were used with the following side-chain protection: Asp(Chx), Glu(Chx), His(Tos), Tyr(2-BrZ), Ser(Bzl). Upon completion of the synthesis, the peptide was cleaved from the resin with liquid HF containing 5% anisole at 0 °C for 40 min. Upon removal of the HF in vacuo, the peptide was precipitated with ether and extracted with 30% aqueous acetic acid or dilute sodium bicarbonate with a small amount of dimethylformamide. The extract was lyophilized, and the residue was desalted on a Sephadex G-15 column (2.6 × 90 cm) in 5% aqueous acetic acid. The peptide was then purified by reverse-phase high-performance liquid chromatography (RP-HPLC) on a Rainin Dynamax C18 column (21.4 × 250 mm) at 10 mL/min using acetonitrile/0.1% aqueous TFA mobile phases. The major peak was collected, and the fraction was lyophilized. The resultant peptide was analyzed for homogeneity by RP-HPLC and TLC (Table II) and for identity by amino acid analysis using a Beckman Model 6300 amino acid analyzer (Table I) and FAB-MS on a Finnigan TSQ-46 instrument (Table II).

**Anticoagulant Assay.** Inhibition of fibrin clot formation was determined as previously described.[10] Briefly, 50 μL (0.2 pmol) of bovine thrombin (Sigma) was added to the wells of a microtiter plate (Falcon) containing 50 μL of a solution of the synthetic peptide to be tested (0–25 nmol). After a 1-min agitation and an additional incubation fr 10 min at 24 °C, 100 μL of diluted human plasma (1:10) in 0.1% EDTA was added and vortexed for 20 s. The turbidity of the solution was monitored by an autoreader (EL 309, Bio-Tek Instruments) at 405 nm at 5-min intervals. All of the above reagents were diluted in an assay buffer containing 0.12 M sodium chloride, 0.01 M sodium phosphate, 0.01% sodium azide, and 0.1% bovine serum albumin, pH 7.4.

**Acknowledgment.** We thank Dr. Brad Ackerman and Dr. John Countant for the FAB-MS analyses and Rita Hoeper for the preparation of this manuscript.

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# Book Reviews

**Organometallic Chemistry. Volume 14.** Edited by E. W. Abel and F. G. A. Stone. The Royal Society of Chemistry, Burlington House, London, WIV OBN. 1986. xvi + 503 pp. 14 × 22 cm. $96.00.

This volume, which is the 14th in a series, is an annual review of the 1984 organometallic chemistry literature. The chapters are organized into discussions of metallic types and the metals are classified by periodic group. Additional chapters deal with the generalities of organometallic structure and are organized with respect to ligand type and structure. Several chapters present overviews of organometallic reactions, such as "Ligand Substitution" and "Homogeneous Catalysis". The final and exceedingly useful chapter is a compilation of metal complexes whose structures have been determined by X-ray, neutron, or electron diffractometry.

This volume represents an excellent attempt to review and critically report on the more than 4000 original organometallic chemistry articles which appeared in 1984. While the discussion of some areas is necessarily terse, the volume offers a balanced overview. Chapter 9 (by W. E. Lindsell) on "Organometallic Compounds Containing Metal–Metal Bonds" is particularly interesting in its treatment of the physical and spectroscopic properties of these complexes.

Chapter 15 (by M. E. Fakley), which reviews homogeneous catalysis by transition metal complexes, is a useful overview of redox, metathesis, polymerization, and addition reactions.

A brief perusal of this volume is all that is required to recognize the valuable summary and compilation of the literature contained therein. This book will clearly be of use to organometallic chemists as a reference volume and probably of occasional use to organic or medicinal chemists.

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**New Cardiovascular Drugs 1986.** Edited by Alexander Scriabine. Raven, New York. 1986. xi + 274 pp. 16 × 24 cm. ISBN 0-88167-209-2. $65.00.

This is the fourth annual volume of a series that began in 1983 which was titled "New Drugs Annual: Cardiovascular Drugs". The title changed to its present form in 1985. Similar to previous editions, this book contains major therapeutic theme areas which this year include: antihypertensive, cardiac stimulant, antiarrhythmic, antithrombotic, and cardioprotective drugs. The last chapter, "Regulatory Aspects of Drug Development", is similar to a chapter that appeared in the first volume of this series. The five therapeutic areas contain a total of 13 chapters ranging in length from 11 to 24 pages. Each chapter describes the preclinical pharmacology, toxicology, metabolism, pharmacokinetics, and clinical pharmacology. The drugs discussed are presently in clinical trials in the United States. A number of the drugs, including cibenzoline, terazosin, carteolol, and suloctodil, are already marketed in various countries.

The presence of chemistry and toxicology sections are welcome additions to what is essentially a pharmacology book since these important elements of a drug's profile are often ignored in standard pharmacology books. What is missing in most of the chapters is a description of any side effects or toxicity observed in clinical trials. Perhaps this is due to the fact that nearly all the chapters are written by representatives of the companies who are developing the drug and the companies, understandably, do not want to divulge any minor toxicity that could stigmatize their drug.

The book is essentially well-written and the similar format for each chapter makes it easy to follow. The use of appropriate standards aids in the understanding of the drugs discussed. The biggest disappointment in the book is a lack of novelty of some of the compounds discussed. Unfortunately, several of the compounds are pharmacologically indistinct from already marketed drugs. I think this book would benefit if newer compounds were included, even if there were no clinical data reported.

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**Flavonoids and Bioflavonoids, 1985.** Edited by L. Farkas, M. Gabor, and F. Kallay. Elsevier, Amsterdam. 1986. xxii + 466 pp. 16 × 24 cm. ISBN 0-444-41737-0 (Series) and 0-444-99520-X (Vol. 23). $109.25.

This book summarizes the proceedings of the 7th Hungarian Bioflavonoid Symposium held in Szeged in May, 1985. Forty-four lectures have been outlined, with their authorship emanating mostly from European laboratories. The latest trends in flavonoid chemistry are adequately described. Some of the most interesting presentations are those dealing with the pharmacology of the flavonoids and related compounds. The pharmacological effects are varied enough and of sufficient interest to warrant continued

research in this area of natural product chemistry.

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**Third SCI-RSC Medicinal Chemistry Symposium.** Edited by R. W. Lambert. The Royal Society of Chemistry, London. 1986. xii + 384 pp. 14.7 × 21 cm. ISBN 0-85186-616-6. $35.00.

This book is the proceedings of a symposium organized by the Fine Chemicals and Medicinals Group of the Industrial Division of the Royal Society of Chemistry and the Fine Chemicals Group of the Society of Chemical Industry, which was held at Churchill College in Cambridge, England, on September 15–18, 1985. The publication covers three topics: (1) Modulation of Serotonin and Dopamine Receptors, (2) Enzyme Inhibitors in the Control of Disease, and (3) Drugs for the Control of the Endocrine System.

The introductory lecture by P. A. Janssen gives an overview of the development of agonists and antagonists of the receptors for muscarine, dopamine, and serotonin. The pharmacological significance of serotonin is discussed in three companion lectures, which review (1) peripheral neuronal serotonin receptors (J. R. Fozard), (2) serotonin in behavioral control (S. D. Iversen), and (3) the function of serotonin in depression (R. M. Pinder). The medicinal chemistry of dopamine is reviewed in four lectures, which comprise one-fourth of the pages in this book. Research on oxazine derivatives as dopamine agonists are reported by J. H. Jones et al. Central dopamine antagonists (E. Kyburz) and peripherally acting dopamine receptor agonists (C. Kaiser and T. Jain) are reviewed in two comprehensive and well-referenced chapters. The use of dopamine in the treatment of heart failure is discussed by R. A. Brown et al.

The second topic covers enzyme inhibitors in the control of diseases. The lectures include discussions of advances in the development of inhibitors of bacterial alanine racemases (C. Walsh et al.), aldose reductase (D. R. Brittain), elastase (J. C. Powers et al.), collagenase (E. D. Harris, Jr.), renin (J. Boger), $H^+,K^+$-ATPase (B. Wallmack et al.) and an abstract on angiotensin converting enzyme (C. H. Hassall).

The final four lectures focus on drugs for the control of the endocrine system. The use of molecular probes for the estrogen receptor is discussed by J. A. Katzenellenbogen. L. Nědělec et al. survey recent steroid antihormone research and A. T. Glen et al. discuss non-steroidal antiandrogens. The final chapter contains an overview of luteinizing hormone-releasing hormone agents as drugs (J. J. Nestor, Jr.).

This paperback book is a collection of individual manuscripts; thus, the style is not uniform, but the photographic reproduction is of good quality. Although there is no author or subject index, most chapters are well referenced with citations as current as 1986. Many of the chapters are short, which is probably appropriate for symposium proceedings. These proceedings are primarily of interest to the symposium attendees as a nice review of the symposium presentations and as a useful reference source. However, the section on receptors, which comprises half of the volume, may interest medicial chemists as a convenient entry to the literature on biogenic amine receptors.

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**New Trends in Natural Products Chemistry 1986.** Edited by Atta-Ur-Rahman and Philip W. LeQuesne. Elsevier, New York. 1986. xiii + 674 pp. 17 × 24 cm. ISBM 0-444-42691-4. $148.00.

This book contains 44 essays stemming from the plenary lectures presented by an outstanding group of international authors at the Second International Symposium and Pakiston–U.S. Binational Workshop on Natural Products Chemistry held in Karachi, Pakistan, on 18–25 January 1986. Other than under the very broad aegis of natural products chemistry, there is no central theme in the book and the papers are not collected according to subthemes but rather are presented in the alphabetical order of the author's names. Unfortunately, there is also no subject index to make finding specific bits of information convenient for the reader. Given the ephemeral value of most conference proceedings and the widely distributed home bases of the authors, the editors are to be commended for producing this volume in less than 1 year from the date of the meetings.

The themes of the papers include most of the topics of contemporary natural product interest and the papers present the authors' views of their recent findings. Despite the usual variation in quality inherent in such undertakings, there is something of interest for nearly everyone with an interest in natural products and the chapters are generally informative and articulate.

Those essays that particularly pleased this reviewer include: John Clardy (Cornell University) on X-ray methods applied to marine natural products; Ian Fleming (Cambridge University) on approaches to the total synthesis of gelsemine; Werner Herz (Florida State University) on *Mikania* sp. sesquiterpene dilactones; C. W. Jefford (Geneva University) on model 1,2,4-trioxanes related to qinghaosu; David Kingston (Virginia Polytechnic Institute) on taxol-related antitumor diterpenes; W. Kraus (University of Hohenheim) on neem constituents, including the structure revision of azadirachtin; Martin Kuehne (Universith of Vermont) on the stereoselective synthesis of vinblastine analogues; Philip LeQuesne (Northeastern University) on *Solidago* sp. constituents in insect predation on plants; John Pezzuto (University of Illinois) on steviol chemistry and mutagenicity; Atta-Ur-Rahman (University of Karachi) on constituents of medicinal plants of Pakistan; Paul Scheuer (University of Hawaii) on marine natural products; J. Stoeckigt (University of Munich) on enzymological biosynthesis of monoterpenoid indole alkaloids; H. Wagner (University of Munich) on immunomodulatory constituents of higher plant extracts; and Steven Wilson (New York University) on silicon-mediated syntheses of natural products.

