Book Reviews

The Chemistry and Biochemistry of Plant Proteins. Edited by J. B. Harborne and C. F. Van Sumere. Academic Press, London. 1975. 15 × 23.5 cm. vii + 326 pp. $30.75.

This volume is No. 11 of the Annual Proceedings of the Phytochemical Society. It is based on a series of review lectures presented at an international symposium at the University of Ghent, Belgium, in Sept 1973. The year and a half delay in publishing the reviews is mitigated slightly by occasional updating with 1974 references.

Although some of the topics discussed may apply equally well to studies of animal proteins, there are sufficient differences to justify a volume dedicated solely to plant proteins. In the preface the editors mention the world food shortage as a justification for this book. It is unfortunate that those chapters having the most direct applications to this problem are the more poorly written ones in the collection. In general, however, the chapters are well written and abound with primary references. There are also author and subject indices which greatly increase the book's usefulness.

From the chapter list below one may determine the wide range of subjects covered. Some of these (especially 1 and 2) may be used as starting points for those interested in entering the field. Others (5, 6, and 7) serve as summaries of present understanding of plant protein synthesis in the whole cell as well as in organelles. I found the other chapters to be of less general interest, but certainly workers in the individual areas will find the reviews to be very worthwhile. The chapter on protein sweeteners may be of interest to many medicinal chemists.

In summary, this volume provides a good review of recent, and some not so recent, findings on plant proteins. However, it is unlikely that personal ownership would be advantageous unless one is directly involved with one of the reviewed areas.

Abridged chapter titles (authors) are 1, Amino-Acid Sequence Analysis (Boulter and Ramshaw); 2, Immunochemical Investigations (Daussant); 3, Storage Proteins (Stegemann); 4, Proteins of Barley (Préaux and Lontie); 5, Protein Synthesis in Higher Plants (Ciferri); 6, Biogenesis of Plant Mitochondria (Leaver); 7, Biogenesis of Chloroplasts (Parthier et al.); 8, Plant Proteins and Phenolics (Van Sumere et al.); 9, Protein Sweeteners (Inglett); 10, Proteins and Taxonomy (Vaughan).

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Chemotaxonomy of Flowering Plants. 4 Volumes. By R. Darnley Gibbs. McGill-Queen's University Press, Montreal and London. 1974. 2372 pp. $135.00.

Such an encyclopedic handbook is impossible adequately to review. Its full worth and scholarship can really be appreciated only through use. Since its appearance, I have had many opportunities to consult it in connection with work on some of the most obscure and poorly known plant families, and my admiration of it increases with each consultation.

Chemotaxonomy represents a very new field the potentialities of which are still only partially recognized. The academic and practical aspects of this field will develop to their fullest extent only when handbooks summarizing our vast but widely scattered information on comparative phytochemistry are available to botanists and chemists. Two such works are now available: Hegnauer's *Chemotaxonomie der Pflanzen* and Gibbs' *Chemotaxonomy of Flowering Plants*. These two monumental publications will long stand as foundations for the great advances in chemotaxonomy destined for the coming decades.

Gibbs' work—dedicated only to the flowering plants or angiosperms—has been written in a more detailed style than has Hegnauer's, which covers the whole Plant Kingdom. It attempts to interpret available data more critically, especially from the level of orders.

Volume I begins with discerning discussions of taxonomy—its history, categories, problems—and other preliminary topics such as chemical evolution in plants, tests used by the author, etc. An admirable originality in approach characterizes the treatment of these topics. They are made to come alive. Concluding this introductory section, Gibbs says: "This book has at least one merit, and one not to be belittled. It points out, again and again, the many gaps, some little, some vast, in our knowledge of comparative chemistry.... It will soon be too late to close some of the gaps.... There is an urgency about this.... Who knows what plants of potential medical or other value, quite apart from their scientific interest, have already gone the way of the dodo?"

The remainder of Volume I—some 600 pages—is devoted to a discussion of specific chemical categories and where they occur in the Plant Kingdom: alkaloids, carbohydrates, coumarins, glycosides, ketones, and many others. The first 190 pages of Volume II continue this discussion.

