Book Reviews

The Peptides. Analysis, Synthesis, Biology. Volume 3. Protection of Functional Groups in Peptide Synthesis. Edited by E. Gross and J. Meienhofer. Academic Press, New York. 1981. xx + 379 pp. 15 × 23 cm. $45.00.

The latest volume in this excellent open-ended series on the synthesis, characterization, and biological properties of peptides is devoted in its entirety to the chemistry of protecting groups. The first four chapters deal with the protection of specific functionalities: amino groups (Geiger and König), carboxyl groups (Roeske), thiols (Hiskey), and alcohols (Stewart). A glittering collection of clever protection–deprotection techniques has been assembled in these four comprehensive chapters, which will clearly appeal not only to specialists in peptide synthesis but also to the synthetic chemical community at large. Chapter 5 (Fauchere and Schwyzer) concerns itself with one of the classic and pivotal problems in peptide chemistry, namely, the proper choice of selectively removable blocking groups during a multistep synthesis. Chapter 6 (Inman), in contrast, covers what might be regarded as the antithesis of this problem, i.e., the preparation of peptides with minimal protection of side-chain functional groups. While there is an understandable tendency to utilize maximally protected amino acids in the hope of increasing yield and avoiding byproducts, much time and effort can sometimes be saved by making use of certain coupling tactics and strategies that specifically allow the use of amino acids not protected in the side chain. A number of illuminating examples of such procedures are discussed in detail in this chapter and others are conveniently tabulated for the reader who is interested in pursuing this topic in depth. Finally, Chapter 7 (Johnson) covers the relatively less familiar but fascinating subject of "dual functional groups". An illustration of such a group is the 4-picolyloxycarbonylhydrazide group for C-terminal amino acid protection. Hydrogenolysis of this group affords a C-terminal hydrazide derivative which is immediately ready for activation to an azide and further coupling. Several other ingenious and intellectually satisfying examples of dual functional groups are provided, and one senses that this is probably an area of peptide chemistry that will expand in the future.

Overall, this volume continues to maintain the high standards of scholarship and editorial skill of its predecessors. There is extensive use of chemical equations for the benefit of "browsers", the tables are plentiful and well-arranged, and the index is generous. An author index is likewise provided. There are virtually no typographical errors, and the paper and binding are both of good quality. This will be a welcome addition to every "peptidologist's" shelf.

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Progress in Biochemical Pharmacology. Volume 16. Endogenous Peptides and Centrally Acting Drugs. Edited by A. Levy, E. Heldman, Z. Vogel, and Y. Gutman. Series Editor: R. Paoletti. S. Karger, Basel and New York. 1980. XV + 159 pp. 17 × 24 cm. $49.25.

This book is a compilation of papers which were presented at the 24th OHOLO Conference held in the Spring of 1979 at the Israel Institute for Biological Research, Ness-Ziona, Israel. Scientists of international reputation review the advances achieved at that time in neurobiology. Contributions include review articles and reports on developments concerning neuroactive peptides and their function, receptor interaction, and deactivation. The volume also includes data on novel neurotransmitters and relevant information on psychopharmacological research.