Despite the rather favorable impression this volume makes, the highly specialized nature of the contributions and their very variety will limit the appeal of this book to advanced readers and the very high price will limit its acquisition to libraries.

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**Regulation of Gene Expression—25 Years On. Symposium 39.** Edited by I. R. Booth and C. F. Higgins. Cambridge University Press, Cambridge. 1986. viii + 309 pp. 15 × 23 cm. ISBN 0-521-32201-4. $59.50.

This book is based on the 39th symposium of the Society for General Microbiology held in April 1986. It is primarily a review of regulation of prokaryotic gene expression, written for an audience with an extensive background in gene expression.

Twelve of the 14 chapters primarily concern regulation of gene expression in Gram-negative bacteria. These include chapters on amino acid biosynthesis, catabolite repression, transacting positive activators of gene expression, phage lambda regulatory protein cII interactions with DNA, DNA supercoiling, RNA polymerase heterogeneity, nitrogen regulation, transcription termination, messenger RNA processing and degradation, ribosomal RNA and ribosomal protein synthesis regulation, transposons, and plasmid maintenance. This provides a fairly complete overview of regulation of gene expression in *Escherichia coli*, lacking only a separate chapter on transacting negative repressors of gene expression. There is extensive discussion of the cAMP–CRP protein regulatory system in both the chapters on catabolite repression and transacting positive activators. There are also brief discussions of eukaryotic genetic regulation in the sections on catabolite repression and DNA supercoiling.

The final two chapters discuss gene regulation of the antibiotic-producing streptomyces species and cellular differentiation of the cellular slime mold *Dictyostelium discoideum*. Other Gram-positive bacteria such as *Bacillus subtilis* are also discussed in the chapter on streptomyces. While the chapter on streptomyces species fits well into the book (numerous comparisons are made between Gram-negative and Gram-positive gene expression) the chapter on *Dictyostelium* does not.

As in all multiauthored books, the chapters quality and style of writing varies, although there is no poorly written chapter. The information presented in the book is up-to-date in all of the chapters, including current references and a fair amount of unpublished material from each author's laboratory. In general, the figures are good, although several of them suffer from information overload.

In summary, many of the chapters serve as short reviews that should be of value to microbiologists, molecular geneticists, biochemists, and other scientists with an interest and background in genetics, particularly *E. coli* genetics.

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**Innovative Approaches in Drug Research.** Edited by A. F. Harms. Elsevier, Amsterdam. 1986. viii + 482 pp. 16 × 24 cm. ISBN 0-444-42606-X. $90.75.

This is Vol. 9 in the Pharmacochemistry Library series. It represents the proceedings of the third Noordwijkerhout Symposium on Medicinal Chemistry, September 3–6, 1985, and two separate satellite sessions on "the role of stereochemistry in the development of new selective drugs", and the "SAR and design of anti-tumor agents".

For convenience, this reviewer has assigned numbers to the chapters in this volume according to their sequence in the text.

For the most part, each of the 29 chapters is well referenced with frequent citations as recent as 1984 and 1985. The 7-page index is topical and generic, but useful nonetheless. The chapters in this collection differ in quality and scope, but cover a wide range of topics. This volume will be particularly valuable to those engaged in drug research.

Certain chapters interspersed through this volume are primarily summary overviews. They include a brief introduction on the history and future of drug development (Chapter 1), the role of receptors in drug research (Chapter 2), calcium channel modulators (Chapter 3), the role of molecular genetics in characterizing drug receptors (Chapter 8), mono- and polyvalent synthetic vaccines (Chapter 18), stereocontrolled synthesis (Chapter 21), chirality in receptor classification, in the action of neuroleptics and antidepressants, and in drug disposition and action (Chapters 22, 23, 24), and mechanisms of antitumor action (Chapter 25).

Authors of the remaining chapters focus mainly upon research activities or projects carried out recently in their own laboratories. They deal with steroid binding (Chapter 4), CNS histamine receptors (Chapter 5), CNS dopamine receptors (Chapter 6), inhibitors of CNS neurotransmitter release (Chapter 7), computer-assisted molecular modeling (Chapter 9) antiviral compounds (Chapter 10), taurolidine development and action (Chapter 11), gibberellin modifications (Chapter 12), forskolin (Chapter 13), prostacyclin (Chapter 14), prostacyclin analogues (Chapter 15), and GABA agonists as potential CNS drugs (Chapter 16). They also include chemical control of drug delivery (Chapter 17), aldose reductase inhibitors (Chapter 19), enkephalinase inhibitors (Chapter 20), SAR of antitumor agents (Chapter 26), design of antitumor agents (Chapter 27), discovery and development of antitumor agents (Chapter 28), and registration of antitumor agents in the Netherlands (Chapter 29).

Readers of this volume will be interested in the outcome of the clinical studies now in progress with some 10 or so of the compounds described in this publication.

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**Thin-Layer Chromatography, Techniques and Applications. Second Edition, Revised and Expanded.** By Bernard Fried and Joseph Sherma. Marcel Dekker, New York. 1986. × + 394 pp. 15 × 23 cm. ISBN O-8247-7609-7. $74.75.

The second edition of *Thin Layer Chromatography, Techniques and Applications* by Bernard Fried and Joseph Sherma has considerable up-dates to the literature citation section, and in addition provides a more extensive coverage of modern techniques and instrumentation in TLC, especially high-performance TLC and quantitative methods. Moreover, six new additional classes of compounds are covered in this edition. More information on the various types of TLC materials is also included. The new edition in particular provides extensive coverage of sample preparation prior to TLC, which is a most useful chapter.

As in the previous edition, the book is divided into two major sections: Part I, General Practices of TLC contains 13 chapters of which probably the most useful, from the reviewer's viewpoint, are the chapters on sorbents, layers and precoated plates; application of samples; solvent systems; development techniques; and detection and visualization. There is an extensive treatment of quantification, particularly because of Dr. Sherma's interest in this area. However, for the general reader this may be a somewhat less useful technique as compared with HPLC.

The second part of the text has 10 chapters dealing with applications of TLC to different compound types, each with concrete examples. In general, the treatment in these chapters is somewhat superficial. However, references to more complete accounts of the areas covered are included. In addition there is a glossary and a directory of manufacturers and suppliers of TLC instruments, plates, and reagents in an index, all of which will be useful.

The reviewer feels that this text will be of major use to individuals who are at an early stage in their use of thin-layer chromatography and as indicated previously, some of the chapters in Part I under "General Practices" will be very useful to the neophyte as well as the more experienced reader. There is some disproportion of treatment in these sections, partly dependent on the major interest of Fried and Sherma. Thus "Quantification" has 26 pages whereas "Preparative TLC" has but 10 pages. The emphasis on HPTLC and quantification may be possibly doing a disservice to the neophyte using TLC and who may not be familiar with the alternative uses and possibilities of techniques such as GLC and HPLC and also preparative HPLC. The reviewer feels that all of these techniques are supportive to each other and that each has a proper place. For example, it is not made clear to individuals beginning to work in TLC that normally HPLC and/or GLC where applicable can provide much better separation than TLC. This occurs in the reviewer's experience particularly when a complex natural product mixture is being worked up. Here in the early stages TLC it is very useful to obtain a feeling for what is going on, and by means of various sprays, with what types of compounds one might be dealing. However, in the later stages of purification, the reviewer has often seen situations where HPLC both by normal or reverse phases will readily separate what may appear to be one spot on TLC. Or, for example, if one is dealing with a mixture of plant sterols, these are almost unresolvable by standard TLC techniques. Yet when such a mixture is derivatized to the trimethylsilyl derivative and subjected to GLC techniques, they can be readily separated. Other than this particular aspect, the reviewer can recommend this text as a good book, particularly for the undergraduate and graduate students, who are just beginning to work with TLC. They will find much useful information and as they gain more experience will be in a position to make up their own mind whether quantitative TLC using HPTLC techniques can equal the power for separation and quantitation available for HPLC with the many types of normal and reverse phase columns now available.

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**Neuropharmacology and Pesticide Action (Ellis Horwood Series in Biomedicine).** Edited by M. G. Ford, G. G. Lunt, R. C. Reay, and P. N. R. Usherwood. VHC Publishers, New York. 1986. 512 pp. 17 × 24 cm. ISBN 0-89573-424-9. $124.00.

This volume contains 23 papers by 38 contributors to the Neurotox symposium held at Bath, England, in 1985. Almost all successful pesticides have been prepared by organic chemists and discovered by screening, and this approach is likely to continue in the foreseeable future. Nevertheless, a limited investment in mechanism-based research on pesticides has been made by a few chemical companies and in some university laboratories. This has centered on neurotoxicity studies because the action of many pesticides has been observed to affect nerve paths of insects, fish,

and other animals. Such investigations promise to lead to more rational design of insecticides, just as neurological mechanisms have opened up more rational approaches to a variety of therapeutics, i.e., selectively toxic agents.

Neurotoxic agents have to localize in and traverse neuronal membranes, and the book begins with the biochemistry of such tissues. Insect neuronal membranes have barely been studied, and their biochemical properties are therefore assumed, for the time being, to be identical or analogous to those of the fluid mosaic model of membranes of higher organisms, their lipid bylayers and membrane proteins. The latter represent targets for neurotoxic agents. The excitable tissue of neuromembranes opens voltage-gated sodium channels which are blocked by saxitonin and tetrodotoxin and held open by two types of pyrethroids. Enzymes at receptor ionic channels have been studied in insects, fish, and other animals, especially cholinesterase as well as its inhibitors. New techniques such as patch-clamp recording have been of great help in these experiments.

J. N. Thornton and her colleagues describe their version of computer graphics in the interpretation of drug–receptor interactions. In many cases, medicinal chemists have arrived at similar conclusions for decades without computer graphics which mostly depict only overlaps with nonapplicable structural segments sticking out here and there, begging for a safe harbor at a receptor or, what is worse, some other protein that may share only a few similarities with the receptor. The immense difficulties of SAR are depicted more comprehensively in a paper by C. R. Ganellin and R. C. Young. This article summarizes all the thousands of options in SAR and should be required reading by medicinal chemists even though it also leaves many burning questions unanswered.

