3.76 and 3.85 (each 1 H, each d, J = 9 Hz, 4-CH_2), 5.22 (1 H, q, J = 5 Hz, OCH).

Biochemical Methods. (a) Binding Studies. Membranes were prepared from 250–300-g Male Sprague–Dawley rats as described previously[5] and resuspended in 20 mM HEPES Krebs' buffer (pH 7.4) for [^{3}H]-*N*-methylscopolamine binding and 20 mM HEPES buffer (pH 7.4) for [^{3}H]oxotremorine M binding (1 mL total assay volume). Assays were incubated at 30 °C for 60 and 40 min, respectively, and were terminated by filtration through Whatman GF/B and 0.05% polyethylene imine presoaked GF/C filters by using a Brandel cell harvester. Drug displacement curves were assessed by using 0.1 nM [^{3}H]-*N*-methylscopolamine and 3.0 nM [^{3}H]oxotremorine-M.

(b) Hydrolysis of Inositol Phospholipids. Tissue slices of rat cerebral cortex (350 × 350 μm) were prepared by using a McIlwain tissue chopper and were washed three times in Krebs–bicarbonate buffer, followed by a 30-min preincubation in the presence of [^{3}H]-*myo*-2-inositol, 2 μCi, (Amersham International, TRK 807 13.8 Ci/mmol) and 10 mM lithium. Tissue slices were subsequently incubated in the presence of muscarinic agonists for 45 min in a 250-μL volume. The reaction was terminated by addition of 940 μL of chloroform/methanol (1:2), and water-soluble inositol monophosphates were isolated by ion-exchange chromatography. The elution methods have previously been described in detail by Brown and colleagues.[19] Radioactivity in the inositol monophosphate fraction was estimated by liquid scintillation spectrometry. All drugs were added in a volume of 10 μL.

(19) Brown, E.; Kendall, D. A.; Nahorski, S. R. *J. Neurochem.* **1984**, *42*, 1379.

Book Reviews

Writing the Laboratory Notebook. By Howard M. Kanare. American Chemical Society, Washington, D.C. 1985. xii + 146 pp. 17 × 24 cm. ISBN 0-8412-0906-5. $19.95.

The aim of this book is to provide laboratory workers and others vitally concerned with recording and use of experimental data with guidelines to record the course of experimentation. Comment on the dustjacket tells us that this is the first text that has "thoroughly covered the myriad aspects of writing and using a laboratory notebook". Mr. Kanare is a chemist and materials scientist but he has structured the book to appeal to a broad scientific readership. Has the author reached his goal? The answer is ambivalent, "Yes" in some ways, "No" in others. The book is concisely and clearly written with frequent useful summaries. Senior and junior personnel will both find much that is instructive in the Reasons, Ethical Aspects, and Patents chapters (1, 3, and 7, respectively).

The Management and Organizing chapters (4 and 5) are also very useful ones. The Ethics and Patents chapters (3 and 7), which should be back-to-back, are critical ones for industrial scientists. Confidentiality is not stressed adequately and the importance of establishing a good working relationship with the patent agent responsible for the area of interest was omitted. The frequently used practice of using separate "idea" notebooks also failed to be mentioned.

Managers charged with responsibilities for setting up organizational record-keeping procedures will find Chapters 4 and 2 (Management and Hardware) valuable.

Scientists outside of chemistry and electronics will not find this book very useful; scope should have been confined to chemists. And chemists must review the book carefully before recommending it to students and junior employees. The transformation of the scientist from "activist"—planning and conducting an experiment—to "judge"—dispassionately weighing the data—and recording both aspects objectively is not stressed. The examples of a well-written notebook (Chapter 6) are not well-chosen. The experiments are trivial and the author advocates a first-person style of writing notes which has led to a wordy, overly personalized series of model pages.

Why the author has failed to reference ACS journals which demand clear, well-written experimentals for publication or other experimental record works, such as "Organic Syntheses", is difficult to understand.

The topic of supplementary records (spectra, chromatography traces, etc.) and how to key them to the notebook is treated too lightly.

The Electronic Notebook (Chapter 8) compares use of a computer terminal for experimental data entry with the traditional handwritten method. Some chemists may have a choice; more typically, the dilemma is how to correlate manual and electronic data records. This chapter is of little aid in solving this problem.

The text is reasonably error-free with high-quality paper and binding and is reasonably priced. The index is adequate while the references vary from appropriate and recent to nonexistent depending on the chapter.

In summary, this text is a useful teaching aid/reference provided that the teacher or supervisor uses discretion.

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Radiation Chemistry. Principles and Applications. Edited by Farhataziz and Michael A. J. Rodgers. VCH, New York. 1987. xii + 641 pp. 16 × 24 cm. ISBN 0-89573-127-4. $95.00.

In its broadest sense radiation chemistry implies the study of chemical changes induced by the interaction of any form of radiation with matter; however it is generally agreed that the scope of the field embraces only those photons (γ and X-rays) and particles (electrons, protons, α and other heavy particles) which possess sufficient energy to induce ionization of the components of a material. Thus it is distinguished from photochemistry, which is concerned with lower energy photons generally capable of producing excited states of molecules but not ions as primary products. In accordance with this, the editors' intent is to provide a broad exposition of radiation chemistry and a description of some scientific areas which depend on it, suitable for students of the field, whether graduate students newly entering the field or practicing scientists in other areas desiring information on radiation chemistry.

The volume consists of 20 chapters, authored by a variety of specialists. The first four chapters are introductory, laying out fundamentals of the interactions of photons and charged particles with matter, the initial products of these interactions, detection methods and instrumentation, and an introduction to the kinetics governing their behavior. The next two chapters are theoretical in nature, covering early phenomena in ionization processes, the structure of ionization tracks and reactions therein. The middle group of chapters develop specific fundamental areas, such as the properties and reactions of the electron and the solvated electron, the radiation chemistry of gases, aqueous and organic liquids, colloidal aggregates, and organic solids. The final several chapters describe the application of radiation chemistry fundamentals to radiation science of polymers, biopolymers, and other biochemicals and the radiation biology of microorganisms and mammalian cells.