H. W. Kosterlitz reviews opioid peptides, especially methionine-enkephalin, leucine-enkephalin, and β-endorphin, their interaction with μ and δ receptor sites, and their importance in the mediation of analgesic effects. Functional aspects of endorphins, their distribution and release, and possible addiction liability are discussed by A. Herz et al. R. Simantov presents data on the inhibition of endorphin synthesis in pituitary cell culture and on the inhibitory effects of guanine nucleotides (GTP and GMP-PNP) on [D-Ala^2]methionine-enkephalin binding to opiate receptors. Characterization of "humoral" endorphin is described in two papers by B. A. Weissman et al. and Y. Sarne et al. Z. Vogel and M. Altstein studied the inactivation of enkephalin by brain enzymes and describe the actions of a puromycin-sensitive aminopeptidase that cleaves the Tyr-Gly bond and of an endopeptidase that cleaves leucine-enkephalin into Tyr-Gly-Gly and Phe-Leu. H. Gainer et al. review peptide hormone biosynthesis via precursor proteins and discuss the implications for neurobiology, i.e., peptide biosynthesis in neurons. Studies on α-melanotropin-containing nerves in the brain are described by T. L. O'Donohue and D. M. Jacobowitz. It is suggested that α-MSH may function as a neurotransmitter or neuromodulator in the brain. V. I. Teichberg and S. Blumberg report on the biological activity and degradation of substance P and synthetic analogues. Both endopeptidase(s) and aminopeptidase(s) are involved. Degradation of the substance P molecule at substance P synapses into an N-terminal tetrapeptide and a C-terminal heptapeptide may be followed by amino-peptidase degradation of the latter. Properties of particulate benzodiazepine binding sites from calf cortex as revealed by specific binding of flunitrazepam are described by Y. Dudai and R. Sherman-Gold. The following three papers deal with psychopharmacological research on Schizophrenia. R. H. Belmaker et al. ponder whether neuroleptic blocking of dopamine receptors continues after chronic treatment. Aspects of the mechanism of action of chlorpromazine, as reflected by platelet function, and of the clinical significance of the chlorpromazine-modified platelet aggregation response are presented by B. Oppenheim et al. G. Sedval proposes the use of the concentrations of monoamine metabolites and chlorpromazine in cerebrospinal fluid for prediction of therapeutic response in psychotic patients treated with neuroleptic drugs. The last paper by G. Burnstock presents data that provide a basis for proposing two types of purinergic receptors.

This book provides a fine overview on the state of the field by the end of 1978. However, the developments since that Conference have been so rapid as to render some of the papers today as of mainly historical interest. The book is exceedingly well produced, albeit at a very high price. It should be of interest to those working in the area of neurobiology.

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Enzyme Regulation and Metabolic Diseases. By Francesco Belfiore. S. Karger, Basel, Switzerland. 1980. xxiv + 880 pp. 15.5 × 24 cm. $149.25.

Metabolic diseases caused by genetically transmitted enzyme defects are typical examples of "inborn errors of metabolism". Although often fatal or seriously debilitating, the majority of these inherited disorders are rather rare. In contrast, a large portion of the population is suffering from metabolic diseases which are characterized by normal levels of enzymes but significant alterations in the regulation of their activities. Since enzyme activity at the cellular and tissue level is under the influence of a variety of controlling factors, such as hormones, metabolites, dietary components, development, sex, aging, environment, etc., changes in the effects of one or more of these factors can lead to the development of disease states of varying severity.

This book is divided into four parts, dealing primarily with subjects in the areas of the author's expertise: obesity, diabetes mellitus, hyperlipoproteinemias and atherosclerosis, respectively, and the corresponding characteristic changes in specific enzyme activities caused by alterations in their metabolic regulation. Each

topic is treated in a very well organized manner, beginning with a systematic review of normal metabolism in the various tissues relevant to the disease concerned. The metabolic pathways are discussed (and well illustrated) in great detail with special emphasis on the significance of relative enzyme activities and the importance of the "key" regulatory enzymes. The same organization and emphasis on regulatory enzyme changes characterize the description of the various pathological conditions based on the author's own observations well integrated with those of other investigators.

The extensive and up-to-date literature coverage (about 5000 citations with original titles) is unprecedented for this type of monograph, although the author still considers it "necessarily selective". This impressive reference collection makes this book the most complete and singular source of information for the experts, as well as those only peripherally interested in this field.

Certain topics of interest for the medicinal chemists and pharmacologists are not covered, apparently due to space limitations. These include effects of prostaglandins, vitamin and mineral deficiencies, alcohol intake, as well as the beneficial or adverse effects of drugs and drug combinations. In spite of these omissions, this comprehensive treatise contains more than sufficient fundamental biochemical knowledge to provide a basis for the rational development of new approaches toward the treatment of metabolic diseases associated with pathological changes in the regulation of specific enzymes and enzyme systems.

This monograph, with its invaluable information content, belongs to the collection of all academic and pharmaceutical R & D libraries, especially since its price is prohibitively high for most individuals. It is highly recommended as a reference book for both professionals and graduate students in the health sciences.

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Burger's Medicinal Chemistry. 4th Edition. Part II. The Basis of Medicinal Chemistry. Edited by Manfred E. Wolff. Wiley, New York. 1979. ix + 1302 pp. 17.5 × 25 cm. $115.00.