The last 290 pages of Volume II and all of Volume III are taken up with classification and chemotaxonomy from the botanical viewpoint. The chemical constitutions of orders, families, and genera are reviewed according to the plants and their relationships.

Volume IV comprises a bibliography of some 950 items, an extraordinarily detailed index of 285 pages that provides an invaluable key to utility of the whole work and an addendum in which Gibbs optimistically tries to keep abreast of rapid-fire research during the lag of publication of his four volumes. The introduction to this addendum has a paragraph indicative of Gibbs' perfectionist yearnings yet stating a sentiment long overdue in print: "Finally, a word of sorrow! Many chemists continue to examine well known plants while hundreds of others, tremendously interesting to students of orders, await their attention". Perhaps the appearance of this magistral work will stimulate more attention to some of the thousands upon thousands of chemically unknown plants.

To me, Gibbs' *Chemotaxonomy of Flowering Plants* is unique in several respects. First, it is an encyclopedic work equally usable and valuable to chemist and botanist. Second, it is original in outlook. Third, it is characterized by the skillful integration of vast amounts of the author's own research results with material from literature sources. Fourth, it is eminently direct in organization and extremely easy to use.

The price might, at first, appear frightening. When one scans the immense coverage of these four volumes, appreciates the fine standards of publication—including the superb printing, excellent paper, and strong binding—and realizes that the work is in itself, a library, one must agree that $135 is a bargain. An average of $34 a volume is indeed a reasonable price today for such a treasure.

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Nuclear Medicine. Edited by Henry N. Wagner, Jr. HP Publishing Co., New York, N.Y. 1975. xvi + 255 pp. 21 × 28.5 cm. $18.95.

In contrast to Wagner's previous multiauthored text entitled, "Principles of Nuclear Medicine" (Saunders, 1968), this book is not intended to be utilized as a standard reference work for the nuclear medicine specialist, but rather it is designed to be of

particular value to medical practitioners, residents and interns, medical students, medically oriented basic scientists, and allied health professionals seeking an introduction to the encompassing area known as nuclear medicine. Nearly all of the chapters appearing in this text were published as individual segments in Hospital Practice from 1968 to 1974 and have been revised, expanded, and updated by the authors in Nov 1974. The book is divided into four sections: (1) the history of nuclear medicine; (2) technology, including instrumentation, computers, color images, radiopharmaceuticals, and radiation risks; (3) diagnosis and therapy, and (4) radioassay. The text is attractively illustrated and selectively referenced. Particularly noteworthy chapters which set this book apart from previous nuclear medicine texts are "How It Began" by Meyers, "Computers" by Wagner and Natarajan, and "Radiation Risks" by Adelstein. In addition to a lucid discussion on benefit–risk ratios, Adelstein has introduced the concept of cost effectiveness for various nuclear medicine procedures. Outstanding chapters in the diagnosis and therapy section include "Blood and Blood-forming Organ" and "The Reticuloendothelial System", both by McIntyre, and "Cerebral Circulation" by Wagner.

The book clearly illustrates the interdependence of nuclear medicine on chemistry, physics, electrical engineering, and computer science, in addition to the more obvious disciplines of biochemistry and physiology. The text is clear, concise, well organized and illustrated, and reasonably priced considering the quality and quantity of the illustrative material. The book clearly achieves its goal of filling the void in available nuclear medicine text geared toward those individuals who are not specialists in nuclear techniques and applications.

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Ion Mass Spectra. By Robert G. Wilson. Wiley-Interscience, New York, N.Y. 1974. vii + 432 pp. 21.5 × 28 cm. $20.95.

This book is an atlas of the ion mass spectra of 100 elements and inorganic compounds reproduced as they were obtained from a low-voltage, moderate pressure, hot filament ion source instrument. The data will be valuable to those researchers concerned with the generation and/or application of ion beams and with mass spectrometry as a method; it has little relevance for the medicinal chemist.