Just as the first two-thirds of the book demonstrates the maturity of the field in terms of fundamental studies in simple inorganic and organic systems, so the last several chapters show that there is much current interest in more complex systems, such

as polymers and biological systems. In this regard the chapter on the applications of radiation chemistry to biochemistry is particularly effective in surveying the utility of radiation chemistry as a tool in the understanding of the chemistry of "natural" free radicals produced by normal biochemical processes, such as those of flavins, cytochromes, nicotinamides, and oxygen. Also, the chapters on the radiation chemistry of biopolymers and mammalian cells underscore the importance of these areas to elucidation of the mechanisms of radiation-induced mutagenesis, carcinogenesis, enzyme inactivation, and cell killing and of the chemistry of radiosensitization and radioprotection which form the basis of cancer therapy with radiation.

With a couple exceptions, the chapters develop their topics logically, are clearly written and informative, and generally provide a level of detail sufficient to give a clear overview of each subject. Most chapters provide abundant references to relevant reviews and the primary literature, although those in the early chapters are much less up to date than those in the last third of the book. There are subject and compound indexes at the end of the book. Overall, the volume is organized so that the chapters run smoothly in logical progression with only occasional instances of repetition. The editors have succeeded in producing a volume which is broad in its scope and comprehensive, and it should be extremely useful to its intended audience.

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Nuclear Magnetic Resonance. Basic Principles. By Atta-ur-Rahman. Springer-Verlag, New York. 1986. ix + 358 pp. 16 × 24 cm. ISBN 3-540-96243-3. $59.00.

Of the various physical methods which organic chemists use for the determination of structures, relative configurations, and conformations of chemical compounds, nuclear magnetic resonance spectroscopy is by far and away the most widely used. For this reason, the spectacular growth in new NMR techniques which has taken place in the last decade has created problems for the nonspecialist who can greatly benefit from these developments. Much of the original literature is essentially unintelligible to most organic and medicinal chemists, and there is clearly a real need for a book which not only presents the basic principles in nonmathematical terms but which also describes the way in which modern NMR spectroscopy can be used to extract structural and stereochemical information about organic molecules in solution. While some may argue about relative points of emphasis, it is my opinion that Atta-ur-Rahman has succeeded in achieving these goals.

The book is designed to provide a complete introduction to the application of NMR spectroscopy to organic chemistry. There are, therefore, chapters dealing with ^{1}H and ^{13}C chemical shifts, spin–spin coupling constants, and the description and elementary analysis of spin–spin multiplicity. The level of treatment of these topics is probably adequate although the tables of data provided do little more than illustrate the principles discussed. Organic chemists, I am sure, would have appreciated a short, critical appraisal of the several large data bases which are now available and which are playing an increasingly important role in the empirical use of NMR spectroscopy, particularly of carbon-13.

The real strength of the book lies in Chapters 3 and 5, although the former is somewhat disjointed, being a potpourri of almost unrelated topics which include an introduction to FT NMR, the theory of the nuclear Overhauser enhancement, a discussion of spin–lattice relaxation, and an introduction to dynamic NMR, the last being essentially a short catalogue of systems which exhcange with lifetimes comparable with the NMR time scale.

Chapter 5, in particular, should be well received. It provides, in terms of simple vector pictures, descriptions of the bases of the more important 1D multipulse experiments and 2D spectroscopy. Although this method of presentation has serious inadequacies (e.g. multiple quantum coherence cannot be represented), the author, nevertheless, succeeds in presenting each technique in a way that will give the organic chemist some conception of what is transpiring. What is more important is that the reader is informed of the unique ways in which the *results* of these experiments can be used to provide information of importance in structural and stereochemical studies.

The style of writing is clear and easy to read although the quality of the reproduced spectra is poor. I believe that this book will be useful to organic chemists in general and medicinal chemists in particular. Some readers will wish to pursue the subject in greater depth. Others will not, but at least they will be well informed of the enormous power of the galaxy of new 1D and 2D techniques which are available to the NMR spectroscopist.

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Neuromethods. Volume 6. Peptides. Edited by Alan A. Boulton, Glen B. Baker, and Quentin G. Pittman. Humana Press, Clifton, New Jersey. 1987. xx + 489 pp. 16 × 23 cm. ISBN 0-89603-105-5. $69.50.

This sixth volume in the Neuromethods series focuses on neuropeptides and methods for their study. The first chapter, by P. Crine and G. Boileau, addresses posttranslational processing of peptide precursors into active fragments. Included here are brief descriptions of immunochemical and recombinant DNA methods for the identification of these precursors as well as a concise summary of different types of posttranslational modifications. Greater detail on immunochemical methods is provided in Chapter 2 (R. Benoit, N. Ling, P. Brazeau, S. Lavielle, R. Guillemin), which deals with strategies for the production of peptide antibodies and development of radioimmunoassays, and in Chapter 3 (F. W. van Leeuwen), which describes immunocytochemical methods for peptide localization. Both of these chapters are rich in practical information including potential pitfalls. Chapter 4 (A. Bayon) presents methods for the study of peptide release in both in vivo and in vitro systems. Considered here are experimental design and analysis of perfusion studies. Several illuminating diagrams accompany this discussion. Chapter 5 (S. A. St-Pierre) presents approaches for the design of analogues of native peptides. Included are discussions of Chou and Fasman rules, the amphiphilic helix approach of Kaiser, and, particularly, the systematic approach of Rudinger as methods to shed light on the nature of peptide–receptor interactions. A brief description of solid-phase peptide synthesis is provided as well. Peptide receptors are further discussed in Chapter 6 (D. M. Dorsa, D. G. Baskin), which describes radioligand binding and autoradiography techniques. Instructive examples from the authors' studies on CNS insulin and vasopressin receptors are provided. The remaining chapters of the volume explore the postsynaptic consequences of peptide–receptor binding. Chapter 7 (P. J. Magistretti) presents biochemical approaches to the study of peptide actions. Examined in detail here are the effects of VIP on cAMP formation and on glycogenolysis in rodent cerebral cortex. Behavioral models for the study of peptide actions are evaluated in Chapter 8 (A. J. Dunn, C. W. Berridge) with emphasis placed upon ACTH-induced grooming behavior, effects of vasopressin on learning and memory, and effects of cholecystokinin on feeding. The use of conscious animals for the evaluation of peptide actions is the major topic considered in Chapter 9 (A. M. Naylor, W. D. Ruwe, W. L. Veale). Techniques for administering peptides into the CNS and for analyzing endogenous levels are presented and compared and examples drawn from evaluations of the thermoregulatory effects of vasopressin are discussed. The final three chapters offer electrophysiological approaches to the study of peptide actions. In Chapter 10 (A. V. Ferguson, L. P. Renaud) in vivo electrophysiological techniques are dealt with. Cell identification, investigation of afferent connections, and sample application techniques are covered with the oxytocin and vasopressin synthesizing neurons of the rat hypothalamus as an example. In vitro electrophysiological techniques and advantages are presented in Chapter 11 (Q. J. Pittman, B. A. MacVicar, W. F. Colmers). Here are found discussions of incubation media, methods of peptide application, and cell identification as well as descriptions of a variety of preparations for in vitro studies of peptide actions. The final chapter (Chapter 12, K. Lukowiak, A. D. Murphy) describes the use of molluscan model systems for electrophysiological studies of neuropeptides. These molluscan neural systems have the