The contents of volume I, previously described by this reviewer [*J. Med. Chem.*, **24**, 353 (1981)], devoted itself largely to, hopefully, efficient means of finding the best candidates among known classes of drugs. Volumes II and III—the latter in the process of review—describe known classes of drugs by way of chemical structure, structure–activity, pharmacological and mechanism of action, metabolism, clinical use, resistance, and toxicity. Beginning with the 3rd edition of this important work as previously noted by this reviewer [*J. Am. Chem. Soc.*, **93**, 1829 (1971)], limitations of space have dictated the omission of chemistry from volumes carrying the work *chemistry* ironically as the principal word in the title. Thus, the intent is to orient and educate the chemist, presumably already competent in synthesis or isolation, in biological areas so essential in his efforts as a medicinal chemist. Editor Wolff is to be commended for considerable success in that endeavor by finding competent authors of the various sections.

Volume II consists of 23 chapters bearing the following titles: "Sulfonamides and Sulfones"; "Synthetic Antibacterial Agents"; "The β-Lactam Antibiotics"; "Nonlactam Antibiotics"; "Antimycobacterial Agents"; "Antimalarials"; "Antiamebic Agents"; "Chemotherapy of Trypanosomiasis and Other Protozoan Diseases"; "Anthelmintic Agents"; "Antifungal Agents"; "Antiviral Agents"; "Drugs for Neoplastic Diseases"; "Agents Affecting the Immune Response"; "Blood Calcium Regulators"; "Peptide and Protein Hormones"; "The Male Sex Hormones and Analogs"; "The Female Sex Hormones and Analogs"; "Agents Affecting Fertility"; "Blood Glucose Regulation"; "Anticoagulants, Antithrombotics, and Hemostatics"; "Prostaglandins"; "Analogs of Cyclic Nucleotides"; and "Antihyperlipidemic Agents".

In so large a work involving multiple authorship, human errors illustrated by the following are expected: page 3 line 24, *vivo* not *vitro*; page 10 line 1, 13.*31* not 13.*21*; page 35 line 3, *Tishler* not *Tischler*; page 175 line 2, replace *those* by *for example polypeptide antibiotics*; page 385 line 10, *primaquine* not *primaquin*; page 423 line 10, 19.*34* not 19.*33*; page 423 line 13, reference 110, not 109; page 423 line 6, clamoxyquine; page 424 line 24, amodiaquine; page 470 line 37, amodiaquine; page 470, 7-chloro missing from 20.*128*; page 520, S missing in ring of 21.*122*.

Volume II covers in splendid fashion for the chemist pertinent facts concerning known drugs, thus laying the groundwork for further molecular modification in the search for better drugs. However, the best hope offered by writers for useful agents with unique modes of action is provided by such statements as Peter Islip's: "Finally, it must be emphasized that too little is known of the biochemistry of the schistosome; further advances must be made in this area before systematic investigations into the chemotherapy of the disease can begin." In that connection, it is regrettable that certain chapters failed to offer possible modes of action for drugs under discussion. This reviewer believes that such considerations, plus creativity and serendipity which cannot be taught, will yield agents of the future.

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The Future of Pharmaceuticals: The Changing Environment for New Drugs. By Clement Bezold. Wiley, New York. 1981. xiii + 142 pp. 16 × 23.4 cm. $12.00.

This book is a compilation of the briefing papers and discussion summaries from the first year of the Foresight Seminars on Pharmaceutical Research and Development. Supported by Hoffmann-La Roche Inc., these seminars are intended to provide Congressional staff with a broad view of the forces affecting the discovery and development of new pharmaceutical products.

In light of advances in research and development and changes in legislation and regulation, Hoffmann-La Roche is continuing its sponsorship of the foresight seminars. As Alvin Toffler states in his foreword, these seminars have been an experiment in legislative foresight. They have brought together experts from the research community, the pharmaceutical industry, public interest groups, government agencies, and other interested organizations to discuss a variety of issues related to pharmaceutical research and development.

