

## Book Reviews

**Progress in Inorganic Chemistry, Volume 23.** Edited by STEPHEN J. LIPPARD (Columbia University). John Wiley & Sons, Inc., New York, N.Y. 1977. v + 394 pp. \$25.95.

Volume 23 continues the tradition of this series by providing concise in-depth reviews of selected areas of inorganic chemistry. Structural aspects of selected metal complexes and coordination numbers are the theme of this particular volume.

The first chapter, by D. L. Kepert, examines the stereochemical effects resulting from the introduction of bidentate chelate rings into the coordination sphere of six-coordinate complexes. The review is more closely limited to complexes containing not more than two chemically dissimilar donor atoms in order to focus attention on the primary coordination geometry rather than the secondary distortions often resulting from different types of donor atoms. A theory which assumes a fixed "normalized bite" (defined as the distance between donor atoms of the chelate divided by the metal-donor atom distance) for bidentate ligands, and is less complicated than purely metal-centered theories, is advanced. Predictions and explanations of tris(bidentate); bis(bidentate) bis(unidentate); and (bidentate) tetrakis(unidentate) ligand structures incorporating this theory are then presented.

Chapter 2, by Michael G. B. Drew, is an excellent and comprehensive review of seven-coordinate chemistry of metal complexes—an area which has grown tremendously since the last review considering seven-coordination in 1967. The discussion is separated into three major areas. A survey of ideal seven-coordinate polyhedra and/or isomers is presented first. The second area concerns structures of seven-coordinate complexes determined via diffraction methods while the third area describes other complexes prepared and characterized, but not necessarily by diffraction methods. A final, much smaller section very briefly describes other aspects such as reaction mechanism and spectra. Those seven-coordinate complexes covered in the review are defined as containing seven metal-ligand bonds having at least some covalent character. As a result, ionic complexes of groups 1A and 2A are excluded. Organometallic complexes, excepting carbonyls and alkyls and aryls bonded through one carbon atom, are also excluded. References are current to 1976.

The third chapter, by Derek J. Hodgson, reviews the stereochemistry of metal complexes of nucleic acid constituents such as purines, pyrimidines, and nucleosides and nucleotides. The scope of the review covers solid-state structures determined (primarily by diffraction methods) for the above complexes between 1967 and 1976. Structural evidence is presented for metal bonding at purine sites contrary to those predicted. Similar studies of the other complexes mentioned illustrate the possibility of using simple systems as models for their more complex counterparts.

Chapter 4, by Luigi G. Marzilli, surveys the chemical knowledge accumulated in the very complex area of metal-ion interactions with nucleic acids. Because of the extent of this area, the results are approximately arranged by nature of the biological molecule (monomer or polymer), nature of the metal (inert or labile complexes), and the techniques used in the investigations. In contrast to Chapter 3, solution studies, especially those using nuclear magnetic resonance techniques, are of paramount importance in this chapter. The extensive references and an addendum provide coverage through at least part of 1976.

A Cumulative Index for Volumes 1-23 is included in this volume.

Daniel J. Strope, *Phillips Petroleum Company*

**Structure and Function of Monoamine Enzymes (Modern Pharmacology-Toxicology Series, Volume 10).** Edited by E. USDIN (NIMH), N. WEINER (University of Colorado), and M. B. H. YODIM (Technion School of Medicine, Haifa). Marcel Dekker, Inc., New York. 1977. xxvi + 996 pp. \$65.00.

This book is a collection of papers presented at a conference of the same title in Steamboat Springs, Colo., in March 1977. As such, it is remarkably comprehensive and there is very little overlap among

the 45 chapters by more than 100 authors. It comes close to being a textbook, although, unfortunately, it lacks an index. The unusually rapid publication is very welcome.

The title might mislead one to believe that the book is concerned solely with enzymology. Although enzymology is thoroughly covered, virtually all aspects of catecholamine and indoleamine metabolism and function are included. The organizers of the conference were fortunate in being able to assemble many of the most important workers in the field, despite the lack of financial support for the conference (bemoaned in the Preface).