These initial general chapters leave you discouraged in their pessimistic realism but a little hopeful that the youngest among us may live to see the time when rational drug design based on receptor interactions will become a reality. From there on, the book gets down to the business which it set out to do: to tell us about neurobiology and pesticide action. There is a chapter on neurotransmitter receptors of vertebrates (where most experimental work has been done) and insects as targets for insecticides; another chapter on the antibiotic, avermectin, which is active against nematodes, acarines and many insects; the effects of insecticides on insect neurosecretory cells; and two chapters on pyrethroids. The final section on cellular pharmacology presents eight chapters ranging from neuropeptides and the ubiquitous cholinergic receptors to experimental methodology by which neurochemical phenomena may be unravelled.

The book is well printed and almost free of typographical errors. It should be on the shelves of libraries of biology, biochemistry, and pharmacology departments. It is too expensive for individual acquisition, especially since the areas discussed are likely to undergo gradual changes before the next Neurotox symposium will be convened.

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**Dopaminergic Systems and Their Regulation.** Edited by G. N. Woodruff, J. A. Poat, and P. J. Roberts. VCH Publishers, New York. 1986. xv + 501 pp. 16 × 24 cm. ISBN 0-89573-509-4. $119.50.

It has become a tradition to have a dopamine meeting as a satellite to the larger IUPHAR meeting held triennially. These dopamine meetings have been organized the Drs. Woodruff, Poat, and Roberts who, in addition to undertaking the largely thankless task of organizing the meeting, have provided much of esprit and commraderie characteristic of this meeting. This tradition continues: Dopamine '87 is now scheduled as a satellite meeting for the 1987 IUPHAR meeting.

Dopamine is probably the most widely studied neurotransmitter in the mammalian CNS. It is attractive for academic as well as industrial scientists. The reasons for this widespread interest in dopamine are many. Within the CNS, dopamine occurs within a limited number of anatomically well-defined neurons. The dopamine released from these neurons elicits a number of biochemical, physiological, and behavioral responses; it is implicated in Parkinson's disease, schizophreniza, feeding behavior, and the brain's endogenous reward system. Dopamine has actions in the cardiovascular and endocrine systems which have led to the development of therapeutic agents. Taken together, it is obvious that dopamine offers something for virtually every subspeciality of the neurosciences.

The book under discussion represents the collected symposium papers presented at Dopamine '84. Since this review is being written in 1987, it is obvious that much of the material appearing in this volume is somewhat dated. Indeed, I found myself wondering if the authors of several of the chapters would strongly defend some of the statements of "fact" appearing in this volume. For example, although it is now widely accepted that the autoreceptors on the dopaminergic nigro-neostriatal neurons represent examples of the D-2 dopamine receptor, we find the autoreceptor being discussed by R. H. Roth and his colleagues as if it were a unique pharmacological entity. A notable exception to this situation is the essay by Dr. Hornykiewicz about the history of brain dopamine research. This chapter summarizes the high points of dopamine research since the year 1910. This material was presented in the initial lecture of the symposium, a fitting tribute to a leader in the field who played a key role in the development of L-DOPA therapy for Parkinson's disease.

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**Age and Susceptibility of Toxic Substances.** Edited by Edward J. Calabrese. Wiley, New York. 1986. xv + 296 pp. 16 × 24 cm. ISBN 0471-84366-0. $65.00.

This book is part of the Environmental Science and Technology Series of Monographs and is the sixth contribution by this author to the series. The present book extends previous contributions by addressing the age factor in the course of environmentally induced disease. The book consists of 14 chapters, starting with an introductory chapter. Chapter 2 discusses the effect of age on the gastrointestinal, dermal, and pulmonary absorption of xenobiotics while Chapter 3 discusses effect of age on protein binding. The metabolism of xenobiotics is treated in Chapter 4 focusing on the developmental patterns of phase 1 (oxidative and hydrolytic) and phase 2 metabolic pathways (glucuronidation, sulfation, acetylation, and conjugation) as well as age-dependent elimination kinetics of foreign compounds. Subsequent chapters deal with organ specific toxicity differences as a function of age. These include hematological factors (fetal hemoglobin, methemoglobin reductase, nitrates and nitrites, and superoxide dismutase; Chapter 5), the immunological system (Chapter 6), kidney toxicity (interspecies comparsions of kidney morphology and function and specific inorganic and organic renal toxins; Chapter 7), liver toxicity (acetaminophen, rolitetracycline, warfarin, bromobenzene, and carbon tetrachloride; Chapter 8), respiratory toxicity (Chapter 9), and neurotoxicity (Chapter 10). The next two chapters address the question of whether age differences affect the capacity to induce and repair potentially deleterious genotoxic lesions following exposure to potential carcinogens and how age may influence the predisposition of certain individuals toward the development of environmentally related cancers. The final chapter provides a very concise and well written summary of the preceding 13 chapters and addresses the relevance of age differences in susceptibility to toxic agents to regulatory agencies with particular emphasis on biological basis of safety factors.

On the whole the book is well written, free from typographical errors and the subject index is quite adequate. Although each chapter is sufficiently referenced there is a notable lack of post 1982 citations (approximately 3% newer than 1982) and only two 1985 references despite the 1986 publication date. It is the opinion of this Reviewer that the author has attempted to address too vast a subject area for the allotted number of text pages. It is impossible to present much more than a very sketchy description of an area of study as vast and important as developmental pharmacology and toxicology. As a result certain extremely important areas of research and disciplines were either not addressed (teratology) or treated only briefly. Despite these criticisms this

Reviewer found the book to be a potentially valuable source for reference information for medicinal chemists involved in related biochemical pharmacology and toxicological studies.

Note: The opinions expressed in this review are those of Dr. Wirth soley and do not necessarily represent those of either NIH or NCI.

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**The ACS Style Guide.** Edited by Janet S. Dodd. American Chemical Society, Washington, D.C. 1986. xvii + 264 pp. 15 × 23 cm. ISBN 0-8412-0917-0. $24.95.

Most medicinal chemists learn early how to write a journal paper or a monograph article. Their professors, hard-pressed to publish or perish, spend their writing time allotment composing voluminous grant applications for future support and have to leave at least the experimental details of their papers to their graduate or postdoctorate co-workers. By the time these young scientists assume independent positions in academia or in industry they will be well versed with the format, purposes, and standard practices of major publications in or near their field of interest. The American Chemical Society (ACS) has provided handbooks for authors in 1967 and 1978 and now offers its Style Guide, which covers the unified as well as the diversified editorial standards of its growing number and variety of journals, monographs, technical reports, and review articles. Moreover, industrial medicinal chemists have to provide drafts of patents that can form the basis of a patent attorney's efforts to nail down the inalienable rights of a company to its protected invention.

For all these purposes one has to retrieve background material from the vast literature, from Adam and Eve to 1987, and present it to the reader in terse and space-saving form. Then comes the task of adapting one's text to the idiosyncrasies of the publication medium to which it is to be submitted. These editorial preferences vary especially as one gets further afield from chemistry and approaches biology, genetics, physics, and other peripheral media with their own time-honored stylistic traditions. At this juncture the ACS Style Guide becomes equally valuable to rotating editors as to authors who might be less familiar with a given journal or the preferences of a new group of referees. It will save authors much grief due to revisions of manuscripts if they write their reports in exactly the format requested by the journal of their choice. Such adherence should be given particularly by foreign-language authors, who should seek the advice of an American colleague in translating and tersing up their manuscripts. Recommendations and detailed examples are provided in the Guide.

Authors, editors, and reviewers have certain ethical obligations in the publication of a scientific manuscript. They concern novelty, confidentiality and other aspects of the publication process which should be self-evident but are often disregarded. The Guide summarizes these rules of conduct in a good summary.

Every medicinal scientist who wishes to communicate his or her work to others will find much factual and time-saving advice in the Guide. The text is clear and readable and the book is priced at less than a junior medicinal chemist's hourly wage. As a bonus, much advice is given to secretaries how to type, spell (for those who do not own a self-correcting, dictionary-based word processor), draw and place formulas, tables, figures, and other adornments.

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**Quantitative Analysis of Catecholamines and Related Compounds.** Edited by A. M. Krstulovic. Wiley, New York. 1986. 384 pp. 17 × 24 cm. ISBN O-85312-824-1. $74.95.

This book is another in the Ellis Horwood series in Analytical Chemistry and sets out to review analytical methods useful in catecholamine research. With the increasing sophistication in analytical methodologies and the demands of research scientists for the detection of even lower levels of biologically important molecules, this volume is a timely addition to the series. The book consists of 10 separate chapters, each of which is authored by an expert in the particular field. The topics covered include gas–liquid chromatography and mass spectrometry, high-pressure liquid chromatography, radioimmunoassay and immunoassay methods, fluorescence and immunofluorescence techniques together with biochemical medical and tissue analysis applications.

As is characteristic of books with multiply authored chapters, the quality of topic coverage varies from chapter to chapter. Most authors have included sufficient introductory material to effectively introduce the nonexpert to the field and in most chapters the literature is covered through 1985. Over 180 pages as seven separate sections are devoted to different aspects of high-pressure liquid chromatography with particular attention paid to electrochemical and fluorescence detection where detection limits in the picogram to nanogram range have been reported. This is appropriate since these methods offer high selectivity and sensitivity at relatively low cost. Many of the chapters give a good outline of the experimental procedures together with more than adequate referencing. This means that the advantages and disadvantages of each analytical procedure are readily discernible.

On the whole the book provides a good balance between traditional analytical methods and those employing newer physical and spectroscopic or biological techniques. The book provides a wealth of useful information including experimental techniques and references to help the practicing medicinal chemist, pharmacologist, or clinician set up an appropriate analytical method for their research programs.

Overall the work gives a good balance between theory and practice. There is something in the review for most interested scientists, from the novice to the seasoned practitioner. The work will be a useful addition to most medicinal chemistry libraries.

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**Development of Drugs and Modern Medicines. A Conference to Honour Professor Arnold H. Beckett.** Edited by J. W. Gorrod, G. G. Gibson, and M. Mitchard. VHC Publishers, Deerfield Beach, FL. 1986. x + 669 pp. 17 × 24 cm. ISBN 0-89573-557-1. $163.00.

This volume is a festschrift honoring A. H. Beckett of Chelsea College and contains 64 papers presented by Beckett himself (three) and his students and colleagues. There are eight parts, each with four to nine papers by a total of 117 contributors. The parts are drug design; pharmacological evaluation; drug and metabolite analysis; drug metabolism (the most importnat chapter); drug delivery systems; pharmacokinetic studies; drug toxicity, interactions and abuse (with experiences in sports medicine); and clinical evaluation and regulatory affairs. The papers represent the principal specialties of the contributors. They are authoritative in experimental detail and reviewing discussion but leave out urgent contemporary problems. Thus, the papers on sports medicine and drug abuse not once mention cocaine and heroin, and the somewhat superficial index does not carry such entries. By contrast, other structural types are emphasized all the way through, in accord with the Chelsea school interest in these drugs.