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Pharmacokinetics. By Milo Gibaldi and Donald Perrier. Marcel Dekker, New York, N.Y. 1975. xi + 329 pp. 15.5 × 23.5 cm. $19.50.

This is the first volume in the new *Drugs and the Pharmaceutical Sciences* series of textbooks and monographs. According to the editor of this first volume, James Swarbrick, the series is designed to enable the pharmacist and others in the health sciences field to stay abreast of the changing trends, advances, and innovations associated with drugs and that body of knowledge that has come to be known as the pharmaceutical sciences.

Pharmacokinetics has gained considerable clinical importance during the last 15 years but, more recently, the growth has been of a somewhat exponential nature. At the same time the number of books of any kind on this important subject has been scarce. This volume is therefore a welcome addition and brings together the fundamental principles, mathematical methods, and applications of pharmacokinetics. Traditionally, pharmacy students, save pharmacokineticists, have not had a very strong background in calculus. This book will be especially useful to these students because some mathematical methods have been approached with Laplace transforms.

The subject matter has been treated in nine chapters covering 266 pages followed by nine appendices covered in 51 pages. The first three chapters are a treatise on compartment models and the next two discuss bioavailability and apparent volume of distribution. Chapters 6 and 7 deal with the kinetics of reversible pharmacologic effects and nonlinear pharmacokinetics. Chapter 8 is devoted to route of administration and drug disposition, and chapter 9 discusses the dosage regimen adjustments in renal impairment.

The appendices deal with such methods as Laplace transforms, solving linear mamillary models, residuals, trapezoidal rule, principle of superposition, and experimentally determined rates. Wherever possible, current literature has been cited; e.g., there are at least five references as recent as 1974, three of which belong to the authors and one is coauthored by the senior author of this volume. Similarly, instead of banking heavily on imaginary or hypothetical data, research data from the literature are used liberally to correlate the theoretical principles.

This first volume reviews very concisely the pharmacokinetic topics of current interest and will be a very useful reference for scientists involved in those areas where pharmacokinetic principles are used. Also, this volume promises to be an excellent textbook in pharmacokinetics but only on a graduate level.

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Biopharmaceutics and Pharmacokinetics. An Introduction. Second Edition. Edited by R. E. Notari. Marcel Dekker, New York, N.Y. 1975. x + 285 pp. 15 × 23 cm. $13.75.

The purpose of this book is to attempt to introduce the basic theory and applications of biopharmaceutics and pharmacokinetics to students and a wider group of people.

The very short first chapter, rather inconsistently entitled Bioavailability, is more like an introduction to the book. The next two chapters stress the theoretical aspects. As no prior knowledge of calculus and kinetics is assumed on the part of the reader, classical mathematical derivations (a few can be found in the Appendix) are deliberately avoided in the text. Instead, the approach that is adopted throughout the book is to explain the meaning and applications of pharmacokinetic equations with as little use of mathematics as possible. Chapter 2 introduces the reader to the principles of compartmental modeling and focuses attention on the one- and two-compartment models. This chapter, like others in the book, contains many numerical examples and test problems which should be very useful to the reader. The last section (Chapter 6) is a collection of problems aimed to test the overall understanding of the reader. Chapter 3 elaborates on the various procedures commonly used to obtain pharmacokinetic parameters of drugs from blood level and urinary excretion data.

Chapter 4 is application oriented and points out how principles discussed in earlier chapters can be used to improve drug therapy. It concentrates on the relationship between blood levels of drugs and biological response and methods and dosage forms (sustained-release products) that are or can be used in clinical practice to obtain optimum blood levels. This chapter also includes a section on the fundamentals of drug absorption from the gastrointestinal tract.

Chapter 5 should be the most interesting section of the book to medicinal chemists. It deals with the effects of molecular modifications of drugs on their stability and pharmacokinetic properties, an area that has not received much attention. With progressively more clinical applications of pharmacokinetics appearing in the literature, the medicinal chemist who understands this area may find it quite valuable as a powerful aid in the synthesis of safer and more effective drugs.