advantages of a simplified architecture and very large neurons and neural processes. Examples drawn from studies of the gastropods *Helisoma* and *Aplysia* are discussed.

As is true of previous volumes in this series, this volume is a well-conceived, clearly written handbook rich in useful detail. While covering a broad range of topics, written by many authors, it nonetheless maintains its cohesiveness. Each chapter is a valuable contribution of up-to-date material.

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Pathogenicity and Clinical Significance of Coagulase-Negative Staphylococci. Edited by G. Pulverer, P. G. Quie, and G. Peters. Gustav Fischer, New York. 1987. xii + 290 pp. 17 × 24 cm. ISBN 0-89574-242-X. $95.00.

Coagulase-negative staphylococci (CNS), especially of the *Staphylococcus epidermidis* group, are predominant pathogens in infections in immunocompromised hosts and in patients with plastic foreign bodies like implants, pacemakers, vascular grafts, and catheters. As of now, approximately 24 species have been identified. In recent medical literature infection with coagulase-negative staphylococci has become one of the major problems of hospitalized patients throughout the developed countries. This in turn has stimulated research and scholarship on coagulase-negative staphylococci, attested by 25 scientific publications presented at the II International Heppenheim Symposium, FRG (June 10–14, 1986). These papers have been compiled in the form of a book, *Pathogenicity and Clinical Significance of Coagulase-Negative Staphylococci*, and it is very rarely that one finds a book devoted to one organism. The editors should be complimented for this timely publication. Furthermore, the intensity of the discussions inserted after each paper reflects the vigor of scientific research in this area.

From a clinical viewpoint, a vigorous classification of CNS involved in human infections is critical for proper identification of these organisms. This issue has been adequately discussed in the first paper by Goodfellow (pp 1–14). Interestingly, coagulase-negative staphylococci grow and attach to the surface of the implanted plastic devices, producing extracellular slime substance (ESS). The characterization of the latter in terms of modulation of production, possible marker reactions, and chemical structure is the subject matter of the second paper by Peters et al. (pp 15–32). Besides its apparent role in adherence to plastic materials, the staphylococcal slime has been shown to play a pathogenic role in foreign body infections by interfering with host defenses. There are several interesting papers in this area presented at the symposium, e.g. Johnson et al. (pp 33–44), Gray et al. (pp 45–54), and Verbrugh et al. (pp 55–65). The coagulase-negative staphylococcal cell surface chemistry and physiology are covered in papers by Wilkinson et al. (pp 67–75) and Kasprowicz et al. (pp 77–81). Furthermore, Wadström et al. (pp 83–91) discuss the interaction of CNS with fibronectin and collagen as a possible first step of tissue colonization in wounds and other tissue trauma. This is followed by Gommell's research article (pp 93–102) on exo-proteins which might play a role in the pathogenicity of these bacteria.

There are several interesting and thought-provoking articles on the adhesion of CNS onto biomaterials (implants or medical devices) and its possible role in the pathogenesis of CNS infections, e.g. Hogt et al. (pp 113–131), Christensen et al. (pp 103–111), and Gristina et al. (pp 143–157). In order to understand the increased virulence of *S. epidermidis* in foreign body infections, a detailed comparative study with *S. aureus* by Vaudaux et al. (pp 183–193) and a related study on 33 strains of *Staph.* species by Fleurette et al. (pp 195–208) should provide an adequate overview of the problems associated with this organism. Ever since *S. epidermidis* emerged as the cause of serious infections in humans in the 1980s, there has been a staggering resurgence of interest in glycopeptide antibiotics such as vancomycin and teichoplanin. This has fueled further search among the microbial products for a novel and superior glycopeptide antibiotic without much apparent success. The glycopeptide antibiotics of vancomycin family along with β-lactams, macrolides, clindamycin, aminoglycosides, rifampin, and others have been extensively evaluated as possible therapeutic agents. There are numerous papers [e.g. Verhoef (pp 209–214), Naido et al. (pp 225–234), Ford et al. (pp 247–257), Marrie et al. (pp 259–274), Lambe et al. (pp 275–286), Peterson et al. (pp 159–167), and Sheth et al. (pp 177–181)] in this context which should provide excellent reading material for biologists as well as chemists.

The book is relatively devoid of typographical errors; "schould" on p 27 should be "should". The reviewer noted inconsistency in the usase of the word "defense", which at many places is spelled as "defence". However, the subject index contains only host "defense". From the papers presented in this book it is evident that we are no where close to solutions for the problem of human infections with coagulase-negative staphylococci; we have a long way to go in understanding the pathogenicity of these bacteria. Considering the severity of clinical problems, this book will serve as an excellent reference material for microbiologists, immunologists, clinicians, and medicinal chemists interested in anti-infective research. However, its exorbitant price (33¢ per page) would prohibit anyone form having it as a desk copy. Without a doubt, this book should prove to be a valuable addition to the shelves of every scientific library in hospitals and research organizations.

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Annual Reports in Organic Synthesis—1985. Edited by Martin J. O'Donnell and Eric F. V. Scriven. Academic Press, New York. 1986. xiii + 513 pp. 15 × 23 cm. ISBN 0-12-040816-3. $39.95.