Staff

Progress in Drug Research. Volume 24. Edited by Ernst Jucker. Birkhauser, Boston. 1980. 412 pp. 17 × 24.5 cm. $112.00

Since the first volume was published in 1959, these annual volumes have presented topics in various fields of drug research. Authoritative information on specific fields of interest have been made available to medicinal chemists, pharmacologists, and researchers in related fields of interest. At the time these volumes were first published, it was unusual to have the chemical as well as the pharmacological and clinical aspects discussed in one article. They were then a most welcome addition to the literature. Over the years many related volumes have proliferated the scene; the most recent being "Medicinal Research Reviews", Wiley-Interscience. Therefore, one is forced to critically examine the contributions in Volume 24 and their appropriateness regarding the rapidly advancing field of drug research.

"Noise Analysis and Channels at the Postsynaptic Membrane of Skeletal Muscle", "The Experimental Biologist and the Medical Scientist in the Pharmaceutical Industry", and "Quaternary Ammonium Salts—Advances in Chemistry and Pharmacology Since 1960" are some subjects covered in this volume. Although well written and scholarly, these three topics, comprising about 50% of the space in this volume, cannot be considered as being at the cutting edge of drug research. The other three topics covered are "Relationships Between Structure and Function of Convulsant Drugs" (there has never been a survey of the SAR of anticonvulsant drugs in the past 23 volumes), "Recent Developments in Disease-Modifying Antirheumatic Drugs", and "Chemotheraphy of Cestode Infections".

This volume also contains a cummulative author index for Volumes 1–24, which, regretably, indexes only the first author, and a subject index for all 24 volumes. Unfortunately, even the subject index leaves much to be desired. To illustrate my point, Volume 21 contained an article entitled, "Agents Acting on Central Dopamine Receptors". On checking the index, no reference could be found for dopamine, receptors, dopamine antagonists, etc. A single entry, i.e., "Central dopamine receptors, agents acting on...", was located. Similarly, the index for Volume 24 is terribly inadequate. It is the hope of this reviewer that the editor and the publisher of this highly respected series will pay more attention to not only providing scientists with topics of real interest in the rapidly changing field of drug research but go one step further by supplying the reader with a useful and complete subject index. For the price of $112.00, that's the least one can expect!

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Annual Drug Data Report. Volume III. Edited by J. R. Prous. J. R. Prous, S. A., Barcelona. 1981. 355 pp. 17 × 24 cm. $85.00.

Volume III of *Annual Drug Data Report* presents over 650 drugs, the great body of which comprises drugs which are under study and have been selected from biomedical journals and congress and symposium proceedings. About 50 products from Volume II and launched since its publication have been given updated entries. Finally, several established drugs not treated in previous volumes are included because of their continued active introduction on the international market.

Each drug is described in monograph form to provide whenever possible the following data: nonproprietary name, research code number, empirical and chemical formulas, pharmacological action, toxicity, manufacturer, and references, the latter including patents from different countries and some related patents. For the drugs which are in clinical practice, indications, dosage, preparations, commercial name, and year of introduction are also included. Monographs are arranged alphabetically according to their nonproprietary name or research code number. The data given in the monographs has in most cases been taken from the literature and does not represent specifications for products available from the manufacturer.

Staff

The Kirk-Othmer Encyclopedia of Chemical Technology. Third Edition. Volume 15. Edited by Martin Grayson and David EcKroth. Wiley-Interscience, Somerset, NJ. 1981. xxvi + 996 pp. 19 × 26 cm. $145.00.

Of particular interest to medicinal chemists in Volume 15 will be the sections on medical diagnostic reagents, memory-enhancing agents and antiaging drugs, microbial polysaccharides, microbial transformations, neuroregulators, and *N*-nitrosoamines.

Staff

Clinical Biochemistry Reviews. Volume 2. Edited by David M. Goldberg. Wiley, New York. 1981. 1981. xx + 433 pp. 18 × 26 cm. $28.50.

This book is representative of the genre of annual review volumes. It is the second volume in this series and, as is usual, represents the contribution of a number of authors. For the most part, the authors have chosen to be selective in the references cited, a fact which leads to some uneveness in the coverage of certain topics.

Outstanding chapters include cancer markers, diabetes mellitus, the gastrointestinal tract, and the kidney. The chapter on instrumentation and computors is weak. the enzyme chapter discusses amylase at great length and trypsin and LDH to a much lesser extent. Other chapters on nonpolypeptide hormones, pituitary hormones, genetic disease, toxicology, and thereapeutic drug monitoring are more general in nature and give adequate references as a starting point for the person seeking more information. In the chapter on the plasma lipoprotein system, lipoprotein lipase is highlighted. Other chapters completing this volume include a complete chapter on hepatobiliary disease and plasma proteins.