To most newcomers, the literature on the monoamines is vast, confusing, and sometimes conflicting. The chapters in this book should help immensely, often answering questions not clearly answered elsewhere. The book is thus timely in a burgeoning field.

Here one can find authoritative discussions on the bewildering array of data on the effects of  $\text{Fe}^{2+}$ ,  $\text{Ca}^{2+}$ , cyclic AMP, phospholipids, and cofactor and substrate concentrations on in vitro tyrosine hydroxylase activity (Kaufman, Weiner, Roth, and Lloyd), as well as those of neural stimulation (Roth), hormones (Hanbauer and Thoenen), and pharmacological manipulations (Reis and others). There is also much on the possible activation of phenylalanine, tyrosine, and tryptophan hydroxylases by cyclic AMP-dependent phosphorylation (Weiner, Roth, and Waymire). Other synthetic and degradative enzymes are discussed in detail.

The induction of synthetic enzymes in the adrenal medulla (Costa, Thoenen, and Otten), sympathetic ganglia (Hanbauer), and central nervous system (Reis) is dealt with by the leaders in this field. The control of monoamine biosynthesis and degradation is discussed by several authors, not omitting the control of neurotransmitter content by precursor availability (Wurtman). Immunohistochemical localization of catecholamine-metabolizing enzymes is discussed (Pickel), although the neuroanatomical distribution of monoamine-containing neurons is not.

Some chapters are also concerned with techniques for measuring the monoamines and their metabolites, including mass spectrometry (Neff) and electrochemical detection (Adams), the latter being used in vivo to measure catecholamine release. The question of the relationship between measures of cerebrospinal fluid, plasma and urinary metabolites, and plasma enzymes, including platelet monoamine oxidase and central and peripheral catecholaminergic function, is also taken up (Buchsbaum, Kopin, and others). This leads into the final section which contains excellent reviews of human studies of monoamine metabolism in affective illness (Bunney) and schizophrenia (Barchas).

Major omissions are any discussion of neuronal re-uptake mechanisms, or of pre- or postsynaptic receptors. It is unfortunate that the plans to include the conference discussion had to be abandoned; much important material was thus lost. It is also mildly distracting that the figures and tables are grouped together at the end of each presentation.

In the absence of any authoritative text on the monoamine neurotransmitters, this book may become a landmark. It is easily the best available book on catecholamine and indoleamine metabolism and will make an important addition to any neurochemist's or neuropharmacologist's library. It is unfortunate that the very high price will preclude its wider use.

Adrian J. Dunn, *University of Florida*

**The Total Synthesis of Natural Products, Volume 3.** Edited by JOHN APSIMON (Carleton University, Ottawa). Wiley-Interscience, New York. 1977. ix + 566 pp. \$35.00.

The previous two volumes of this series, published in 1973, contained chapters describing the total synthesis of a variety of natural products, including carbohydrates, prostaglandins, pyrrole pigments, nucleic acids, antibiotics, oxygen heterocycles, terpenes, and steroids. The new third volume is devoted entirely to the total synthesis of alkaloids.

The book consists of three chapters, each written by an acknowledged and active practitioner of the art of alkaloid synthesis. The first and largest chapter (272 pp), by T. Kametani, covers the very broad field of isoquinoline alkaloids. The author's exhaustive and detailed treatment (with 524 references) makes this virtually a book within a book and the most valuable compendium now available on isoquinoline alkaloid synthesis.

The second chapter, by J. P. Kutney, concerns the synthesis of indole alkaloids, another broad and complex area which has attracted the attention of some of the greatest masters of organic synthesis of our time. The author has admittedly eschewed an encyclopedic presentation of all of the available literature. He has given us, however, a beautifully organized and lucid overview of the field, which certainly is the best review of its kind. Starting with an introduction on general synthetic methods for indoles, he leads us on a synthetic tour of some fourteen different indole alkaloid families.

