988. xv + 465 pp. 17.5 × 24.5 cm. ISBN 0-89925-430-6. $165.00.

Peptide research is a vigorous, interdisciplinary field that is regulary presented at excellent symposia. Timely publication of the proceedings of these meetings is a valuable service that has the potential to extend the appreciation of new results to a wider audience. This book documents a memorial symposium held August 31–September 4, 1987, which was organized by members of the Institute of Medical Chemistry at Szeged University, Hungary. The symposium celebrated the 50th anniversary of the Nobel Prize in Physiology and Medicine for its most notable chairman, Professor Albert Szent-Györgyi (1893–1986). The book is a collection of typescript papers in the style of short communications punctuated by occasional reviews.

The book begins with a tribute to Szent-Györgyi that focuses on his early contributions. Following this are the largely unedited papers, organized into sections entitled: Immunological Aspects of Peptides: Enzyme Substrates, Inhibitors, and Toxins; Methods of Peptide Synthesis, Purification and Analysis; Molecular Mechanisms of Hormone Action; Neuropeptides, Neurotransmitters and Behavior, Peptides as Potential Drugs and Pharmaceuticals: Structure–Activity Relations; Structural and Conformational Considerations in the Design of Biologically Active Peptides; and Pseudopeptide Chemistry. There is also a list of participants and adequate author and subject indices. The interesting subject headings unfortunately lead to a less cohesive group of papers of uneven quality, and there are no chapter divisions or introductory editorial summaries that could put the work into perspective. A majority of the papers are from groups at Szeged and other Eastern European laboratories, so the collection affords a comprehensive perspective on the research programs at these institutions. Some papers are reviews; e.g., B. Riniker and P. Sieber on the synthesis of peptides containing His residues; F. Fahrenholz and E. Kojro on vasopressin; D. deWied and J. P. H. Burbach with a now-familiar summary on neuropeptides; M. Manning and W. H. Sawyer on vasopressin antagonists; V. Hruby, et al. on conformational constraints in opioid peptides; P. S. Anderson et al. on CCK antagonists; B. Castro on pseudopeptides. Many short communications documenting original results in synthetic peptide chemistry, physiology, and receptor studies round out the volume.

Most of these short papers would be of interest only to a specialist in the subdisciplines represented here. Among the best examples are several synthetic methodology papers; e.g., B. Penke et al. on the new SAMBHA resin; J. Rivier et al. on hydroxyethyl benzhydrylamine resins; B. Penke et al. on mercaptoethanesulfonic acid peptide hydrolysis; M. Beyermann et al. on FMOC acid chlorides. The majority of the physiological papers are from Telegdy and colleagues at Szeged University Medical School, now named the Albert Szent-Györgyi Medical University. These papers look like poster abstracts in that they have snippets of biochemical results and report behavioral studies without providing complete data or statistical tests. A summary paper collecting these contributions into a unified overview would have been a useful addition.

In general, *Peptides* is a reference book that documents the Szent-Györgyi Memorial Symposium without enhancing it. Specialists may want to examine the short communications for new methodology, or results on their favorite peptide, but the general medicinal chemist would probably be interested only in the reviews.

Hoffmann-La Roche Inc. **Gary L. Olson**
Nutley, New Jersey 07110

Studies in Natural Products Chemistry. Volume 1. Stereoselective Synthesis (Part A). Edited by Atta-ur-Rahman. Elsevier Science Publishers B.V., Amsterdam, The Netherlands. 1988. x + 739 pp. 17 × 24.5 cm. ISBN 0-444-42970-0. $223.75.

With this book, Dr. Atta-ur-Rahman (H. E. J. Research Institute of Chemistry, University of Karachi, Pakistan) has launched an ambitious new series of volumes devoted to the chemistry of natural products, "...with the hope that it will provide a platform on which the major developments in the field can be presented by renowned experts...". While the logic behind the specific choices of subject matter for inclusion in this initial volume is neither stated nor self-evident, each of the 17 chapters provides an up-to-date account (often with references into 1987) of a lively area of natural products chemistry.