Once or more each week the practicing organic/medicinal chemist, whether group leader, project member, student, or postdoctoral, scans the library shelves to see the new journals. Everyone knows the feelings that come to mind when trying to grasp this material, and the efforts that must be made to retrieve the reactions and methods that will help not only to solve immediate problems but also to build the background of experience we all rely upon. It is hardly surprising that many aids and guides exist to help us, from *Chemical Abstracts* to numerous small short- or long-lived summary journals. *Annual Reports in Organic Synthesis* is a survey of 45 key journals in which the majority of the new synthetic methods developed world-wide are reported. The emphasis is on reaction categories, protection, useful methods to prepare key functional groups, and listings of contemporary reviews which can serve as additional groupings of information.

The key features of this book are simple organization, visual immediacy and impact, and relatively low cost. I would expect to see it on the shelf above the laboratory desk rather than in the Departmental library. The price is less than almost any science text available today, which makes this book widely accessible as well as useful.

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Labelled Compounds and Radiopharmaceuticals Applied in Nuclear Medicine. By A. T. Balaban, I. Galateanu, G. Georgescu, and L. Simionescu. Wiley, New York. 1987. 742 pp. 17 × 24 cm. ISBN 0-471-90458-9. $127.00.

Quite a number of books have appeared in the last several years on the subject of labeled compounds. Some of these have focused on the preparation and use of specific isotopes and others have highlighted the work presented at various international symposia. Notwithstanding the topics covered in previous volumes, this text will still be a useful addition to the libraries of both students and investigators involved with labeled compounds. Written by chemists and physicians, the work successfully blends their perceptions of the subject both in substance and style.

Containing 27 chapters, this very large book is clearly divided into four sections. The first part provides an introduction to the concept of isotopes in general and radioisotopes in particular. The

authors emphasize the factors that govern the selection of a particular isotope for a specific task and the techniques and health physics associated with making labeled compounds. The next section discusses the diagnostic use of radiopharmaceuticals. Ten chapters in this section review the opportunity to use this technique for areas such as hematology, tumor location, the thyroid gland, digestive tract, skeletal and central nervous system. Part three is an in-depth and practical discussion of radioimmunoassay (RIA). Sufficient detail is provided so that any problems associated with the use of this very valuable technique can be identified and solved. The fourth and final part of the book outlines the specific applications of RIA to medicine. Each chapter contains many references and a subject index concludes the text. This volume would appeal to anyone concerned with the preparation and application of labeled compounds and radiopharmaceuticals in nuclear medicine.

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Personal Computers for Scientists. By Glenn I. Ouchi. American Chemical Society, Washington, D.C. 1987. x + 276 pp. ISBN 0-8412-1001-2. $22.95.

This timely book is written by a chemist who is known for his promotion of the use of personal computers in the laboratory. Though the term "scientist" is used in the title, it is evident that the book focuses on chemistry. The book is easy to read, begins with the basics (and, as such, is suitable for the almost totally uninitiated), and yet contains enough information to hold the interest of those who are fairly well versed in personal computers. After several introductory chapters on terminology, hardware, and disc operating systems, individual chapters are devoted to word processing, spreadsheets (including the use of spreadsheets for the analysis and display of chromatographic data), graphics, data base management systems, project management, and statistical analysis programs. Each of these chapters discusses the purpose and application of the appropriate programs and describes several of the more popular software packages available in each category. The final section of the book deals with communication: capturing data from dedicated instruments, PC–mainframe interfacing, networking, on-line data bases, and related topics. Product prices and manufacturers' names, addresses, and telephone numbers are provided. The only serious criticisms of this book are that (a) the treatment of statistical packages is very limited, (b) there is no discussion of structure processing programs, and (c) the general focus of the book is primarily on IBM-compatible hardware and software. Nevertheless, this excellent book is a must for those contemplating the first-time purchase of hardware/software, and is highly recommended for those who wish to expand upon their present systems.

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Methods in Protein Sequence Analysis. 1986. Edited by Kenneth A. Walsh. Humana Press, Clifton, New Jersey. 1987. xxxv + 658 pp. 15 × 24 cm. ISBN 0-89603-118-7. $79.50.

The title of this book might deceive a potential reader into thinking that this is a book of detailed laboratory methods for performing protein sequencing—or, at least, a compilation of methods developed in 1986. Rather, the book is based on proceedings of the Sixth International Conference on Methods of Protein Sequence Analysis held at the University of Washington in August 1986. The editor, Kenneth A. Walsh, is one of the luminaries in the field of protein sequencing, and the contents of the book reflect his philosophy (stated in a recent *Annual Reviews of Biochemistry* article) that "... protein sequencing in the future will be a cooperative endeavor between protein chemists and molecular biologists". In keeping with this philosophy, the present volume has a number of contributions dealing with the strengths and limitations of modern molecular-biological methods as they apply to the field of protein chemistry.

The book is organized into major sections and, within those sections, into individual contributions dealing with recent researches by experts in the field. The major sections are Perspectives; The Interface of Protein Chemistry and Molecular Biology; Mass-Spectrometric Approaches; Analytical Boundaries; Microanalytical Tactics; General Tactics; Edman Degradation Techniques; Posttranslational Modifications; Homology and Domain Substructure; Predictions and Probes of Three-Dimensional Structure; and Closing Address/Concluding Remarks. There is also an author index and a brief subject index. For the most part, the various contributions fit well into their respective categories, although one might have thought that a contribution by Field and co-workers on mass spectrometry would have been better placed in the Mass Spectrometry category than in the Posttranslational Modification category.

Sampling contributions from this book is somewhat akin to looking over a tempting box of chocolates and trying to decide which to choose. Among the tastier morsels to this reviewer are the Perspectives article, "New Ways to Look at Old Proteins", by Hans Neurath (who better to write such an article?); "Interface of Protein Chemistry and Molecular Biology", by Hugh D. Niall of Genentech; a lovely overview of the strengths and limitations of mass-spectrometric approaches by Klaus Biemann; a tantalizing suggestion by D. H. Hawke of Applied Biosystems that a C-terminal sequencing machine may be on the horizon; development of a mutant protease by the Drapeau laboratory that cleaves at the amino-terminal side of aspartic acid residues; a clever sequencing method for membrane proteins by a Soviet group (Y. A. Ovchinnikov et al.) involving protein immobilization on thiol-glass supports; mass-spectrometric approaches to post-translational modifications by several groups, including my colleagues Jack Dixon and David Smith; and a superb overview of approaches to protein structure with 2D NMR by Rachel E. Klevit. This last article is particularly valuable, as it tells us what techniques are available and takes us step-by-step through a typical structural investigation without bogging us down in complex terminology or mathematical minutiae. References abound for those who want to dive in more deeply.