Most of the articles on medicinal chemistry are reviews that will bring the reader up-to-date and offer fresh insights into earlier observations. There are some really excellent discussions of the molecular mechanisms of calcium antagonists, featuring details of calmodulin complexes. Cytochrome P-450 is the subject of several papers, illuminating biochemical oxidations in interesting metabolic situations. Pharmacological problems are at the core of pharmacokinetic studies and drug delivery systems; the latter field has blossomed to an almost independent doctrine and competes with synthetic efforts of drug development. Beckett's interest in drug interaction and abuse is reflected in papers by himself and his numerous former students. Finally, the decrees of various national drug control agencies are discussed with all the confirming and objecting opinions such regulations evoke.

A good-sized volume such as this with so many articles on all kinds of topics can barely be homogeneously satisfactory. There are some superb reviews as well as some weak research papers

that would have had trouble being accepted in refereed journals. Two articles are full of typos; the editors obviously did not read the proofs. The book is printed well and illustrated beautifully. Maybe that is the reason for its extremely high price. Some well-endowed libraries, especially in the industry, may be able to pool their resources and acquire this symposium volume.

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**Site Specific Drug Delivery.** Edited by E. Tomlinson and S. S. Davis. Wiley, Chichester. 1986. x + 164 pp. 15 × 22 cm. ISBN 0-471-91236-0. $37.95.

This book, based on the proceedings of a symposium on drug delivery held in October 1986, is organized to provide an overview of recent advances in cell and molecular biology that may offer opportunities for site specific drug delivery. As such, the editors have succeeded in setting the stage for new therapeutic strategies that will inevitably impact upon the design and utilization of the next generation of chemotherapeutic agents.

The topics in this book include (1) identification and expression of cell-surface receptors for endogeneous ligands such as low-density lipoproteins on hepatocytes and the heterogeniety of virus receptors in different tissues, (2) the internalization and intracellular processing of receptor bound ligands, (3) the pharmacokinetic behavior of monoclonal antibodies and the design, evaluation, and optimization of antibody–toxin conjugates, (4) the design of colloidal microparticulate drug carriers for intravenous use and the physiochemical properties governing their in vivo behavior, (5) the useeof one such microparticulate system, liposomes, containing immunostimulants for treatment of metastatic cancer and viral infections, and (6) the strategies and approaches to gene therapy.

An essential consideration in the rational design of the next generations of drugs will be incorporation of determinants that will confer site specificity. The monographs in this book provide insight into the cellular processes involved in the physiology of drug targeting, current in vivo application of monoclonal antibody, and liposome-based delivery systems in cancer therapeutics and newly evolving strategies for gene therapy. This volume should be of interest not only to cell biologists but to medicinal and pharmaceutical chemists interested in the fundamental process governing site specificity and establish new approaches to the design and development of new therapeutic agents.

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**Carbohydrate Chemistry. Volume 18. Part I. Mono-, Di-, and Trisaccharides and Their Derivatives. Specialist Periodical Reports.** N. R. Williams, Senior Reporter. The Royal Society of Chemistry, Burlington House, London. 1986. x + 284 pp. 14 × 22 cm. ISBN 0-85186-202-0. $52.00.

The 18th volume in this series is a review of the literature published during 1984. Continuing the tradition begun with Vol. 14 of the series, Parts I and II (Macromolecules) are published separately in an effort to expedite publication. The current volume is published directly from authors' camera-ready manuscripts in order to contain prices and again, to expedite publication, a policy which was begun with Vol. 15. It should also be noted that structural formulae are hand-drawn and lettered. They are consistent in style throughout the text, however, and are very well done. The organization of the review is virtually identical with that of past volumes with the exceptions that the discussion on glycosides has been expanded and divided into two parts (glycosides and disaccharides; oligosaccharides), and the discussion of the synthesis of enantiomerically pure noncarbohydrate compounds from carbohydrates has been placed in a separate section. In both cases, these changes reflect the extensive and growing interest in these subjects. The title of the Report, unfortunately, does not convey its full scope, especially with regard to the chemistry of nucleosides and carbohydrate-containing antibiotics, and to physical and analytical methods relevant to the subject. The breadth of the Report, however, is appropriate in my view and the imprecision of the title is not a serious flaw. As a researcher in this field and a lecturer on the subject, I continue to find these Reports most useful.

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**Reagent Chemicals, Seventh Edition.** By ACS Committee on Analytical Reagents. American Chemical Society, Washington, D.C. 1986. xiii + 713 pp. 15 × 23 cm. ISBN 0-8412-0991-X. $89.95.

This volume is the Seventh Edition of the series formally introduced in 1950 by the ACS Committee on Analytical Reagents. Formal supplements as updates have been published between editions, and one is planned in the future before the Eighth Edition is published. This comprehensive treatise provides specifications and test procedures for over 350 commonly used chemical substances.

The book is divided into two major sections, the first being "Definitions, Procedures and Standards". In addition to the definitions of test equipment, assay, and impurity requirements, etc., a large part of the section is devoted to "General Directions and Procedures" for the most common specifications and tests. For example, general directions for gravimetric methods, physical property measurements (boiling range, color, density, freezing point, and melting point), calorimetric method, and instrumental methods (flame photometry, atomic absorption spectrophotometry, potentiometry, polarography, electrometric endpoint detection, gas chromatography) are included. This section, in particular, gives the nonanalytical chemist a good overview of some basic analytical techniques. Also included are the definitions of and working directions for the preparation of 77 reagent solutions and 59 standard solutions which are used in testing procedures described later.

The second, and major section of this volume is "Specifications". Approximately 350 chemical substances are listed in alphabetical order. Given for each substance is the chemical name (including the exact degree of hydration, where appropriate), common synonyms, chemical formula, formula weight, CAS number, requirements, and the specific analytical tests to assay those requirements. Many of the tests listed have been previously described in the Procedures section, and are back referenced by page number. The tests which are not back referenced are described, and the working directions are clear and concise.

The index is complete, and listings include the 358 chemical substances for which requirements are stated, and also numerous references to the section on "Definitions, Procedures and Standards".

This book is a well put together reference volume which is easy to use. In particular, the numerous cross references for test directions are clear and easy to follow. The layout of the book and the index make it easy to find any item. No typos are evident from scanning the text. This book should be invaluable to any analytical and manufacturing chemist. In addition, a copy would be handy in other chemistry laboratories, to help eliminate research errors caused by impure reagents.

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**CRC Handbook of Hormones, Vitamins, and Radiopaques.** Edited by Matthew Verderame. CRC Press, Boca Raton, FL. 1986. 328 pp. 18 × 26 cm. ISBN 0-8493-3291-5. $144.00.

Handbooks are expected to present virtually all pertinent information on a given topic, so that the reader will not need to refer to other sources except for experimental details. The present volume fulfills this promise but, like its predecessors in the same series, places strange bedfellows under one cover. Of course it is interesting to teach a nutritionist or endocrinologist about radiopaques but it is doubtful whether such specialists will profit from the intricacies of an area unrelated to their field of interest. How does such a conglomerate originate? Is it that the respective

manuscripts arrive at the editorial office simultaneously and their total number of pages make it attractive to lump them together? Would it not have been better to combine the hormones and the vitamins with some other discussion of biocatalysts? Why should an endocrinologist have to pay dearly for a chapter that he will probably never read? These questions do not detract from the excellence of each of the sections of the book but question the relevance of the editorial policy of the series.

The chapters on hormones include most steroid hormones (androgens, anabolics, antiandrogens, estrogens, antiestrogens, antiovulatory agents), thyroid and antithyroid drugs, insulin and other hypoglycemic agents, and hypothalamic and pituitary hormones. Notably absent are neurohormones except for passing mentioning of some of them.

As an example of the coverage of each detail, the section on pyridoxine could be cited. The discovery, nutritional background, and isolation of the vitamin, determination of its structure, and its chemical synthesis are described. This is followed by a discussion of $B_6$-deficiency symptoms, the dietary sources of the vitamin, structure–activity relationships, $B_6$ antagonists, mechanisms of action, biosynthesis, pharmacokinetics, and toxicity. The same sequence is followed for each of the vitamins. Structural formulas are clear and there are ample references in the text. Important data are tabulated and illustrated by instructive figures.

There are, of course, older compendia which could have been brought up to date by articles reviewing recent findings. For example, McCollum's "A History of Nutrition" (Houghton-Mifflin, 1957) and Wagner and Folkers' "Vitamins and Coenzymes" (Interscience, 1964) cover most of the same discussions of the vitamins until about 25 years ago. The frequent review articles in *Annual Reviews of Medicinal Chemistry* have kept the reader abreast of current developments. All this holds for the other subjects in the present handbook as well. Of course it is nice to be able to re-read these data under one cover, but for a serious search of the literature, is a computer-aided survey not equally easily handled?

The high quality of the descriptions in this volume compensates for such questions. Besides, they make for clear and easy reading in a well-printed and handy book.

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**Neuromethods. Volume 4. Receptor Binding.** Edited by A. A. Boulton, G. B. Baker, and P. D. Hrdina. Humana Press, Clifton, New Jersey. 1986. xxi + 584 pp. 15 × 23 cm. ISBN 0-89603-078-4. $64.50.

Receptor Binding is the fourth volume of the Humana Press Neuromethods series (Series I: Neurochemistry). As stated in the preface, the goal of the volume is to critically review the contribution of receptor-binding studies to the fields of neuropharmacology and neurochemistry with emphasis on methodological aspects and problems associated with the integration of binding data and the function of receptors. The 15 chapters, written by well-recognized neuroscientists, begin with an introduction on the general principles of receptor binding and end with a discussion of receptor binding in drug development. In between are chapters on dopamine, adrenergic, serotonin, muscarinic, excitatory amino acid, GABA, nonopioid neuropeptide, opioid, purinergic, benzodiazepine, and antidepressant binding sites. An additional chapter was devoted to tryptamine and phenethylamine sites and another to PCP and amphetamine sites; these less frequently reviewed areas are a nice addition to such a book.

In general, the chapters are well-written and are appropriately comprehensive. Each chapter (where applicable) discusses the subtypes of binding sites that have been identified and the radioligands that are commonly employed to label them. Also, available data on the physiological/pharmacological relevance of the various sites are reviewed. One gets the distinct impression that each of the contributors made a concerted effort to meet the stated goal. Unfortunately, the book must have been long in preparation; with the rare appearance of a few 1985 citations, the literature is covered only through 1984.