This volume is to be recommended to investigators looking for an overview of the field of clinical biochemistry on a year to year basis.

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Chromatographic Science Series. Volume 16. Steroid Analysis by HPLC: Recent Applications. Edited by Marie P. Kautsky. Marcel Dekker, New York. 1981. xii + 397 pp. 10 × 23 cm. $45.00.

It should come as no surprise that HPLC has also swept the field of steroid analysis. Thus, I fully agree with the following comment in Chapter 8 of this book: "Any attempt at a comprehensive survey of steroid hormone HPLC is destined to be rapidly outdated". Wisely, the impossible was not attempted here. Rather, this book represents a timely stock taking. It is the more welcome, since it supplements the 1978 book on "*Analysis of Steroid Hormone Drugs*" by Görög and Szász which, admittedly, did not include steroid analysis in biological materials and which was short on HPLC applications. The editor should be congratulated on a very carefully planned selection of topics, covering the wide field of steroid classes. In all chapters, discussion is not restricted to HPLC columns, solvent systems, and detection devices. Equal prominence is given to separation and purification. Invariably, a discussion of other methods is also presented. Generally, the literature references include those published in 1979; not a bad record for a multiauthored book published in 1981. After all, success of such a venture depends on the weakest link; namely, on the last one to send in the assigned chapter.

All chapters are very readable, but in my opinion Chapter 8, quoted above, on "Analysis of Steroid Hormones in Adrenal and Testicular Cells and Tissues" by Michael J. O'Hare and Edouard C. Nice, is the most elegantly written. Being a pharmaceutical analyst, for me the most pertinent and useful chapter is number 4 on "Determination of Synthetic Adrenocorticosteroids in Pharmaceutical Preparations and Biological Fluids by HPLC" by Marilyn Dix Smith. The other chapters are as follows (Authors in parentheses): Chapter 1, "HPLC Separation of Bile Acids" (W. H. Elliott and R. Shaw); Chapter 2, "HPLC Analysis of Cardiac Glycosides and Related Steroids" (J. M. Seiber, C. J. Nelson, and J. M. Benson); Chapter 3, "Analysis of Progestins by HPLC" (R. H. Purdy, C. K. Durocher, P. H. Moore, Jr., and P. N. Rao); Chapter 5, "Analysis of Estrogens by HPLC" (G. J. Schmidt); Chapter 6, "Separations and Determination of the D Vitamins by HPLC" (R. Vanhaelen-Fastré and M. Vanhaelen); Chapter 7, "HPLC of Sterol Intermediates in Cholesterol Biosynthesis" (E. Hansbury and T. J. Scallen); Chapter 9, "The Study of Enzymic Steroid Reactions by HPLC" (J. F. Studebaker); Chapter 10, "Separation of Steroid Epimers by HPLC" (J. R. Redel and J. Capillon); Chapter 11, "HPLC Analysis of Natural and Synthetic Hormones in Food and Feeds" (P. S. Jaglan and L. F. Krzeminski).

Mrs. Kautsky set out to organize "a laboratory handbook to assist the investigator in devising schemes for the separation and analysis of steroids and similar compounds". She has succeeded admirably.

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Basics of Electroorganic Synthesis. By Demetrios K. Kyriacou. Wiley-Interscience, New York. 1981. viii + 153 pp. 16 × 23.5 cm. $27.50.

There is a need for a short monograph presenting an introductory overview of organic electrochemistry for use by organic chemists unfamiliar with the field, inasmuch as several such works which were available several years ago are either out of print or obsolete, leaving primarily the huge and expensive, though ex-

cellent, reference volume edited by M. M. Baizer. Unfortunately, this book cannot be recommended as filling this need.