Chapter 5, not found in the previous edition, is an interesting addition. Other improvements include an updated and revised discussion of the subject matter and the inclusion of a list of leading references at the end of each chapter. Not everybody familiar with the older edition may agree that the modified order of presentation found in this edition is substantially better.

There is an acute paucity of introductory books in this area. While this fact by itself may make this book valuable, the author deserves credit for a text that is fairly self-sufficient and not very difficult to read. While many people involved in self-study may

profit from this book, it will be most useful in a course where it finds companion explanations and clarifications by the instructor.

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Molecular and Quantum Pharmacology. Proceedings of the Seventh Jerusalem Symposia on Quantum Chemistry and Biochemistry held in Jerusalem, March 31–April 4, 1974. Edited by Ernst Bergmann and Bernard Pullman. D. Reidel Publishing Co., Dordrecht, Holland. 1974. 591 pp. 16 × 24 cm. $54.00.

This book is a collection of papers presented by many of the world's leading contributors to quantum pharmacology, plus a scattering of papers on linear free energy–SAR studies and molecular pharmacology. There are 86 authors of 40 papers. As a collection each paper gains from the proximity of other papers. Not all of the work reported has been published elsewhere; that which has gains perspective in the somewhat more relaxed style of a symposium volume. The book does include a record of at least some of the discussion following each paper. In general, this is only a page or two. Because of each of these features the volume represents a reasonable state-of-the-art view of certain aspects of quantum pharmacology and may be useful to both researchers and newcomers to the field.

The quantum pharmacology papers comprise approximately two-thirds of the book. They deal almost exclusively with the calculation of conformation. In addition, several papers report the results of the experimental determination of conformation by NMR or x-ray methods. Studies on the neurotransmitters, anticholinergics, phenothiazines, amphetamines, iprindole, antiepileptic drugs, antihistamines, amino acids, gastrin, LH-RF, TRF, depsipeptides, prostaglandins, narcotic analgetics, and thyroxine analogs are reported. In view of this emphasis on conformation, very little attention is paid to the thermodynamic considerations of the relevance of a solution or crystal conformation to the interaction of the drug with the receptor. Roberts and Portoghese each briefly address this issue, and it is discussed briefly after the paper by the Camerons. There seems to be a need for a convention for the labeling of the conformational energy maps in that it is not always clear about which bonds the rotation is considered to occur, nor what conformation corresponds to 0°.

The papers which do not deal with conformation include three papers on various aspects of purines, pyrimidines, and DNA: one each on the sodium channel, the ellipticines, anesthesia, imidazole tautomerism, and the Hansch approach; and two on hydrophobicity.

The mark of Pullman is seen throughout the volume; in most of the discussions he asked a question, and he has added conformational energy maps calculated in his own laboratory to the discussion of several papers.

There are a rather large number of typographical errors which mar the elegance of the book. The volume contains no author or subject index. Hence, it is very difficult to discover what compounds are considered unless one reads the whole book.

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Methods in Enzymology. Volume XXXVI. S. P. Colowick and N. O. Kaplan, Editors in Chief. Hormone Action. Part A. Steroid Hormones. Edited by Bert W. O'Malley and Joel G. Hardman. Academic Press, New York, N.Y. 1975. xviii and 573 pp. 15 × 23.5 cm. $36.50.

The considerable interest in the modes of action of hormones is evidenced by the large number of papers dealing with these topics which have appeared in the last 10 years. These publications are scattered throughout the scientific literature and are not easy to assemble. Particularly, it is difficult to seek out and critically evaluate information on the approaches and methods used. Frequently the experimental procedures are described in an abbreviated manner with many essential details left out. Therefore the decision of Drs. S. P. Colovick and N. O. Kaplan, the Editors in Chief of *Methods in Enzymology*, to publish a series of volumes dealing with the methodological aspects of hormonal action is highly commendable.