Individual chapters provide reviews of Indolocarbazole alkaloids (J. Bergman), Pentacyclic *Strychnos* indole alkaloids (J. Bosch and J. Bonjoch), Synthetic studies in the field of indole alkaloids (M. Lounasmaa), Synthesis of zwitterionic indolo[2,3-*a*]quinolazine alkaloids (G. W. Gribble), Vinylazides in natural products synthesis (C. J. Moody), Synthesis of some isoquinoline alkaloids *via* 8,14-cycloberbines (M. Hanaoka), The synthesis of 1-azabicyclic alkaloids (Y. Nishimura), Synthesis of potent antitumor alkaloids isolated from *Sesbania drummondii* seeds (F. Matsuda and S. Terashima), The synthesis of pyrrolidine-containing natural products via [3 + 2] cycloadditions (H. W. Pearson), Total synthesis of nitrogen-containing natural products *via* cycloaddition reactions (C. Kibayashi), Synthetic approaches to complex nucleoside antibiotics (Ph. P. Garner), Studies directed toward the total synthesis of the milbemycins and avermectins (M. T. Crimmins, W. G. Hollis, Jr., and R. O'Mahony), Stereoselective synthesis of biologically active compounds (A. V. Rama Rao), Tropone: Versatile building block for natural product synthesis (J. H. Rigby), Homochiral ketals and acetals in organic synthesis (E. A. Mash), Recent advances in biomimetic olefin cyclization using mercury(II) triflate/amine complex (M. Nishizawa), and Chiral synthesis of bioactive natural products employing the building blocks of microbial origin (K. Mori).

As might be anticipated for a book with 21 contributors, the quality of these chapters is variable; some are outstanding, and even the weakest might be called very good. Inevitably, there is overlap. Most strikingly, A. V. Rama Rao includes a discussion of *Sesbania* metabolites, which makes up the entire subject matter of the Matsuda–Terashima chapter. While some authors have done an excellent job of putting their subject into a larger context, others launch directly into highly specialized material. Many chemists regret the growing tendency of some authors to publish short communications which lack experimental detail. In this context, special praise is due to Prof. Kenji Mori, who has provided a fascinating chapter on the use of biochemical hydrolysis and redox methods for the synthesis of chiral products. This discussion is rendered especially valuable because it includes examples of typical experimental procedures! This chapter might be a useful model for other reviews of experimental methodologies.

I would like to offer some specific criticisms in the hope that future volumes in this projected series may benefit. Instructions to *Journal of Medicinal Chemistry* reviewers suggest that particular attention be paid to the adequacy of author and subject indices. While this book appears to have an adequate subject index, there is no author index at all! This is a serious omission. With respect to aesthetics, the individual chapters in this book have been prepared as camera-ready copy; the wide variety of typefaces and formula styles makes the book look like a bound

set of unconnected journal articles.

A lecturer at Cornell recently joked that the universal language of chemistry today is "broken English". Remarkably little broken English can be found in this internationally authored volume, but the editorial staff might have tried harder to revise sentences such as "These two classes of alkaloids constitute a very large family of natural products which are widely isolated from plants, insects, animals, oceanic lives and secondary metabolites of microbes". Clearly, the author needed and deserved more editorial support, both linguistic and biological, than he received.

Overall, Professor Atta-ur-Rahman is to be congratulated on assembling a first class group of organic chemists and convincing them to write stimulating and timely reviews. Since this book is not cheap, a buyer might justifiably hope for a firmer editorial hand, uniformity of format, and an author index. With these improvements, the projected series might well meet the high expectations that Dr. Rahman has set for it.