Though the overall rating can be nothing less than favorable, it is apparent that medicinal chemists were not (nor were they intended to be) the prime audience. There are extensive descriptions of methodology and experimental detail. There are even listings of several computer programs for data analysis. From a medicinal chemist's point of view, more chemical structures would have been useful to get a better appreciation for the various structure types involved (particularly where many agents are commonly referred to by code numbers or catchy abbreviations). In fact, there are only two figures of structures (neither errorless) in the entire book. Nevertheless, there is enough in this volume to make it a valuable reference source for medicinal chemists interested in centrally active agents. Indeed, the last chapter Receptor Binding in Drug Discovery and Development by Williams and Wood is a realistic approach to the application of binding studies in current research. Because the advantages, disadvantages, limitations, and strengths of the binding procedure are described in depth, this chapter could easily become required reading for graduate students in medicinal chemistry.

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**Pharmacokinetics: Processes and Mathematics.** By Peter G. Welling. American Chemical Society, Washington, DC. 1986. xiv + 290 pp. 15 × 23 cm. ISBN 0-8412-0967-7. $59.95

Although several books on pharmacokinetics have been published in recent years, this very useful book is probably the first to take the practical approach of describing basic principles of drug disposition in addition to the mathematical application of these principles, i.e., pharmacokinetics. Accordingly, the book is divided into two sections. The first considers the anatomical, physiological, and physicochemical concepts affecting xenobiotic absorption, distribution, metabolism, and excretion. Included are descriptions on the fundamentals of membrane transport, biopharmaceutics, factors affecting drug absorption, first-pass metabolism, enterohepatic circulation, protein binding, penetration into the central nervous system and tissues, biotransformation processes, and mechanisms of and factors affecting renal excretion. The second section titled the Mathematics of Pharmacokinetics consists of discussions on compartment modeling, physiological modeling, and model-independent pharmacokinetics and includes chapters on multiple-dose kinetics and metabolite pharmacokinetics.

The book is well-written and easy to read. Each chapter contains a concise summary and many include a set of mathematical problems. Fortunately, the chapters on pharmacokinetics are not overly weighed down by equations; those provided are sufficient to develop the concepts discussed without entering the realm of incomprehensible mathematics. The author could have devoted more attention to species differences and pharmacogenetics. Also, since a major effort was made to describe basic concepts, the absence of any description on stereoselectivity in biotransformation of racemic drugs and its consequences on pharmacokinetics was an oversight. The appendix contains a comprehensive nomenclature of mathematical terms but an incomplete glossary of technical terms. In this reviewer's opionion, the subject index in most texts on pharmacokinetics is virtually useless. Welling's index, however, is quite comprehensive, although it could have been even better if all pharmacokinetic terms discussed (e.g., area under moment curve) were included.

In spite of these minor shortcomings, this text is an excellent source reference containing well-organized descriptions both of basic concepts of drug disposition and of pharmacokinetics. The author's experiences both as a professor and an industrial investigator have served him well in the preparation of this book, which would be extremely valuable to the student as well as the experienced scientist in the fields of drug metabolism, clinical pharmacology, biopharmaceutics, medicinal chemistry, and toxicology.

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**Developmental Neurobiology of the Autonomic Nervous System.** Edited by Phyllis M. Gootman. Humana Press, Clifton, New Jersey. 1986. xix + 416 pp. 15 × 23 cm. ISBN 0-89603-080-6. $64.50.

This book, one of three volumes of a series titled *Comtemporary Neuroscience* and covering many aspects of the maturation of the autonomic nervous system (ANS), was suggested from a symposium on the developing autonomic nervous system held in the spring of 1982 (*Fed. Proc., Fed. Am. Soc. Exp. Biol.* **1983**, *42*, 1619). The book is not another review of the ontogeny and phylogeny of the ANS: Dr. Gootman has obtained contributions from field leaders focused upon the more recent advances in developmental neurobiology. Chapters 1–3 address the cellular development of the ANS, the parasympathetic nervous system, and the sympathoadrenal axis. Chapters 4–7 are devoted to the development of sympathetic innervation of the heart, including endocrine control of synaptic development in the sympathetic nervous system, the cardiac–sympathetic axis, development of autonomic innervation in the avian and mammalian myocardia, and autonomic effects in the developing heart. Three additional chapters are devoted to development of sympathetic innervation of the vasculature including postdevelopmental changes associated with aging. There is also an excellent presentation on the development of central autonomic regulation of cardiovascular function. Besides the heart and cardiovascular system, the only other organ system treated is the respiratory system. Lacking are treatments of development of autonomic functions in the kidney and urinary tract and gastrointestinal organs. The developmental aspects of the neurobiology of these organs have not progressed as rapidly, and thus are not covered extensively in this volume. The chapters are, in general, well written, well focused, and extensively references to include current literature; the text is generously illustrated with tables, figures, and photomicrographs. The quality of the text and illustrations dose vary somewhat from chapter to chapter.

*Developmental Neurobiology of the Autonomic Nervous System* is a specialty text aimed at neurobiologists, physiologists, and pharmacologists having some knowledge of the adult autonomic nervous system. The book represents a substantial contribution to the field and is recommended for research libraries and specialists in neurobiology.

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**Studies in Physical and Theoretical Chemistry. Volume 41. Theoretical Chemistry of Biological Systems.** Edited by G. Náray-Szabó. Elsevier, Amsterdam. 1986. xiii + 504 pp. 17 × 25 cm. ISBN 0-444-42597-7. $109.25.

Computational chemistry is becoming increasingly important for biooriented research today, and most drug companies have their own modeling facilities. Ab initio, semiempirical and molecular mechanics calculations are used for conformational analysis as one important aspect of structure–activity studies in drug research. Classical drugs are small molecules and as such very suitable for theoretical treatment, since computation time is dependent on the number of atoms/electrons in the structure studied. In recent years, many attempts of theoretical treatment of complicated bioorganic molecules of different classes have appeared in the literature. Such molecules of interest are, e.g., peptides and proteins, nucleic acids, and carbohydrates, and special sections in this book are devoted to these interesting molecules.

The first chapter gives a survey of the computational methods available and their scope and limitations. It is emphasized that the large size of the bioorganic molecules necessitates the introduction of approximations in the theoretical treatment of these molecules. However, since reference to experimental data sometimes is possible, the validity of the theoretical results can be checked, which is also done throughout this book. In the section on peptides there is a discussion of the character and specificity of an active site, as well as i.a. electron transport phenomena over biological membranes. The different theories of DNA base pairing and helicities are discussed in great detail in the section of DNA model building. Most computational models used for DNA conformational analysis are by necessity semiempirical in nature. Such methods are thoroughly described. A special subsection deals with the electronic properties of polynucleotides, investigated with several different theoretical methods as, for example, Hartree-Fock and perturbation theory. This section also describes the effects of hydration on the energy bands of DNA.

The introductory part of the chapter on carbohydrates deals with the predictability of the computational methods used and structural notations and conventions of carbohydrates, as well as suitable model compounds studied. The anomeric and exoanomeric phenomena are discussed in great detail in conjunction with the importance of solvent effects. Hydration of biomolecules is an important subject which has been given its own section in this book. Both Mont Carlo and molecular dynamics techniques are discussed. Specific examples of hydration of nucleic acids and peptides are given. The authors emphasize the important difference between the conformation of a compound in the crystal state (X-ray conformation) and the conformation in solution. One has to bear in mind that crystal packing forces can distort the conformation to become very different from the conformation in vacuum (theoretical calculations) or in solution (NMR). The section on the hydrophobic effect is organized chronically and a vast amount of valuable references are listed. Unfortunately, this section suffers from more typing errors than can be tolerated in a quality publication like this.

In summary, the different sections of this comprehensive survey of the theoretical treatment of bioorganic molecules are written by experts in their respective fields, and in each section many valuable references to current publications are given. This book covers many important subjects in this research field and should be of great value to scientists already into such studies, as well as to those who are just beginning to encounter the gigantic task of unraveling the chemical secrets of biological systems.

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**Opioid Analgesics: Chemistry and Receptors.** By Alan F. Casy and Robert T. Partiff. Plenum Press, New York. 1986. xv + 518 pp. 15 × 23. ISBN 0-306-42130-5. $69.50.

This comprehensive, thoroughly referenced treatment of opioid analgesics is relevant and timely, given the rapidly burgeoning research of the past two decades on agonist–antagonist analgesics and opioid receptors. The authors have surpassed their stated aim, "to afford medicinal scientists an entry into the chemistry and biological activity of morphine and related compounds".

An introductory chapter that briefly covers definitions, testing methods, side effects, pharmacokinetics, and biochemical and bibliographical aspects is followed by 4,5-Epoxymorphinans, not surprisingly, the most extensive chapter of the book. Chapters 3–5, concerned with, respectively, morphinans, benzomorphans, and the interesting but little-investigated 5-arylmorphans, follow logically for reasons of genesis and structural similarities. The next three chapters treat piperidine-type analgesics (pethidine and related 4-phenylpiperidine analgesics-6; further analgesics based on piperidine and related azabicyocloalkanes: prodines, promedols, profadol, and their derivatives-7; fentanyl and the 4-analinopiperidono group of analgesics-8). Methadone and related 3,3-diphenylpropylamines constitute Chapter 9 while enkephalins, endorphins, and other opioid peptides are given good coverage in Chapter 10. Chapter 11 deals with miscellaneous groups of analgesics (atypical structural types, e.g., benzimidazoles, tetrahydroisoquinolines, cyclohexanes, aminotetralins, etc.). The final two chapters on antagonists, dualists (agonist–antagonists), and $\kappa$ agonists (12) and opioid receptors (13) are particularly scholarly and should evoke widespread interest. Throughout, molecular geometry (especially optical isomerism) and structure–activity analyses and interrelationships are emphasized.

Editing and proofreading have been thorough, although Senay (ref 11, Chapter 9) has been misspelled ("Senag" and "L.T. Sargent" should be L. J. Sargent (ref 220, Chapter 4). The Table

of Contents and Index are good, and the print is flawless.

Minor criticisms are the use of 3-benzazocine numbering with the 6,7-benzomorphan generic name (Chapter 4) and the limiting subtitle of the book which could better have been "Chemistry, Pharmacology and Receptors".

For educators, students, laboratory scientists, and physicians interested in centrally acting pain-relieving agents, this book by two authors well versed in the chemistry, pharmacology, and biochemistry of opioid analgesics will be informative, stimulating, and thought-provoking.