Several common themes emerge from this book. One is that molecular biology has not destroyed protein chemistry, but rather has given it new life. Second, it is easier to make site-directed mutations than to evaluate clearly the effects of the mutation. Third, analytical boundaries are pushing toward femtomole sensitivity in the protein/peptide field. Fourth, carboxy-terminal sequencing is important and remains a challenge for future development. (In this regard, there is mention of a C-terminal sequencing idea of Nazimov in the closing address; yet there is no article by this author in the book.) Finally, the "second part of the genetic code"—protein folding—is under active assault and useful generalizations are emerging.

Because the book is photoreproduced from camera-ready manuscript throughout, this reviewer must join hundreds of others in wondering aloud why such monographs are so expensive. Nevertheless, the quality of the articles is uniformly high, and there are many useful and clearly drawn figures. This book is definitely recommended as an addition to the library of any protein chemist, whether a specialist in the field of sequencing or not. It provides unusual perspective on where a major branch of biochemistry is going.

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Pharmacologic Analysis of Drug–Receptor Interaction. By Terrance P. Kenakin. Raven Press, New York. 1987. xi + 335 pp. 16 × 24 cm. ISBN 0-88167-277-7. $78.00.

As the title indicates, this book represents a comprehensive treatise on the analysis of drug–receptor interactions, focusing predominantly on the classification of the molecular properties of drugs in isolated tissue systems. Its greatest strengths are the numerous experimental and theoretical examples of drug–receptor

interactions offered throughout and the evaluations of the limitations of various receptor theories, methodologies, and plots used to estimate such terms as drug affinity and intrinsic efficacy. Additionally, mathematical derivations are used to help the reader gain a better understanding of the drug–receptor–response relationship. Throughout the text, it is evident that analysis of drug–receptor interaction must be studied with multiple drug doses (and in several different tissues).

Divided into 13 chapters, the book has reference lists at the end of each chapter and a fully functional subject index. Whereas each chapter is ended by a conclusion, this section was, for the most part, too general; chapter summaries would have been preferable. I enjoyed reading this book and welcome it as a valuable addition to my library. I wish only that it had been available sooner.

The two initial chapters cover theories of drug–receptor interactions and stumulus–response mechanisms. Included are occupation theory, rate theory, receptor–inactivation theory, and an evaluation of their general applicability to experimental results. The rationale and methodology for employing isolated tissue systems and their limitations are discussed in Chapter 3. Chapters 4 and 5 deal with the delivery of drug to the receptor compartment and factors that could alter the effective drug concentration at the receptor (e.g., diffusion, drug uptake, drug inactivation, and release of endogenous substances), thus affecting the drug-induced tissue response. The experimental design and statistical analysis of isolated tissue experiments are covered in Chapter 6.

Chapters 7 and 8 deal with agonist affinity and agonist efficacy, respectively. Methods for estimating these parameters by isolated tissue techniques are discussed, as is the distinction between "intrinsic activity" and "efficacy" and their relative importance to the agonist-induced response. Chapters 9 and 10 treat drug antagonists from the viewpoint of classification of type (i.e., chemical, competitive, noncompetitive, and functional) and uses of the Schild plot. Rationale for the classification of receptors as muscarinic, α-adrenergic, etc. is the subject of Chapter 11; a short discussion of the kinetics of drug action comprises Chapter 12. The final chapter discusses drug design and stresses the need for rational drug design rather than random screening when searching for new drugs. An understanding of how drugs work mechanistically could form the basis for the discovery of new drugs in the future.

This book is an excellent text for any pharmacologist actively working with isolated tissues techniques or interested in receptor theory. Additionally, it should serve as a valuable reference to the medicinal chemist looking for new receptor agonists or antagonists.

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ChemText (Version 1.1). Molecular Design Ltd., San Leandro, CA. 1987. $1500 (Industrial), $500 (Academic).

ChemText is part of Molecular Design's CPSS or Chemists Personal Software Series that also includes ChemBase, ChemTalk, and ChemHost. ChemText is a word processor that integrates text, chemical structures, and mathematical equations. Although CPSS is designed as an integrated system, ChemText can certainly be used as a stand-alone program. Minimum hardware requirements necessary to operate ChemText are 640 KB RAM, a graphics card, one 360 KB floppy disk drive, a hard disk, and a mouse. In addition to its word processing capabilities (Document Editor), the program includes a Molecule Editor, a Reaction Editor, and a Form Editor. The program (a nine-disk package) comes with extensive documentation and with over 400 Help Screens that can be summoned at any time with a single keystroke.

The Document Editor accomplishes the usual tasks expected of a word processor. Unlike many other programs, however, a library of different fonts is available; these include Helvetica (6–48 points in size), Greek letters, mathematical symbols, and a whole host of other scientific characters truly developed with the scientist in mind. Another useful feature, particularly when integrating text and structures, is a page-preview screen. With the Molecule Editor, new structures can be quickly constructed and existing structures can be conveniently edited. Structures can be stored, or placed directly in a manuscript created with the Document Editor. The Molecule Editor, like the other editors, makes extensive use of a menu system which includes pull-down submenus. These menus are self-explanatory and even a novice can be drawing complicated stereochemically defined structures within 30 minutes. When drawing structures, a warning prompt is given if the proper valency is exceeded (however, with nitrogen, the prompt was not displayed until a sixth bond was introduced). Several predefined template screens (e.g. functional groups, ring systems, steroids, aliphatic chains, carbohydrates) aid the rapid construction of molecules; personalized templates can also be created. The most commonly employed heteroatoms are quickly summoned and incorporated into a structure; however, if one desires a less common atom, one "click" of the mouse accesses the periodic chart from which any atom can be selected (useful information regarding a selected element is simultaneously presented in a small window). This latter feature also allows the selection of special atoms (e.g. deuterium, tritium) and many of the more common amino acids. Perhaps one of the nicest features of the Molecule Editor is its "Clean" function. A rough structure can be sketched with just a few mouse clicks and the Clean function will normalize the molecule (or any portion thereof) so that it has uniform bond lengths and angles. One nasty habit noted by this reviewer is that cleaning acetylenic structures results in "trans" (*sic*) acetylenes. This function will also "flatten out" the chair and boat conformations of cyclohexanes (although this can be prevented). Nevertheless, this function alone makes the drawing of structures a joy rather than a chore. Chemical reaction schemes can be displayed without use of the Reaction Editor. But, use of this editor makes it easy to move, or adjust the layout of, reaction schemes. The Form Editor allows the creation of forms, similar to index cards, that store chemical structures and chemical/biological data. Certain special data fields, if utilized, are filled in automatically (i.e., are calculated from the structure) such as molecular weight and empirical formula. (ChemBase is necessary in order to search the database by keyword, structure, or sub-structure.)