Drs. B. W. O'Malley and J. G. Hardman are the Editors in charge of the volumes on hormone action. Steroid hormones are the subject of the first volume of this group of publications (*Methods in Enzymology*. Volume XXXVI). Additional volumes (XXXVII–XL) dealing with other aspects of modes of hormonal action are in preparation. The decision of Drs. O'Malley and Hardman to deal first with steroid hormones will be most welcomed by those involved in investigations of endocrinology, biology, and biochemistry of steroids.

The volume is divided into seven major sections: (1) Hormone-Binding Proteins and Assays for Steroid Hormones, (2) Serum-Binding Proteins for Steroid and Thyroid Hormones, (3) Cytoplasmic Receptors for Steroid Hormones, (4) Nuclear Receptors for Steroid Hormones, (5) Purification of Receptor for Steroid Hormones, (6) Steroid Hormone Effects on Biochemical Processes, and (7) Isolation of Biologically Active Metabolites of Steroid Hormones.

A well-presented mathematical treatment of the "Theory of Protein-Ligand Interaction" is given by D. Rodbard and H. A. Feldman in Section 1. The authors make the important comment that curve fitting should be performed in terms of the variables which are actually measured. They point out that subtractions of "blanks" may introduce systematic errors which could lead to spurious interpretations. They also stress the need to use weighted procedures, because the "uniformity of a variance" cannot be assumed without prior proof. The "Practical Guide" included in this article, though somewhat too concise, will be useful to many investigators.

The rest of the book is descriptive, albeit certain articles include some minor mathematical treatment. However, in general no attempt was made to relate the mathematical model(s) to the various topics. The selection of the subjects does cover the broad scope of problems related to steroid hormone action.

The numerous experimental procedures are described in a clear manner and include sufficient details for the facile operation of the methods. The inclusion of technical "tricks" is of great importance since these frequently determine the success of the method and make laboratory life bearable.

This is a valuable volume which will be of use to the advanced investigator and of great help to the uninitiated in the field.

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Pre- and Postsynaptic Receptors. Edited by Earl Usdin and William E. Bunney, Jr. Volume 3 of a series on Modern Pharmacology–Toxicology. Marcel Dekker, New York, N.Y. 1975. xvi + 337 pp. 16 × 23.5 cm. $29.75.

This volume presents the proceedings of a study group held at the Thirteenth Annual Meeting of the American College of Neuropsychopharmacology, San Juan, Puerto Rico, in December 1974. The 13 presentations by distinguished and active researchers covered the current state-of-the-art of both techniques and current theories in this rapidly developing field of research.

The role that neuronal receptors play in our understanding of the modes of action and side effects of many psychoactive agents and in the therapy of neurological diseases need not be reemphasized. The functions of the pre- and postsynaptic neuronal receptors are reviewed in detail from a variety of viewpoints in this book and the involvement of the cAMP system in both the post- and presynaptic amplification system following ligand binding is reported. Even though this book focuses primarily on dopamine as a neurotransmitter and the receptors involved in this system, new work on the morphine receptor and the pineal β-adrenergic receptor is also presented. Discussed also in this book are the possible implications of the new understanding of neuronal receptors for the systematic study of neuronal receptor function in man.

This reviewer was pleased to find an intriguing discussion of the structure–activity relationship for agonist and antagonist drugs

at pre- and postsynaptic dopamine receptor sites and to find the only two chemical structures in this volume, in this chapter. The structure for butaclamol is shown indicating the absolute configuration at all asymmetric centers for the (+) and (−) enantiomers. Unfortunately, however, the (+) and (−) enantiomers were not identified in relationship to the absolute configuration (only one of these enantiomers is biologically active).

This volume will certainly be of interest not only to those chemists, pharmacologists, and clinicians currently involved in the many aspects of research with neurotransmitters and drugs such as catecholamines, prostaglandins, acetylcholine, and opiates but in a much broader sense also to those involved with drugs affecting cell membrane receptors, peptide hormones, growth hormone, prolactin, follicle-stimulating hormone, or any of the many drugs known also to bind to target cells.

The editors and the publishers of this volume are to be particularly commended for making this book available only 6 months after the symposium, for its uniformly readable style, and for including a subject and author index.

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