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**Monitoring Neurotransmitter Release During Behavior.** Edited by Michael H. Joseph, Marianne Fillens, Ian A. MacDonald, and Charles A. Marsden. Ellis Horwood Ltd., Chichester. 1986. 270 pp. 17 × 24 cm. ISBN 3-527-26222-9. $57.00.

This volume is based on a symposium on electrochemical detection in pharmacology and neurochemistry, held in Oxford in September, 1984, under the auspices of the Biochemical Society of London. The literature coverage is quite good up to the date of the symposium, with a few 1985 articles cited. An adequate subject index is provided. The chapters are uniformly well written, with the concepts clearly presented.

Despite the title, this volume concentrates on several techniques for measuring the levels of central neurotransmitters in rat brain. The emphasis is heavily on the biogenic amine neurotransmitters, dopamine, norepinephrine, and serotonin, with the excitatory amino acids and neuropeptides receiving limited coverage. Although the stress is on analytical methods, the ability of these methods to detect changes in transmitter overflow or turnover is illustrated and validated by a variety of experimental paradigms involving both behavioral modification and standard pharmacological manipulations. One weakness, however, is the lack of more correlations between transmitter measurement in rats and corresponding data in larger animals in which there are fewer technical difficulties (i.e., less limitation on sample size or tolerance in cannula location).

The methods covered include in vivo electrochemistry and intracerebral dialysis, as well as various techniques for sampling small volumes of cerebrospinal fluid. A useful commentary is provided, pointing out the advantages and weaknesses of the individual analytic techniques. A section on specific chromatographic methods suitable for separation, derivatization, and detection of neurotransmitter molecules is provided.

This review volume will be of most interest to those involved with measurement of central levels of biogenic amines in the rat. Enough information is provided, both in terms of general background and specific techniques, to make an intelligent choice as to which method is likely to yield the most useful data. In addition, the collection of technical information on catecholamine analysis could be a valuable resource for workers in related areas.

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**Local Anesthetics.** Edited by G. R. Strichartz. Handbook of Experimental Pharmacology, Vol. 81. Springer-Verlag, New York. 1987. xii + 292 pp. 17 × 25 cm. 52 Figures. ISBN 0-387-16361-1. $159.00.

Local anesthetics are among the oldest and most widely studied medicinal agents; they have taken the place of general anesthetics in regional, epidural, intrathecal, and other surgical procedures. A few of them have useful side effects that benefit cardiac arrhythmias, chronic pain, and topical irritation as in sunburn. The raison d'être of these drugs is their biological activity, and all other observations of structure–activity relationships (SAR) and mechanistic studies are subjugated to the aim of increasing and improving local anesthesia and making it more specific, less toxic, and less hazardous. It is therefore appropriate that a group of 12 pharmacologists and anesthesiologists has presented their historical, biochemical, pharmacological and clinical experiences in the present volume. Their interaction was facilitated by their geographic proximity; all but three of them are located at Harvard and Yale.

The history of the discovery of the medicinally desirable and objectionable properties of cocaine, the grandfather of modern local anesthetics, has been reviewed many times but barely ever as authoritatively and thoroughly as in this handbook. The circumstances concerning the roles of Sigmund Freud, Carl Köller, Paolo Mantegazza, V. K. von Anrep, and Alfred Einhorn, who were all involved in this development, are set forth impartially and interestingly. The multiactivity of cocaine did not call for the concomitant use of such vasoconstrictors as epinephrine which characterized many of the early local anesthetics of the ester, ether, and amide types. John Jacob Abel contributed handsomely to this work.

The primary site of the blocking action of local anesthetics is the sodium channel, a transmembrane protein controlling the influx of $Na^+$. The status of this complex phenomenon occupies a long chapter, bringing us up-to-date on all aspects of this electrical action. Other excellent chapters deal with the mechanisms of differential nerve block and the pharmacokinetics, toxicity, and systemic effects of local anesthetics. The role of local anesthetics on the central nervous system, which is so much debated and feared by the public, and in cardiac arrhythmias are discussed in chapters totalling 72 pages. There are extensive bibliographies which will be useful to researchers in these fields.

The least palatable chapter, to medicinal chemists, is the one on SAR. It is written by pharmacologists for pharmacologists and lacks many traditional approaches to SAR. However, the principal methods of SAR researches are outlined.

This reviewer does not have many wealthy friends. The few that would qualify are bankers, real-estate tycoons, financiers, and the like. They would not be interested in this book. The biochemists and pharmacologists who should read this volume could not afford it. Who then will be able to put down a month's grocery budget for 292 pages even though they be very much worthwhile?

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**Asymmetric Synthesis. Construction of Chiral Molecules Using Amino Acids.** Gary M. Coppola and Herbert F. Schuster. Wiley, New York. 1987. xiii + 393 pp. 16 × 24 cm. TSBN 0-471-82874-2. $55.00.

The synthesis of enantiomerically pure compounds is an important facet of modern organic synthesis. The synthetic challenges of asymmetric synthesis have been met by a variety of approaches, one of which is to use chiral amino acids as building blocks and as chiral templates. The aim of the authors of this book was to demonstrate the synthetic utility of amino acids, one of the more versatile and inexpensive sources of commercially available chiral building blocks. Asymmetric syntheses of important pharmaceuticals, agrochemicals, and natural products, summarizing over 1900 literature references (through about 1985), are covered in nine chapters. Interestingly, 17 of the 19 common chiral amino acids have been used as precursors of more complex molecules or as chiral auxiliaries. Both applications are extensively illustrated.

The extensive and detailed coverage of important reactions and synthetic intermediates makes this book a valuable reference resource for the chemist interested in asymmetric synthesis. The index comprehensively lists name reactions, compound types, and reaction mechanisms while each chapter is organized by the amino acid precursor (alanine, phenylalanine, valine, etc.) so that it is easy to locate information quickly. In addition, the synthesis of various compounds is clearly abstracted and illustrated so that this book should prove useful to those interested in natural product synthesis. Due to limitations of space and the large amount of material covered, the authors sometime fail to discuss fully the limitations of various methods. In addition, these reviewers noted that the use of the terms *threo* and *erythro* is inconsistent and undefined. The nomenclatures of Fischer and Heathcock/Evans are reproduced from the original references

without any attempt being made to clarify their use. A brief introduction to the current use of these terms would have been helpful.

This book is highly recommended for those interested in asymmetric synthesis and those who wish to learn more about the chemistry of amino acids.

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**CRC Handbook of Cardiovascular and Anti-Inflammatory Agents.** Edited by Matthew Verderame. 13 Contributors. CRC, Boca-Raton, FL. 1986. vii + 313 pp. 18 × 26 cm. ISBM 0-8489-3290-7. $125.00.

This is the sixth handbook of medicinal agents in this series. It continues the format of its predecessors which includes the historical development of the class of drugs, disease states for which the drugs are used, testing methods, some chemical syntheses, and always structural formulas. The mechanisms of action, SAR, pharmacokinetics, uses and dosage, toxicity and drug interaction, and complete physicochemical data, alternate drug names, and other significant data are reported tersely but thoroughly. A check on a dozen examples with which this reviewer is familiar demonstrated the comprehensive, well-documented, and authoritative treatment in each case. Thus all standard and up-to-date information on all classes, subclasses, and all important individual drugs in each of these areas can be gleaned rapidly from these reviews. The text is clear and simple throughout and can therefore be appreciated by specialized medicinal scientists and practitioners who are only superficially familiar with a given class of agents.

In accord with their clinical importance—also reflected in the amount of chemical research activity, the antiinflammatory steroids occupy only 26 pages as compared with the 77 pages allotted to nonsteroidal antiinflammatory drugs, antipyretics, and uricosurics. However, in both cases all the important agents are discussed, classified, and contemplated from every chemical and pharmacological angle. In these chapters all aspects of these drugs and their mechanisms of biochemical and therapeutic action are brought up to date. One cannot escape the wishful thought that with so much understood at the enzymic and molecular level how these drugs act, it should by now be possible to design additional agents rationally, based on stereochemical considerations; but alas this time has not yet come.

Among the cardiovascular drugs, antianginal, antihypertensive, antiarrhythmic, antilipemic, antithrombotic, and hemostatic agents are described in addition to cardiac glycosides. In each of these chapters one will find all the data and comparisons listed above, and in each case one cannot help but admire the detailed and authoritative manner of the respective presentations. These articles should be adequate to inform experts and novices of all the current well-researched features of these fields and to help in sorting out trends of established and investigative importance. They will help in orienting chemists and experimental biologists in each case and provide reliable sources of quick reference to given drugs for clinicians as to their utility in medicine.

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**An Insider's Guide for Medical Authors & Editors.** Peter Morgan. ISI, Philadelphia, PA. 1986. viii + 111 pp. 15 × 23 cm. ISBN 0-89495-076-2. $14.95 (paperback).

This volume is one of a series published by ISI Press; i.e., "The Professional Editing and Publishing Series". In this book an attempt is made "to win the author's sympathy concerning the author–editor system". Editors have definite expectations for the manuscripts that they receive, and especially new authors oftentimes have had inadequate training in the "author–editor system, which is at the heart of journal science". The book is intended to assist both the experienced and inexperienced author to better understand what a medical journal requires and consequently offers suggestions, through example, of methods for preparing better, more readable, and more readily accepted manuscripts for peer-reviewed journals. Although intended for medical journals, much of the material presented is equally applicable for other scientific publications. Clearly, the book is not intended to detail "how to" write an acceptable manuscript. Nevertheless, many useful suggestions are advanced in this seven-chapter edition that contains sections ranging from "Writing the Right Title" to "The Joys of Revising a Manuscript" to "How to Get a Rejected Manuscript Published".

In my opinion, this volume admirably meets its objective of presenting through anecdote and example the role of author, reviewer, and editor. As a result this is enjoyable light reading while, at the same time, it is educational. I recommend it, without qualification, especially to new authors. It is clearly and honestly written. This fascinating, illustrative, and modestly priced book should be of significant benefit to many authors, especially those who are inexperienced.

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**Chlamydial Infections.** Edited by David Oriel, Geoff Ridgway, Julius Schachter, David Taylor-Robinson, and Michael Ward. Cambridge University Press, London. 1986. xvii + 583 pp. 18 × 25 cm. ISBN 0-521-32453-X. $59.50.