ChemText can import data (text and tabular files) in ASCII file format, including those made in Lotus 1-2-3 and DBase. File conversion of images (e.g. those created with RS/1) is possible and structures and metafiles created with MACCS, REACCS, and Chemlab-II mini/mainframe software can be used without conversion. Other useful features of the program include direct access to DOS, multiple windows, mailmerge capability, and the ability to create macros. Various types of printers are supported. Although dot matrix printers provide rough-draft-quality structures, laser printers are necessary for publication-quality graphics.

ChemText is without a doubt one of the most versatile and useful personal computer programs currently available for the integration of text, equations, and chemical structures. For those not currently using separate word processing and structure processing programs to perform these tasks in an individual manner (followed by cut-and-paste), the obvious advantage of ChemText is its integration and the requirement of learning (and purchasing) only a single program. For the rest of us, it might be very difficult not to contemplate conversion.

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The Peptides: Analysis, Synthesis, Biology. Volume 8. Edited by Sidney Udenfriend. Academic Press, Orlando, Florida. 1987. x + 370 pp. 15 × 23 cm. ISBN 0-12-304208-9. $75.00.

Volume 8 of this open-ended treatise is the second dedicated to a group of related peptides, here the neurohypophyseal peptides. Major emphasis is on the neuropeptides oxytocin (OT) and vasopressin (VP). Volume 6 dealt with the opioid peptides. Each of the eight chapters ends with an alphabetical reference section, and the volume as a whole is covered by a subject index.

Chapter 1 deals with numerous clinical aspects of disorders of the neurohypophysis. Chapter 2 very briefly describes the "other peptides", including the opioids, hypothalamic releasing factors, and gastrointestinal peptides. Aspects of molecular genetics, transcription, and processing of the neurohypophyseal peptides are covered in Chapter 3. The fourth chapter comprises 40% (131 pages, 400 references) of the entire volume. This valuable review by Hruby and Clark analyzes in detail the structure–activity relationships of OT and VP agonists and antagonists. The relevant pharmacological models are critically compared. There are extensive tables of analogues with their biological effects. Size and stereoelectronic properties of the cystine ring in these peptides are discussed. The importance of the critical residues in relation to binding and signal transduction is analyzed. It is concluded that agonists of OT and VP utilize different conformations and exhibit different SAR from those of the antagonists, so they are discussed separately. The fifth chapter deals with conformational analysis of these hormones by X-ray and molecular modeling, but mainly by NMR methods. It is shown that conformation of the 20-membered ring is solvent dependent. The hypotheses linking antagonist activity to conformational restraint are examined. The final three chapters are devoted to pharmacology and physiology in CNS, renal, and cardiovascular systems, respectively. The CNS chapter chiefly reviews evidence connecting the neurohypophyseal hormones with memory and learning and other adaptive functions such as drug dependence. The roles of VP and its intracellular mediators and its interactions with other hormone systems in renal function are surveyed. Finally the cardiovascular properties of VP are considered, including receptor subtypes, phosphoinositide metabolism, and local effects in specific vascular beds.

Recent years have seen an exponential increase in the numbers of neuropeptides described in mammalian systems. But to understand the relative significance of OT and VP, it is important to recall that they were first detected nearly a century ago, are overwhelmingly the most abundant neuropeptides of the neurohypophysis, and have been the objects of more extensive analogue synthesis than any other peptides. Thus, the lessons to be gleaned from the study of these peptides will be valuable for chemists and pharmacologists studying any peptide hormone and/or its receptors. The present volume succeeds well in its goal of assimilating all the chemical, biological, and medical highlights of these important peptides into one volume. Coverage of the hormones other than OT and VP is necessarily very thin. But treatment of pharmacology and physiology of these two peptides is good enough to be a useful reference for experts, and the treatment of their structural chemistry is excellent. Peptide chemists will appreciate the difficulty of designing antagonists or superagonists from the structure of agonists. Principles inferred from one peptide are rather unlikely to be directly applicable to another. Nevertheless it is very important to understand the rationale, strategy, and tactics which have been applied in successful cases. For this reason the present volume will be particularly valuable to chemists interested in modulation of the biological activities of widely diverse classes of hormones.

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Perspective on Receptor Classification. Receptor Biochemistry and Methodology. Volume 6. Edited by J. W. Black, D. H. Jenkinson, and V. P. Gerskowitch. A. R. Liss, New York. 1987. xi + 295 pp. 18 × 26 cm. ISBN 0-8451-3705-0. $62.50.

Divided into 23 chapters of varying length, the present volume comprises the proceedings of a Festschrift held in London in December 1985 to honor the respected pharmacologist, H. O. Schild, who died in 1984.

The topic of this symposium, "Perspectives On Receptor Classification", is one of prime and ever increasing importance and concern to the pharmacologist today. Indeed, to many, it appears as if the latest issues of the pharmacological journals bring with them avalanches of new receptor subtypes, a phenomenon calculated to induce both despair and cynicism in equal quantities.

In the Foreword, the editors acknowledge the need of some framework for receptor classification and recommend the establishment of an International Commission to deal with this topic, feeling convinced that all necessary knowledge and skills are now present to reach "provisional agreement".

Represented in this volume are many luminaries in the field of receptor research who encompass the range of techniques from radioligand binding (Laduron, Weinstein, Nahorski, Birdsall), through transduction and second messenger systems (Rodbell, Levitzki, Michell, Cuthbert, North) to a plethoric consideration of classical approaches (Leff, Waud, Jenkinson, Brink, Kaumann, Hechter, Mackay, Stephenson, Colquhoun, Kenakin). Of the contributors, Green and Maayani, Furchgott and Black are those who most directly focus on the topic of the symposium; Green, in an article that is very similar to that published recently in *Trends In Pharmacological Sciences* which finally provided the impetus for the establishing of an international commission; Furchgott, in an article where a less than fine distinction is made between the role of chemists, biochemists and pharmacologists in deciding the future of receptor classification; and Black who eruditely reviews his concept of analytical pharmacology including the questionable value of the "circuitous reasoning" that uses biological systems to define ligands and then these ligands to define the pharmacological selectivity of newer ligands.