Baker Laboratory **Jerrold Meinwald**
Department of Chemistry
Cornell University
Ithaca, New York 14853-1301

Vascular Neuroeffector Mechanisms. Edited by J. A. Bevan, H. Majewski, R. A. Maxwell, and D. F. Story. IRL Press, McLean, Virginia, 1988. xi + 336 pp. 15.5 × 23 cm. ISBN 1-85221-095-8. $90.00

Vascular Neuroeffector Mechanisms is a collection of articles contributed by the invited speakers who participated in the Sixth International Symposium on Vascular Neuroeffector Mechanisms held in Melbourne, Australia, from August 30 to September 2, 1987. The symposium was an official satellite symposium of the 1987 IUPHAR Meeting and is published as Volume 10 of the International Council of Scientific Union (ICSU) Symposium Series. The abstracts of the free communications presented at the symposium have been published previously in *Blood Vessels*, **1987**, *24*, 201–228.

The topics addressed by the symposium not only covered the current findings with regard to classical adrenergic neuroeffector mechanisms and the effects of pharmacological modulation at both pre- and postsynaptic neuronal sites but also the latest developments in the more recent lines of vascular neuroeffector research. Thus, presentations were made on the involvement of endothelium-derived relaxing factor (EDRF) in vascular control; the demonstration of the involvement of nonclassical neuroeffector transmission; the importance of ion channels in vascular muscle responses; and the involvement and multiplicity of second messenger systems in receptor–response coupling systems. Each of the nine sections of the symposium is devoted to a particular aspect or mechanism involved in vascular control, and the articles in each section represent state-of-the-art presentations by leading and well-known authorities in that particular field.

While the sections of EDRF, ion channels, and second messenger systems are particularly timely and informative, representing, as they do, the latest discoveries and developments in neuroeffector transmission and vascular control, of particular interest is one of the later sections in the monograph entitled "Pathological and degenerative changes in vascular neuroeffector function". This section presents some observations correlating abberations of vascular neuroeffector mechanisms with pathological conditions.

In general, while the monograph cannot be considered a classical handbook for scientists already active in a particular field covered by the symposium, the articles do provide a broad reporting of the current directions and knowledge in the study of vascular neuroeffector mechanisms. As such the monograph will be extremely useful for scientists who need to expand or update their knowledge in this area and who in some cases may have only a peripheral interest or familiarity with vascular control mechanisms. The theories and observations presented in the various sections also have important implications to scientists performing research in other areas such as, for example, gastrointestinal pharmacology, cardiology, senility, and the plethora of disorders of the central nervous system. To this end, while none of the articles can be considered extensive or exhaustive reviews on any particular topic, sufficient key and relevant background references are cited to allow the interested reader to identify key material for further consultation.

Wyeth-Ayerst Research **David Grimes**
Princeton, New Jersey 08543

Annual Reports in Organic Synthesis—1987. Edited by E. F. V. Scriven and K. Turnbull. Academic Press, Inc., San Diego. 1988. xiv + 473 pp. 15 × 23 cm. ISBN 0-12-040818-X. $39.95.

This is the current volume of the well-established *Annual Reports in Organic Synthesis* series. The editors have surveyed 49 journals covering the year 1987 and have written abstracts that "include all reactions and methods that are new, synthetically useful, and reasonably general". Each abstract is composed primarily of structures, allowing the reader to scan the material quickly. The reader should take note of the papers that arouse interest, then consult the original papers for additional details.

Although there is no subject index provided, the detailed Table of Contents provides sufficient organization for the reader to find the material of interest. About half of the book is devoted to Carbon–Carbon Bond Forming Reactions, and the remaining half is divided into Oxidations, Reductions, Heterocycles, Protecting Groups, Useful Synthetic Preparations, and Other Reviews. Chapter headings within the text are missing, but the running page headings and the classification numbers of the abstracts make them unnecessary. An index of senior authors is also provided. If a reader knows of one investigator working in an area, any related papers can be found together with those of the known author.