*Chlamydia* are Gram-negative bacteria obligately parasitic within eukaryotic cells. Infections due to this organism continue to be a major cause of ocular and sexually transmitted diseases around the world. *Chlamydial Infections* is a time publication wherein the major advances and fundamental issues in chlamydial research during the past 5 years or so have been adequately addressed. This book embodies the proceedings of the Sixth International Symposium on Human Chlamydial Infections held in June 1986 at Surrey in the United Kingdom. The book is divided into 13 sections and the value of each section has been accentuated by a brief and coherent overview of the subject preceding the research articles. Section I containing 14 research papers is solely devoted to outstanding problems in chlamydial cell biology such as the components involved in specific binding and receptor interactions, regulation of chlamydial growth by antagonism between amino acids, histone-like nucleoproteins vis-à-vis regulation of gene expression and replication, and host of other issues. Genetics and antigenic structure is the main theme of Section II, containing 13 research papers. Section III entitled Ocular Chlamydial Infection with six research articles primarily deals with various facets of trachoma. In view of increasing interest in cervitis and genital chlamydia infections, Sections IV and V are extensively devoted to this subject. Surprisingly, no research paper on chlamydial infections in human arthritis was presented at the symposium. Nevertheless, Section VI on Rheumatology is well compensated by an excellent review article. Four research papers on pediatric infection are described in Section VII. Considering recent reports on psittacosis, Section VII through several papers has justifiably focussed on chlamydia organism TWAR. Research activities pertaining to animal models have been discussed in Section IX. Immunological events associated with chlamydial infections have been presented in 11 papers of Section X. Six papers on the epidemiological studies are grouped together in Section XI. Section XII under the heading of Chemotherapy illustrates adequately the potential effectiveness of quinolones, macrolides, β-lactams, and other antibiotics in the treatment of chlamydial infections. A detailed account of the diagnostic methods for detecting this organism is given in Section XIII.

The research articles and reviews in each section are generally well written, informative, and up to date. The quality of polyacrylamide gels and autoradiograms published in this book is superb. There are hardly any typographical errors, except the sections on Epidemiology, Chemotherapy, and Laboratory Methods under Contents should be marked as XI, XII, and XIII, respectively. In addition, pages xiii–xvii described under Contents have not been marked in the text. The section on Chemotherapy would have been exceedingly beneficial to medicinal and synthetic chemists, if the authors had included the structures of novel

antibiotics such as quinolones and macrolides.

Regardless of the aforementioned shortcomings, this book would be a valuable addition to the libraries of organizations engaged in anti-infective research. More importantly, this book should serve as a source of reference material to scientists devoted to chlamydial research. Of course, in view of the intensity of the ongoing research in human chlamydial infections, this book will have to be updated in due course.

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**Drugs and the Kidney.** Edited by T. Bertani, G. Remuzzi, and S. Garattini. Raven, New York. 1986. vii + 302 pp. 16 × 24 cm. ISBN 0-88167-196-7. $59.00.

This book is a collection of 18 articles on drug-induced kidney disease and seven on other aspects of renal disease. The drug-induced glomerular diseases are presented in chapters on adriamycin-induced nephrosis, mitomycin-induced diseases, and drug-induced immune-mediated disease. Both literature reviews and presentations of authors' research studies are included. Drug-induced tubular and interstitial disease papers make up the next section. Analgesic nephropathy is covered in a separate section of four papers. The final section of seven papers covers selected aspects of treatment designed to slow the progression of renal damage such as limiting dietary protein.

The essays in this book vary in quality. Some are thorough reviews of the topic with references as recent as 1984. Others are more superficial with few recent references. The book is of value for people particularly interested in drug-induced kidney disease who want to learn about parts of the subject in which they have little personal research experience.

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**Ultratrace Analysis of Pharmaceuticals and Other Compounds of Interest.** Edited by Satinder Ahuja. Wiley, New York. 1986. xvi + 384 pp. 15 × 23 cm. ISBN 0-471-82673. $59.95.

Many scientists and professionals use ultratrace analyses of drugs and related compounds in their work. Ahuja has edited a book, "... to provide a ready reference to methodologies that are used in different fields to allow optimal method selection". The book meets this purpose.

The volume has 13 chapters: (1) The Scope of Ultratrace Analysis of Pharmaceuticals and Other Compounds of Interest; (2) Derivatization for Gas and Liquid Chromatography; (3) Selected Ion-Monitoring Methods; (4) Liquid Chromatography and Liquid Chromatography–Mass Spectrometry; (5) Modern Thin Layer Chromatography; (6) Atomic Spectrometric Analysis; (7) Impurity Analysis of Pharmaceutical Compounds; (8) Impurity Analysis of Excipients; (9) Analysis of Drugs and Their Metabolites; (10) Drug Analysis in Animal Feeds; (11) Regulatory Analysis of Drug Residues in Animal-Derived Foods; (12) Ultratrace Drug Analysis in Forensic Chemistry; (13) Drug Analysis in Postmortem Toxicology. The editor wrote or contributed to Chapters 1, 2, 3, 7, and 10. These and the remaining chapters are written by authors who are experienced in their fields.

Other than occasional inane slips (e.g., Chapter 1: "Derivatization invariably involves a chemical reaction.", p 20; "Phosphorus- or nitrogen-containing compounds can be analyzed with the phosphorus or nitrogen detectors, respectively.", p 21) and overstatements by the editor (e.g., Chapter 7: "Studies ... are discussed at great length.", 21 pp; Chapter 8: "The object of this chapter is to provide detailed methodology.", 17 pp), the book is well written. Furthermore, the book provides a good blend of theoretical and practical material. One drawback, however, is that few references are cited past 1981. Overall, the book is well illustrated and contains few typographical errors.

In summary, Ahuja has compiled an interesting and informative monograph. The volume deserves a place in laboratories or libraries serving analytical, forensic, medicinal, and pharmaceutical chemists.

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**Voltammetry in the Neurosciences. Principles, Methods, and Applications.** Edited by Joseph B. Justice, Jr. Humana, Clifton, NJ. 1987. xviii + 383 pp. 15 × 23 cm. ISBN 0-89603-103-9. $64.50.

In recent years there has emerged a number of powerful techniques for studying on-going brain functions. Most of these techniques require a multidisciplinary approach. The development of in vivo voltammetry has followed this course and continued to draw talents from different areas in physical sciences and neurosciences. The editor, J. B. Justice, Jr., has brought together a leading group of scientists active in the field who in this volume treat topics ranging from the fundamentals of in vivo voltammetry to the sophisticated applications in behavioral studies. This book contains enough information for an electrochemist, a pharmacologist, a neurochemist, or a behavioral biologist to determine whether a research problem can be attacked by the voltammetric techniques, and to get started if one decides to try a particular approach.

This book is divided into three sections. The first section, on fundamentals, contains three chapters. The first chapter serves as an extended introduction to the theories and practices of in vivo voltammetry. It covers mass transport, electrode kinetics, electrochemical reactions, and instrumentations in the context of voltammetry in the unique physical and chemical environment of brain tissue. A minireview on applications in chemical neurotransmission and behavioral studies is also included. The other two chapters deal with issues on chemical specificity and quantitative measurement of in vivo voltammetry in more experimental detail. The second section, on application to catecholamine neurochemistry, contains chapters on electrochemical monitoring of dopamine release, measuring DOPAC following dopamine release, identifying dopamine and serotonin receptors, studying brain noradrenergic neurons, and probing pathways of neuroendocrine regulation. The last section describes several applications in behavioral studies. They include a chapter on application to behavioral pharmacology, a chapter on the simultaneous monitoring of dopamine release, amino acid release and uric acid levels in unrestrained rats, and an in vivo voltammetric study on neurochemical control of movement and blood pressure.

In spite of the multiauthor format, this book is well-organized and has uniformly high quality for all the chapters. The only flaw may be the appearance of different measurement techniques in different applications (chapters) without some comments and comparisons on the relative merits and pitfalls. For a new investigator or would-be investigator in this field, it is not apparent which mode of measurement or what instrument and apparatus should be employed in a particular situation. This confusion, however, is intrinsic to many emerging methodologies at the early developmental stage and not the fault of the authors. In the meantime, this is a must-read book for any researcher who is currently involved in or seriously considering the development and applications of in vivo voltammetry.

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**Porphyrins: Excited States and Dynamics.** Edited by Martin Gouterman, Peter M. Rentzepis, and Karl D. Straub. American Chemical Society, Washington, D.C. Symposium Series 321. 1986. x + 397 pp. 15 × 23 cm. ISBN 0-8412-0997-9. $64.95.

This volume originates from camera-ready chapters contributed by the major invited speakers at the independently organized symposium held in Little Rock, AR in November 1985. The manuscripts were submitted in the spring of 1986, and most cite relevant work appearing up until that time. The 23 chapters have been well organized into five subsections: (1) theoretical studies, (2) steady-state absorption and emission spectroscopy, (3) pico-

second spectroscopy, (4) resonance Raman studies, and (5) porphyrin photochemistry. The diverse set of topics covered present an excellent overview of a field which continues to excite great interest over a wide range of physical and life sciences. While most of the proceedings are not directly related to medicinal chemistry per se, the work discussed in the closing chapter by C. K. Chang and co-workers on hematoporphyrin derivatives is critical to understanding and developing "photodynamic therapy" with tumor-localizing photosensitizers.

The major biological functions of porphyrins and related macrocycles include electron transfer, $O_2$ transfer, storage and utilization, photosynthesis, and carbon–carbon bond rearrangements (i.e., vitamin $B_{12}$). With the exception of the last of these, photophysical and photochemical processes have played a significant role in the study of porphyrin static, dynamic, and reactive properties. The chapters included cover the full range of reactivity both in synthetic porphyrins and metalloporphyrins and in a variety of biological systems. The stated goal of this volume was "to collect a wide range of scientists engaged in studies on porphyrin excited states to review the developments during the last decade in photodynamics". Many of the major figures in this field have contributed to this volume; unfortunately, a few of the most noteworthy did not. Nonetheless, within the inherent limits of a book based on a symposium, the editors have succeeded in this goal.

The quality of the figures and text is surprisingly high, given their camera-ready origins. The index is adequate and the chapter organization logical. The price of the volume is moderate and it is likely that workers in the field will wish to have their own copy.

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**Carbon-13 NMR Spectroscopy (3rd ed.).** Eberhard Breitmaier and Wolfgang Voelter. VCH, New York. 1987. xvi + 515 pp. 17 × 24 cm. ISBN 0-89573-493-1. $135.00.

This attractively printed (and expensive) book will not be of much help to the understanding of $^{13}C$ NMR by medical chemists who are not already reasonably well-versed in NMR from other connections. The first chapter contains a wholly uncompromising, rather rigorous, mathematical exposition of what NMR is. Those who profess that physical phenomena are not really understood unless, and until, they can be described mathematically will be pleased. Others, like the reviewer, who do not use vector notation daily, will have to search elsewhere for more qualitative explanations of what is involved in NMR phenomena.