In order to be useful to the neophyte, a book of this type must accurately represent the state of the art; the monograph by Kyriacou is seriously deficient in this respect. For example, the mechanism of oxidation of aromatic compounds as presented on page 37 ff. is incorrect in some places (the bispyridination of anthracene, page 41, does not proceed via the anthracene dication) and misleading in others (the three mechanisms on page 37 seem to be given equal probability; in fact, the last is no longer considered viable by those in the field). Along similar lines, (a) alkyl halide reductions do not in general proceed in two one-electron steps in aprotic media (page 82) nor would they be expected to do so; (b) the reduction of alkenes to alkanes at platinum (page 76) almost certainly does not involve addition of two hydrogen atoms to the double bond, nor does reference 1 (page 78) suggest this mechanism; (c) the fact that one can oxidize alkanes in strongly acid media (page 36) is presumably because, as Pletcher et al. (ref 1, page 44) have noted, one can reach very positive potentials in these solvents.

There are some other problems arising from the way the literature is presented. Sometimes older literature is not cited (Belleau and Weinberg, not Swenton et al., are the discoverers of the anodic synthesis of quinone ketals, page 64), but other times older, discredited mechanisms are presented, e.g., the ionic mechanism for reduction of alkyl halides (page 82). Finally, it should be noted that about half of the "Manufacturers and Suppliers of Electrochemical Equipment" listed on pages 146–147 neither manufacture nor supply such equipment.

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Pollution Engineering and Technology Series. Volume 16. Carcinogens in Industry and the Environment. Edited by J. M. Sontag. Marcel Dekker, New York and Basel. 1981. xi + 761 pp. 17.5 × 25 cm. $79.50.

Within the past decade there has arisen a significant interest and concern with regard to the possible and/or real presence of known and/or potential mutagenic/carcinogenic compounds within the human/animal environment and/or employment sites. A very large amount of information has accumulated describing the presence of various organic and inorganic chemicals in the environment and industrial locations, along with another, often separate, body of information regarding the possible or demonstrated mutagenic and/or carcinogenic properties of these very same compounds. In some rare instances, literature reports attempt to answer both questions, i.e., distribution and possible human exposure, together with known and new animal/human data related to biological/toxicological properties. In general, it has been a difficult task for any one individual to collate and bring together these usually separate bodies of information, at least until the present monumental and comprehensive text edited by the eminentaly qualified James Sontag.

The list of contributors to this particular collection of individual chapters reads as would a Who's Who in the fields of chemical carcinogenesis, environmental pollution and distribution of chemicals, industrial carcinogens, food carcinogens, and related subjects. Thus, to name but a few contributors, there are chapters by E. K. Weisburger, G. W. Casarett, P. D. Lotlikar, J. C. Arcos, I. B. Weinstein, and other of equal stature and competence. Dr. Sontag has contributed the introductory chapter, which uniquely and quite successfully brings together all of the threads that interweave and connect the fabric of the overall manuscript. In addition to extensive discussions on the location and distribution of various environmental/industrial chemicals, there are several initial chapters which take more of an overview of the entire problem. These discuss the social and economic implications of cancer in the U.S., legal implications of working with carcinogens, safety and control implications of working with carcinogens, and a statistical analysis of carcinogenesis data from chronic animal studies. It should have become apparent already that this is a very extensive and comprehensive work, encompassing some 15 separate chapters and almost 700 pages in all. It is not an easy book to read cover to cover in one sitting or even several sittings, for the material is quite involved and extensive. The references for almost every chapter are enormously extensive and very up-to-date, which is only another indication of the extent to which each contributor has gone to make the overall text the success that it has so obviously become. The sheer amount of information to be assimilated is, in many cases, more than one can expect to successfully accomplish in a first reading. This is a text that one must return to again and again; it is not meant to be read cover to cover but rather to be used as a comprehensive reference text for individual subjects and areas of interest. In that regard, it is uniquely successful and must be recommended to virtually any serious student or worker in the above-mentioned fields of interest. Sometimes, the price of a new book is out of proportion to what the book has to offer the reader, and certainly we have all seen, bought, or read just such works. In the present case, the amount of money being asked is virtually inconsequential when compared with the amount of information and material being provided the customer. This is one of the few times when I can honestly say that, even at an asking price of $80.00, there is still an enormous value provided in the final text. We are indeed getting our money's worth, perhaps even a bit more than our money's worth, because this is one of those texts that will be used for many, many years to come. There is every indication that it will become one of the most referenced and referred to texts in the years ahead.

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Progress in Cancer Research and Therapy. Volume 16. Augmenting Agents in Cancer Therapy. Edited by Evan M. Herah, Michael A. Chirigos, and Michael J. Mastrangelo. Raven Press, New York. 1981. xviii + 574 pp. 18 × 26 cm. $65.00.