While this volume raises far more questions than it appears to answer, it is apparent that all the contributors see the need for a classification system. However, in pointing out that "pharmacologists do not agree about the definition of a hormone let alone the definitive nature of the hormone receptor", Sir James Black also prompts the reader to believe that pharmacologists themselves do not agree about what pharmacology is. As the techniques of molecular biology, biochemistry, biophysics, computer science, molecular modeling, and computational chemistry all serve to round out the basic discipline of pharmacology, it would be less than wise for the proposed International Commission to take as its basis the premise that the "true" pharmacologist (with fingers stained from eons of smoke drum usage and the ability to string up a frog gastrocnemius (or biochemist) in a nanosecond flat) will be the final arbiter of whatever may pass in the way of receptor classification. The chapter by Kaumann best addresses this issue in considering the need to consider the compatibility between different techniques for addressing receptor function. A similar consideration by Laduron unfortunately titled "Limitations Of Binding Studies " (all biological techniques have their limitations!) indicates that "binding studies have to be integrated into a multidisciplinary approach", indeed the same caveat exists for effector coupled, second messenger and all other systems that comprise this volume.

Due to its topicality, this book is less than comprehensive and as such limited in its appeal. This is compounded by the absence of contributions from such seminal figures as Ariëns, Hollenberg, and Snyder, whose efforts have contributed significantly to the presently perceived state of confusion. Also the omission of the discussions which must have been entertaining is a loss. While not a book to buy for one's personal use, it is one that should be in every institutional library until it is suplanted either by the proceedings and recommendations of the International Committee (formed in August, 1987) or by Sir James' own long-overdue expanded work on analytical pharmacology.

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Molecular Foundations of Drug–Receptor Interaction. By P. M. Dean. Cambridge University Press, Cambridge, New York. 1987. xv + 381 pp. 15 × 23.5 cm. ISBN 0-521-30255-2. $75.00.

Divided into nine chapters, the present volume approaches the concept of drug–receptor interactions from a quantum mechanical/computational chemistry viewpoint. As such, this is one of the few volumes that treats receptor–ligand interactions from the more difficult receptor-based side rather than the easier ligand approach that is more typical of pharmacological treatises. From

what must be one of the more erudite, and certainly the only oenophilic, review of the origins of receptor theory through consideration of the structural geometry of molecules, intra- and intermolecular forces, characterization of molecular shape, ligand-binding sites, solvent effects on drug–receptor interactions, ligand docking and design to a consideration of future studies related to protein engineering and the potential role of site-directed mutagenesis in understanding active site geometry, this volume is both comprehensive and, to this biologist at least, very accessible. Given the present state of the art of "receptorology", nearly all the examples used substitute enzymes for receptors, two examples being dihydrofolate reductase (DHFR) and tyrosyl tRNA synthetase. In this context, the author's review of studies on the *Torpedo* nicotinic receptor, one that has been cloned, sequenced, and had its mRNA expressed in frog eggs, seems rather overoptimistic in light of the minimal impact this has had in the design of new ligands for this receptor. Similarly, the rapid switch from the nicotinic receptor, in light of anticipated "results of crystallographic studies ... in the 1990s." (p 153), to DHFR to discuss ligand binding sites somewhat restricts the value of this section, especially to the pharmacologist. Chapter 9, "Future studies ...", however, provides a very rational and simulating perspective. The author's emphasis on computational techniques and the need for the building of appropriate drug-related data banks is of interest, as is the observation that Britain's own International Computers Limited (ICL) DAP array processing mainframe computer is 96% faster than a CRAY-1 in doing molecular dynamics calculations. Although this may reflect the architecture of the two computers (serial versus array) rather than any intrinsic superiority inherent in the ICL machine.

The wealth of information present in this volume has precluded the identification of major faux pas or typos on a single reading. Despite the caveats, Dr. Dean's infectious, enthusiastic, and, above all, fresh approach to his subject matter makes this a highly recommendable volume (despite its price) for anyone interested in receptor theory and the future of drug design. From a personal viewpoint, it is a pleasure to share in the author's delight in his subject. In the introduction, the history of receptor theory is compared to that vintage Bordeaux wines. In the postscript, the future of such research is compared to the "racy and exciting ... young wines from the Moselle". In between, at the mundane bench level, lies a good deal of effort that one is tempted to classify as California Napa Valley like, which this volume cannot help but compliment and vice versa.

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Drugs and the Brain. By Solomon H. Snyder. Scientific American Library (Distributed by W. H. Freeman and Co., New York). 1986. ix + 228 pp. 22 × 24 cm. ISBN 0-7167-5015-5. $32.95.

Since the discovery in the 1950s of chlorpromazine's remarkable utility in the treatment of schizophrenia and the impact that this has had on society, the study of drugs and their influence on the brain has dramatically intensified. This has resulted in not only a better understanding of the brain and neurotransmission in general but in the discovery and development of many new drugs that produce phenomenal effects upon the mind. Subsequently there has been an explosion in our understanding of how the brain functions at both the cellular and molecular levels. In addition, this brain research has had a profound impact on pharmacology and our understanding of neurotransmitters and their receptors in general. Thus, until the late 1950s only two neurotransmitters, acetylcholine and norepinephrine, were known. Now, largely as a consequence of research with drugs that affect the brain, more than 50 neurotransmitters have been identified. The implications of such findings are awesome. The author, Solomon H. Snyder, has been a pioneer researcher at the very forefront of this revolutionary science. In this 17th book in the Scientific Library Series, he describes in remarkably simple terms the monumental revolution of 20th century science that holds promise for "bringing the mystery of human consciousness into the realm of human understanding".