As part of an established series, this book shows how the series is evolving. The number of synthetic papers increases each year, but the size of this volume is limited by cost considerations. The editors have accommodated more papers by using multiple listings to include more references per page. Many abstracts include five or more references to closely related papers. This use of multiple listings has resulted in a 1987 edition with slightly fewer pages compared with the 1982 edition (454 versus 469) but many more references (2800 versus 2000, by my estimate). More abstracts are included in the 1987 version by packing them more densely on the page.

Other evolutionary changes over the past 5 years are the addition of phosphorus-stabilized anions, photochemical reactions, phosphorus and selenium oxidation, rearrangements, bridgehead heterocycles, phosphorus and tellurium compounds, and protecting groups for amino acids and oximes. The Glossary of Abbreviations has doubled in size, becoming a reference for many more a bbreviations than just those needed to understand the abstracts in this book. Considering how little space this glossary requires, I hope it continues to grow and serve as a dictionary of the common abbreviations used in organic chemistry.

Colorado State University **L. G. Wade, Jr.**
Fort Collins, Colorado 80523

Carbohydrate Chemistry: Monosaccharides and their Derivatives. By Hassan Saad El Khadem. Academic Press, San Diego. 1988. x + 256 pp. 15.5 × 23.5 cm. ISBN 0-12-236870-3. $44.95.

This book was designed as a classroom textbook for use by undergraduates and graduates enrolled in chemistry, biochemistry, and pre-med curricula. Writing such a text is quite a challenge because these audiences, and thus the requirements the text must meet, are very different. For the undergraduate, a text should convey the importance of the subject and its context within the larger set of related disciplines. It should teach the general principles relevant to the subject and provide numerous problems to help the student learn those principles. It should also be well-written and modestly priced. For the graduate student, a much more in-depth coverage is required. The text should additionally include a large number of up-to-date, original literature citations. This text fails to meet this challenge. Although it is well written, its coverage is so broad that its treatment of the subject is rather shallow. Although a few relatively recent research

articles are cited in the text, most of the citations are review articles published between 1970 and 1980. The text includes a few problems, but not enough to serve as a learning device. Additionally, the book is rather expensive for use in a one-quarter or one-semester course.

Department of Chemistry **Gary R. Gray**
University of Minnesota
207 Pleasant Street SE
Minneapolis, Minnesota 55455

Transdermal Delivery of Drugs. Edited by Agis F. Kydonieus and Bret Berner. CRC Press, Boca Raton, FL. 1987. 18 × 26 cm. Volume 1: ISBN 0-8493-6484-1; 205 pp; $145.00. Volume 2: ISBN 0-8493-6485-1; 154 pp; $110.00. Volume 3: ISBN 0-8493-6486-1; 160 pp; $110.00. 3-Volume set $345.00.

This is a comprehensive discussion of many aspects of importance in the delivery of drugs through the skin. The first volume concentrates on a general overview of the concepts necessary for such drug delivery, the preclinical and clinical methods which have been developed for studying this process, and the different kinds of devices which have been developed to date. The second volume focuses on the unique aspects of skin, pharmacokinetics of drug penetration, and the effects of age on drug absorption. This volume includes discussions of models of skin permeability and the methods to enhance the penetration of skin by drugs using specific chemicals. The third volume of the series concentrates on the drugs themselves, including those parameters and structural features important for transdermal drug delivery, the thermodynamics of the process, and the use of prodrugs to enhance transdermal delivery.

This is a very complete summary of currently available information pertaining to transdermal drug delivery. Each chapter considers a different section of the overall subject and is complete with clear, understandable figures and a complete list of references. Virtually all subjects of interest to both novices and experts in the field are covered, including both experimental approaches under development and those which are already commercially available. The background chapters, and those on the properties of the drugs and of the skin which enhance drug penetration, make this a useful book for anyone interested in the subject. It will be of particular interest to biologists and pharmacologists, but several chapters will be of great interest to chemists as well.