This volume entitled "Augmenting Agents in Cancer Therapy" represents the proceedings of a Conference on Biological Response Modifiers sponsored by the Division of Cancer Treatment of the National Cancer Institute. "Augmenting Agents" are immunotherapeutic agents, a subset of the broad class of biological response modifiers. This heterogeneous group of materials either stimulates normal immune reactivity in an immunodepressed host or increases host defense reactivity above the normal level in patients.

This volume contains 36 chapters written by experts in the preclinical and clinical field discussing the biological effects of both well-established and new augmenting agents. The major classes of agents discussed in these chapters include microbial fractions, interferon inducers, synthetic polymers, and miscellaneous compounds. Synthetic polymers are important because their administration can cause in vivo production of various antitumor cytokins and because they can activate natural killer (NK) cells, macrophages, the reticuloendothelial system, or other B-cell functions. Under the miscellaneous category of compounds are suppressor cell modifiers and cell-membrane modifiers with either direct or indirect antitumor activity. The specific substances that are discussed in the volume are microbial fractions including BCG and *C. parvum*, poly(I)–poly(C), synthetic polyanions, pyrimidinoles, NED-137 polymer, MVE2 (pyran copolymer), Bayi 7433 (nonionic synthetic copolymer), CD 46,665 (a lipoidal amine), prostaglandins, Cimetidine, DTC (diethyldithiocarbamide), isoprinosine, lysolecithin analogues, Tuftsin (Thr-Lys-Pro-Art), Azinexone (cyanoaziridine), and Thiazolobenzimidazoles and thiazolobenzothiazoles. Agents of promise are discussed thoroughly in terms of their biological activity, toxicology, therapeutic activity, in vitro correlates of activity, monitoring methodology, and mechanisms of action.

The medicinal chemist will be amazed at the heterogeneous group of compounds showing immunoresponse and will find the lack of any structure–activity correlations disconcerting. This is, perhaps, understandable, since the field is newly emerging. To the medicinal chemist, the lengthy discussions of materials are rather dull and hard to comprehend.

In summary, this volume will be primarily of interest to immunologists and clinical and experimental oncologists. It will be an excellent addition to the library. To the medicinal chemist,

I would particularly recommend the summary chapter, which gives an excellent overview of the materials discussed in the book in this developing field of importance to cancer therapy.

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Annual Review of Neuroscience. Volume 4. Edited by W. Maxwell Cowan, Zac W. Hall, and Eric R. Kandel. Annual Reviews Inc., Palo Alto, CA. 1981. viii + 556 pp. 16 × 23 cm. $20.00.

Although one of the newest in the annual review series of publications, *Annual Review of Neuroscience* demands our attention. The editors are to be congratulated for bringing together so many interesting and comprehensive articles from the diverse fields of research in present day neuroscience. Plasticity, in one way or another, is a major theme of this year's volume: Brown, Holland, and Hopkins review our current knowledge of motor nerve sprouting, Drachman reviews the biology of myasthenia gravis, and Minneman, Pittman, and Molinoff discuss β-adrenergic receptor properties and regulation. On a more holistic level, Tsukahara reviews the present status of research on synaptic plasticity in the mammalian CNS, while Miles and Lisberger discuss their new hypothesis concerning plasticity of the vestibulo-ocular reflex. "Plasticity" over a much longer time frame is considered by Northcutt, who describes the evolution of the telencephalon in nonmammals.

Reviews of specific neuronal function include a discussion by Dennis of the inductive interactions between cells during the development of the neuromuscular junction, and Hagiwara and Byerly who detail voltage-dependent calcium channels (from eggs to muscles) and the problems of biophysical studies. Structural engineering of the nervous system is discussed by Dennis, Bray, and Gilbert in their review of cytoskeletal elements in neurons, while Garth, Bray, Rasminsky, and Aguayo review the interactions between axons and their sheath cells. There are also excellent discussions by Stent of the strengths and weaknesses of the genetic approach to the development of the nervous system, by Weitzman on sleep and its disorders, and by Robinson on the use of control systems analysis in the study of the neurophysiology of eye movements.