Beginning with the recognition of acetylcholine as a neurotransmitter in the brain, the author proceeds through a description of neuronal transmission to describe the "dramatic detective story of how scientists have used drugs as probes that yield novel and exciting insights into brain function". After introducing the reader to the biochemical actions of psychoactive drugs and the reciprocal advancement of our understanding of the brain by describing the neurotransmitter role of acetylcholine and its implication in Alzheimer's disease, the author then relates the history of the opiates and the impact that these drugs have had on our knowledge of pain and pleasure and the remarkable consequences of this research. After detailing historically and illustratively the exploration of how drugs used to treat schizophrenia, mood disorders, and anxiety act in the brain, research on LSD and other psychedelic drugs is presented. Snyder concludes by unifying pharmacology's contribution to psychiatry and neuroscience and presents suggestions of new methods for development of future drugs.

Drugs and the Brain is for a very general audience. It is written with such clarity and simplicity that it can be understood by even those lacking a scientific background. Comprehension of the remarkable research described in this book is facilitated by the numerous clearly described multicolored, oftentimes simplified, illustrations, models, tables, and pictures. Actual quotations and writings from patients and users of various drugs that influence the brain add to understanding the clinical picture. Clearly, the book is intended for general readership and describes fascinating research advances that are well known to neuroscientists. Nevertheless, even for those well versed in these topics, the style of presentation makes this a book that will be appreciated by both the scientist and nonscientist; it is an extraordinary story of the scientific process at its best.

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Books of Interest

Dementia. Leonard L. Heston. W. H. Freeman & Co., San Francisco. 1983. xv + 170 pp. 15 × 23 cm. 0-7167-1569-4. $11.95.

Contemporary Themes in Biochemistry. O. L. Kon. Cambridge University Press, New York. 1986. xxxvii + 715 pp. 16 × 23 cm. 0-521-33269-9. $49.50.

Bacterial Protein Toxins. P. Falmagne. VCH New York. 1987. x + 398 pp. 17 × 24 cm. 0-89574-233-0. $83.75.

Drugs for Mental Illness. Marvin E. Lickey. W. H. Freeman, San Francisco. 1983. viii + 349 pp. 15 × 23 cm. 0-7167-1458-2. $13.95.

Clinical Neuropharmacology. William E. Bunney, Jr. Raven Press, New York. 1986. xxi + 596 pp. 17 × 25 cm. 0-88167-293-9. $30.00.

Molecular Cloning of Hormone Genes. Joel F. Habener. Humana, Clifton, NJ. 1987. xvii + 441 pp. 15 × 22 cm. 0-89603-091-1. $64.50.

Handbook of Industrial Drying. Arun S. Mujumdar. Marcel Dekker, New York. 1987. xii + 948 pp. 18 × 26 cm. 0-8247-7606-2. $150.00.

Organic Chemistry for Students of Biology and Medicine, 3rd ed. G. H. Taylor. Wiley, New York. 1987. ix + 352 pp. 14 × 21 cm. 0-582-44708-9. $29.95.

Methods of Hybridoma Formation. Arie H. Bartal. Humana, Clifton, NJ. 1987. xxv + 480 pp. 16 × 23 cm. 0-89603-100-4. $69.50.

Mild Hypertension. W. E. Miall. Cambridge University Press, New York. 1987. xviii + 222 pp. 15 × 23 cm. 0-521-33293-1. $39.50.

Drug Treatment of the Rheumatic Diseases, 3rd ed. Frank Dudley Hart. Williams & Wilkins, Baltimore. 1987. x + 229 pp. 17 × 24 cm. 0-86433014-6. $48.00.

USAN and the USP Dictionary of Drug Names. Mary C. Griffiths. United States Pharmacopeial Convention, Inc. 1987. 708 pp. 21 × 28 cm. 0-913595-23-3. $69.50.

Reviews of Physiology, Biochemistry and Pharmacology. Edited by P. F. Baker. Springer-Verlag, New York. 1986. 264 pp. 17 × 25 cm. ISBN 3-540-16874-5. $70.40.

Methods of Enzymatic Analysis. Volume XII. Edited by Hans Ulrich Bergmeyer. VCH, New York. 1986. xxiii + 498 pp. 17 × 24 cm. ISBN 0-89573-242-4. $155.00.

Tolerance to Beneficial and Adverse Effects of Antiepeleptic Drugs. Edited by H. H. Frey. Raven, New York. 1986. xii + 180 pp. 15 × 24 cm. ISBN 0-88167-249-1. $31.50.

Oklahoma Notes Pharmacology. Edited by Joanne I. Moore. Springer-Verglag, New York. 1987. xi + 247 pp. 21 × 28 cm. ISBN 0-387-96332-4. $12.95.

Chemistry and Physics of Carbon. Volume 20. Edited by Peter A. Thrower. Marcel Dekker, New York. 1987. xii + 275 pp. 15 × 22 cm. ISBN 0-8247-7740-9. $99.75.

Experimental Approaches to Mammalian Embryonic Development. Edited by Janet Rossant. Cambridge University Press, New York. 1986. xiii + 558 pp. 16 × 24 cm. ISBN 0-521-30991-3. $70.00.

The Adrenal Medulla. Volume 4. Edited by Stephen W. Carmichael. Cambridge University Press, New York. 1986. 259 pp. 16 × 23 cm. ISBN 0-521-32885-3. $29.95.

Biological Psychiatry. Edited by Graham D. Burrows. John Libbey & Co., London. 1984. xii + 256 pp. 17 × 25 cm. ISBN 0-86196-023-8. $46.00.

Clinical and Pharmacological Studies in Psychiatric Disorders. Edited by Graham D. Burrows. John Libbey & Co., London. 1985. xviii + 394 pp. 17 × 25 cm. ISBN 0-86196-067-X. $46.00.

Drugs in Pregnancy and Lactation, 2nd ed. Edited by Gerald G. Briggs. Williams & Wilkins, Baltimore. 1986. xxiii + 537 pp. 18 × 26 cm. ISBN 0-683-01058-1. $47.95.

Handbook of the Biology of Aging. Edited by Caleb E. Finch. Van Nostrand Reinhold Co., New York. 1985. xvi + 1025 pp. 18 × 26 cm. ISBN 0-442-22529-6. $75.00.

Annual Review of Neuroscience. Volume 10. Edited by W. Maxwell Cowan. Annual Reviews Inc., Palo Alto, CA. 1987. ix + 716 pp. 15 × 23 cm. ISBN 0-8243-2410-2. $31.00.