The volumes are well organized, and the chapters within each volume are arranged in a logical progression. Readers interested in only a subset of the total presentation can easily purchase one or two of the volumes. However, the three volumes together form an impressive base for learning about transdermal drug delivery.

Nova Pharmaceutical Corporation **Mark Chasin**
Baltimore, Maryland 21224

Recent Advances in Receptor Chemistry. Edited by Carlo Melchiorre and Mario Giannella. Elsevier, Amsterdam. 1988. vii + 333 pp. 16 × 24.5 cm. ISBN 0-444-42965-4. $123.75.

This book is Volume 11 of the *Pharmacochemistry Library* series edited by W. Th. Nauta, R. F. Rekker, and H. Timmerman. It is the Proceedings of the Sixth Camerino-Noordwijkerhout Symposium, Camerino (Italy), September 6–10, 1987. In it recent results relating to receptor chemistry are described by leading researchers from a number of different disciplines including chemistry, biochemistry, pharmacology, biophysics, physiology, and mathematics. After introductory chapters Adventures in Bioassay and Pharmacological and Biochemical Aspects of Receptor Regulation, the next five sections deal with various topics relating to adrenergic, particularly α, receptors. Following this are two articles directed toward calcium channels and their ligands, five that deal with various aspects of muscarinic receptors, three that consider histamine receptors, and one describing The Message-Address Concept in the Design of Highly Selective and Potent Nonpeptide δ-Opioid Antagonists. The final chapter From Receptors to the Pharmacist's Shelf outlines briefly the steps involved in the development of a new drug product. Here the estimate that, on average, it takes 10 years to go from the chemists' bench to the pharmacists' shelf seems realistic; however, the estimate of "in excess of $10 M" for each drug launch is extremely conservative.

The book is remarkably neat, uniform, and well organized considering that it has been compiled from "camera ready" copies. Uniformly, the articles are up-to-date with references as recent as 1987, and the editors have been remarkably successful in having the book published in such a timely fashion. The subject index is adequate.

Clearly, the book will be of greatest interest to medicinal chemists, as well as scientists in various other disciplines, with an interest in the topics treated in greatest detail. These scientists will probably want to add this book to their personal libraries; whereas for others, general library access for scanning for principles of receptor research should be sufficient.

Staff

The Melanotropins. Chemistry, Physiology and Mechanisms of Action. Edited by Alex N. Eberle. Karger, Basel, Switzerland. 1988. xx + 556 pp. ISBN 3-8055-4678-5. $212.75.

As three distinguished scientists point out in the foreward to this book. "Anyone who believes that the melanotropins are molecules of negligible interest concerned mainly with pigment control will soon find himself disabused of such an idea on perusal of these chapters. These are molecules noteworthy by chemists, biologists, and physicians, exerting a multiplicity of effects throughout the body...". This theme is expanded in Dr. Eberle's text which, includes, for example, sections on the effects of MSH on the pituitary, on the immune, nervous, and cardiovascular systems, on fetal tissues, and on the kidney and eye. These and other extensive compilations concerning the biological properties and importance of the melanotropins are valuably supplemented by sections dealing with their chemistry. These are also extensive, covering *inter alia*, isolation and structure, chemical synthesis (including the latest solid-phase techniques) and modification, radioactive and affinity labelling, and assay. It is particularly pleasing to see details of experimental procedures included in the text, making it a true laboratory handbook which will provide useful models for other peptide systems.

Over the years the author has been involved in many facets of experimental melanotropin research and writes with authority and clarity. The work appears to be particularly up-to-date with nearly half the 2400 references published since 1980. For those immediately concerned with the melanotropins, this compendium will go a long way toward providing literature access and review. For others with more general interests, it provides a fascinating insight into chemical and biological studies using peptide hormones which will be relevant in other areas.

Medical Research Council Laboratory of Molecular Biology **R. C. Sheppard**
Cambridge, U.K.