Last, but not least, Sperry in the opening review entitled "Changing Priorities" attempts to make the case that recent conceptual developments in neuroscience clear the way for a "rational approach to the theory and prescription of values and to a natural fusion of science and religion". From attacks on Marxist–communist doctrine to a scientific approach to the prescription of ethical values, Sperry weaves a tortuous path. While I consider it of utmost importance for scientists to consider the relationship of their ivory tower to the rest of the world and the potential impacts and repercussions of their work, I do not feel that the *Annual Review fo Neuroscience* is the correct vehicle for such individual statements.

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Foreign Compound Metabolism in Mammals. Volume 6. Specialist Periodical Reports. Edited by D. E. Hathway. The Royal Society of Chemistry, Burlington House, London. 1981. xvi + 390 pp. 14 × 22 cm. $138.00.

This series of the "Specialist Periodical Reports" continues to improve and impress with its latest volume which reviews literature published during 1978 and 1979. Coverage is divided into 14 chapters by 17 contributing authors. The chapters are again replete with structural diagrams, comprehensive in their survey (tabulation reveals a total of 2623 references) and descriptive in their treatments of specific topics of interest. The latter coverage, along with development of relevant background material, makes this volume particularly enjoyable reading. A few highlights from some of these chapters (authors) include: 1. "Drug Kinetics" (P. G. Welling). The lower bioavailability observed for nadolol in man compared to dog "throws doubt on the use of this species" in screening programs designed to discover orally administered therapeutic agents. 2. "Enzymic Mechanisms of Oxidation, Reduction, and Hydrolysis" (P. Bently and F. Oesch). The "first direct demonstration of an NIH-shift in human drug metabolism" involving propranolol. The "first conclusive proof that cytochrome P450 catalyses ethanol oxidation." Interesting discussion of advances toward defining the location of oxygen entry during N-dealkylation and of various tissue localizations of monooxygenase activity. 3. "Enzymic Mechanisms of Conjugation" (P. C. Hiram and P. Millburn). An in-depth coverage concerning glucuronidation. 4. "Species, Strain, and Sex Differences in Metabolism" (J. D. Baty). 5. "Mechanisms of Chemical Carcinogenesis" (D. E. Hathway). The author has again provided an admirably comprehensive chapter. The "mutagenic activity of methylene chloride in *S. typhimurium* TA 100 strain" is worth noting. 6. "Drugs Acting on the Central Nervous System" (C. Rhodes). The new author has changed the subject matter subdivision from a pharmacological classification to structural categorizations, and the result seems a more effective treatment than is found in previous volumes. 7. "Cardiovascular Drugs" (G. R. Bourne). The growing use of deuteriated drugs, e.g., acebutolol, alprenolol, and oxprenolol, to determine metabolic pathways in man is evident. 8. "Biotransformations of Sympathomimetic Agents and Bronchodilators" (L. G. Dring and P. Millburn). A thorough treatment of the latest developments toward defining amphetamine metabolism reflects the interest in this pharmacological class and addresses more basic questions such as the mechanism of N-dealkylation and the metabolic handling of stereoisomers. 9. "Anti-infective Agents" (P. Johnson and J. Skidmore). 10. "Steroids and Antihormones" (G. H. Thomas). The author has extensively developed the background for this topic and yet maintained the thrust intended in this series, since the background sets the stage for his review of the 1978–1979 associated metabolism literature. 11. "Food Additives" (S. Gangolli). A structural grouping approach has been suggested for the toxicological examination of the large number of compounds in this class. An interesting update on the metabolism of polymeric bound dyes is presented. 12. "Agricultural Chemicals" (C. T. Bedford and C. J. Logan). 13. "Industrial Chemicals and Miscellaneous Organic Compounds" (C. T. Bedford and I. J. G. Climie). The PCBs are extensively covered. Formic acid, rather than formaldehyde, appears to be the toxic species associated with methanol metabolism. 14. "Cancer Chemotherapeutic Agents" (G. F. Kolar). That this topic deserves a special chapter is exemplified by the authors' comment "guiding principles for planning the structures of effective cytotoxic agents are an outstanding need" and perhaps metabolic considerations can play an important role in certain design strategies.

The new volume still seems most appropriate as a library reference or as a personal copy only to those specifically working in the area of drug metabolism. In this regard, the compound and metabolite index is an asset. It is unfortunate that an author index no longer appears in this volume.

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