For the reasonably knowledgeable, Chapter 2 is an excellent, even if concise, exposition of the instrumental methods of $^{13}C$ NMR, which features many fine examples of the way spectra change with instrumental parameters or software manipulation. This chapter and Chapter 3, which has detailed discussions of the structural and molecular factors (shift, coupling, rate, and relaxation effects) which influence $^{13}C$ NMR, are the guts of this book and seem worth the price. Nonexperts may have trouble understanding how the two-dimensional $^{13}C$ NMR experiments actually work, but they will be able to see clearly what kind of information the experiments give and how they lead to well-defined strategies for structural analysis. It is a little surprising that the authors do not discuss the possible tradeoffs with respect to flip angle, repetition rates, and relaxation times in taking spectra, where the sample size is limited.

The remainder of the book is an annotated and extensive compendium of data for different classes of compounds. The general usefulness of this material for complex compounds is hard to evaluate. It would probably be much more helpful, if the information (perhaps keyed to specific table numbers or book pages) were also supplied in ASCII code on a standard diskette capable of being transferred to a suitable data-base program. Although the discussion of instrumental methods for spectra taken of solutions is reasonably up-to-date, high-resolution magic-angle $^{13}C$ spectra of solids are not referenced in the Index, although mentioned on p 308, with citations to several pre-1981 papers. The vast majority of the other literature cited is also pre-1981, so that the compendium of data provided will be of little help in deciding whether or not the $^{13}C$ spectra of any particular compound has been reported in the last fifteen years.

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**Brain Peptides and Catecholamines in Cardiovascular Regulation.** Edited by J. P. Buckley and C. M. Ferrario. Raven, New York. 1987. xviii + 429 pp. 16 × 24 cm. ISBM 0-88167-262-9. $55.00.

The physiological basis for the regulation of blood pressure is a complex scientific topic. For every class of new molecule that is identified, there usually follows a school of investigators who identify a role for this class of molecules in the regulation of blood pressure. Two families of compounds which have passed the test of time in establishing their role in the regulation of blood pressure are catecholamines and brain peptides. These two families of compounds are the subject of the present volume.

The book under discussion is a collection of papers related to a meeting held at the beginning of 1986. The multiauthor format of the volume leads to a diversity of writing styles and scientific approaches. At best the chapters provide an overview to the authors' scientific approach. At worst, the chapters are a compendium of recent observations presented with little critical attention. Because of the "camera ready" format used in the preparation of the book, the editors had little opportunity to alter the text and correct obvious mistakes such as the absence of tables referred to in the text.

When all is said and done, this is a book for the library rather than the individual to purchase. The chapters provide at best an introduction and overview to contemporary views about important scientific questions.

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**Stereochemistry of Organic and Bioorganic Transformations.** Workshop Conferences Hoechst/Volume 17. Edited by Wilhelm Bartmann and K. Barry Sharpless. VCH, Weinheim. 1987. xii + 330 pp. 17 × 24 cm. ISBN 0-89573-607-1. $54.00.

This work consists of a collection of 18 short reviews which emphasize some of the most important stereochemical issues of organic and bioorganic chemistry currently under active investigation. Chapter 1 (E. J. Corey) provides a masterly account of a multidisciplinary approach directed toward the delineation of the mechanism of enzymic lipoxygenation of arachidonic acid. Chapters 2 (H. Yamamoto), 3 (H. B. Kagan), and 4 (S. Masamune) address a variety of areas of practical significance in the field of asymmetric synthesis and include some thought-provoking mechanistic speculations.

The intriguing enzyme organomercurial lyase forms the subject matter of Chapter 5 (C. Walsh). The preparation of enantiomerically pure 3-hydroxy carboxylic acids and their versatility as progenitors of other molecular types is discussed in Chapter 6 (D. Seebach).

An understanding of molecular recognition at the surfaces of organic crystals promises to aid the development of a number of areas of importance to organic chemists, e.g., resolution of enantiomers. Chapter 7 (M. Lahav) concisely reviews some of the pioneering attempts in this field.

The bleomycins have been the subject of much biochemical and chemical investigation since their isolation in 1966. Chapter 8 (M. Ohno) reviews attempts to reproduce the sequence specificity of DNA cleavage of bleomycin with structurally simplified congeners and hence to throw light upon the detailed mechanism of action of the natural product. The biochemical role of glycoconjugates is currently inspiring a great deal of endeavor. Chapter 9 (R. R. Schmidt) documents some of the elegant synthetic chemistry which has arisen to keep pace with this developing field.

In Chapter 10 B. M. Trost outlines, through many imaginative examples, the way in which organopalladium chemistry can be harnessed to achieve excellent stereocontrol in the synthesis of complex natural products.

Conformational analysis can be regarded as one of the major conceptual advances to have occurred in organic chemistry during the 20th century. In Chapter 11 D. H. R. Barton provides an historical perspective of this field in which his own remarkable insight was to play such a fundamental role.

The question of the manner in which molecules bind to DNA is of tremendous importance to the pharmaceutical industry. Chapter 12 (P. B. Dervan) summarizes efforts to prepare synthetic molecules which bind to DNA in a sequence-specific manner.

The application of molecular modelling to problems in organic chemistry is currently receiving attention in both industry and academia. Chapter 13 (W. C. Still) describes a bold attempt to elucidate the factors involved in the molecular recognition of some *N*-acetyl dipeptides by the antibiotic aglycoristocetin. Chapter 14 (K. N. Houk) is devoted to a new theory of the stereoselectivity of nucleophilic addition to carbonyl compounds.

In Chapter 15 (B. Giese) emphasis is given to the exploitation of the unique properties of free-radical intermediates in organic synthesis. Chapter 16 (J. R. Knowles) examines the mechanism of dehydroquinate synthase and together with Chapters 1 and 5 this work elegantly demonstrates the importance of stereochemical probes in studying the mode of action of enzymes. In the penultimate chapter, A. R. Battersby describes the exemplary science which has characterized his 18-year-long odyssey to unravel the mysteries of the biosynthesis of the pigments of life.

The final chapter (K. Nakanishi) demonstrates the extraordinary power of the exciton chirality method for determination of the stereochemistry of organic molecules.

The success of this book emanates from the fact that the authors, having few peers in their respective research areas, are in a unique position to write timely and searching reviews of their work. The book should be included in the library of all research and teaching institutions in which organic chemistry plays an important part.

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**Antigenic Variation in Infectious Diseases.** Edited by T. H. Birkbeck and C. W. Penn. IRL, Oxford. 1986. x + 170 pp. 16 × 23 cm. ISBN 1-85221-000-1. $58.00.

This special publication of the Society for General Microbiology (Volume 19) resulted from the Symposium "Antigenic Variation in the Course of Infectious Diseases: a Survival Strategy for Pathogenic Micro-organisms" held in Nottingham, England, in September 1985. The book identifies the diversity of strategies employed by microorganisms to enhance survival and focuses on the impact of rapid genetic change in important pathogenic microbes.

The editors emphasize the need for awareness of the resultant complexities that can be generated in disease pathogenesis and underscore the need for greater understanding of the biological interactions that can occur between microorganisms and their hosts. The monograph provides insight into the molecular biology associated with microorganism functional mutation and adaptation to the environment.

The topics covered in the nine chapters are: (1) antigenic variation in the parasitic protozoa, (2) antigenic variation in Hong Kong influenza virus haemagglutinins, (3) antigenic variations in the lentiviruses that cause visna-maedi in sheep and arthritis–encephalitis in goats, (4) antigenic variations during persistent infections by equine infectious anemia virus, (5) the genetic basis antigenic variation in bacteria, (6) gonococcal antigenic variation and pathogenesis, (7) fimbrial variation in *Escherichia coli*, (8) molecular basis for antigenic variation in a relapsing fever Borrelia, and (9) antigenic variation in *Bordetella pertussis*. Each author provides a detailed presentation of the known and hypothesized mechanisms of adaptation and variation associated with the specific microorganisms of record. Considerations of genetic and environmental factors are lucidly presented and accompanied by detailed lists of references, many from 1985, at the end of each chapter.

At the end of each chapter is a "discussion", "conclusions", or "summary" section which provides a useful overview of the detailed descriptive information on the subject pathogen. The eight-page index is useful for cross-referencing the known mechanisms of variation.

This highly specialized publication will be of particular interest to microbiologists and those with an interest in infectious disease resistance mechanisms at the molecular level. The integration of molecular biological concepts into the chapters as a means of explaining genetically and environmentally induced changes in the organisms should prove valuable to a variety of scientists committed to (a) anti-infective therapy development and (b) an appreciation of problems to be anticipated in overcoming infectious diseases.

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**Tin as a Vital Nutrient: Implications in Cancer Prophylaxis and Other Physiological Processes.** Edited by Nate F. Cardarelli. CRC, Boca Raton, Florida. 1986. 329 pp. 18 × 26 cm. ISBN 0-8493-6579-1. $130.00.

This book, which includes papers from the Tin and Cell Malignancy Symposium, held May 27–29, 1984, at Chapman Lake, PA, is a timely survey of the literature related to biological effects of tin compounds, through June 1984. The editor has used his experience with his previous well-received text, *Controlled Release Pesticide Formulations* (CRC Press) to produce a book that is well written and complete in its coverage of the literature to date.

Introductory chapters on tin as a nutrient and a review of tin and cancer are followed by a survey of studies on tissue distribution of tin compounds. The occurrence of tin in the thymus is given particular attention and this is the major emphasis of Chapters 10 and 11. The following section (Chapters 12–15) describe the synthesis and antitumor activity of a series of organotin compounds, leading into a series of chapters on the role of and structure/activity relationships of tin steroids (Chapters 15–17, 19, 20) as antineoplastic agents.

The in-depth treatment of both thyroid activity and tin and tin steroids leads the editor to postulate, in Chapter 24, that tin steroids can penetrate cell membranes (in particular, preneoplastic cells), after which protein synthesis is disrupted by association of the tin steroids with RNA.

Other topics treated, although to a lesser extent, include effect of tin on cell growth (Chapter 8), tin and aging (Chapter 21), and the toxicology of tin derivatives (Chapter 23).

In summary, therefore, this book describes the research reported to date on the biological effects of tin compounds, in particular concentrating on their role in the thymus and in cancer control. The editor then takes the available data and postulates that the mechanism of action for tin compounds as antitumor agents involves attack of preneoplastic RNA by tin steroids.

Although some chapters consist only of short presentations from the Chapman Lake meeting, they do tend to complement the remainder of the text by describing on-going research efforts in

this field. The text is, in general, well planned, although the order of some chapters could be questioned. The index, an important feature in such books but often poorly written, is in this case exceptionally good.

This is a text, therefore, which sould be essential reading to anyone interested in metals and living systems. It is well written and exhaustively researched. The theories presented by the author from the data presented should provide the stimuli for further studies in this rapidly growing field.

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