The third and last chapter, by R. V. Stevens, is entitled simply "Alkaloid Synthesis", and is quite different in nature from the previous chapters. Rather than surveying the synthesis of any one alkaloid type or family, the author is here giving us a rather personalized short course on general principles and planning in alkaloid synthesis. Using a number of case studies from his own research, as well as studies by others, he guides us in a fascinating and elegant manner through a number of selected syntheses of a variety of alkaloids, including those of the mesembrine, *Amaryllidaceae*, *Lycopodium*, pyrrolizidine, and pyridine types. In short, this chapter provides the reader with some rare insight into creative thinking in synthesis.

There is no doubt that this book must be viewed as indispensable by an organic chemist with a serious interest in alkaloid synthesis.

Michael P. Cava, *University of Pennsylvania*

**Enzyme Structure and Mechanism.** By ALAN FERSHT (MRC Laboratory of Molecular Biology, Cambridge). W. H. Freeman and Co., San Francisco. 1977. xvii + 371 pp. \$20.00, cloth; \$9.95, paper.

This book is a clearly written general introduction to enzymology. The initial chapters on three-dimensional structure of enzymes and chemical catalysis are followed by rudimentary discussions of enzyme kinetics, pH dependence of enzyme rates, and descriptions of the experimental techniques used to measure the rates and equilibria of enzymatic reactions. Throughout these chapters examples of well-studied enzymes are used to demonstrate fundamental principles. There is a gratifying tendency to relate the theory discussed with the experimental means used to make the relevant measurements. Following chapters are devoted to allosteric interactions, cooperative binding, substrate binding energies, enzyme-substrate complementarity, and specificity. The last chapter provides a number of specific examples of enzyme mechanisms including those of the dehydrogenases, proteases, nucleases, and glycolytic enzymes.

This volume would serve as an effective text for an introductory

course in enzymology or as a readable account of the field for the nonspecialist.

D. J. Hupe, *The University of Michigan*

**Mass Spectrometry in Drug Metabolism.** Edited by ALBERTO FRIGERIO ("Mario Negri" Institute for Pharmacological Research, Italy) and EMILIO L. GHISALBERTI (University of Western Australia). Plenum Press, New York. 1977. xii + 532 pp. \$42.50.

This book is a compilation of papers presented at an international symposium on the use of mass spectrometry in the study of drug metabolism held in Milan, Italy, in June 1976. Most were contributed papers but there are included as well several invited papers reviewing selected areas of techniques and applications. The papers deal with three major areas of interest: drug metabolism, methodology, and drug abuse. The first section is concerned with recent results and developments in the area of drug metabolism, including identification of metabolites, quantification studies, and reactivity of intermediates. The second area covered is developments in methodology, including new ionization techniques, use of stable isotopes in drug metabolism, and ancillary instruments such as capillary columns, pyrolyzers, and computers. The final section deals with drug abuse.

The broad range of topics and the mixing of review articles and original papers provides the reader with a comprehensive account of the current status of mass spectrometry in drug metabolism research and a detailed insight into a variety of applications of current interest for pharmacologists, biochemists, and biomedical scientists.

Margaret L. Johnson, *University of Michigan*

**Fluorine Chemistry Reviews. Volume 8.** Edited by PAUL TARRANT (University of Florida). Marcel Dekker, Inc., New York. 1977. viii + 206 pp. \$29.50.

The eighth volume of this well-established series maintains the level set by earlier volumes and presents a good assortment of topics. The review of halogen derivatives of group VI oxy acids by Aubke and Desmarreau is a very readable account of these unusual compounds. As reviews should but often fail to do, it includes some mention of fields not yet plowed in this research area and also refers briefly to compounds like  $\text{CF}_3\text{OF}$  and  $\text{CF}_3\text{COOF}$  whose chemistry is related to but not included in the main topic. The section on preparation and reactions of fluoromethylenes by Burton and Hahnfeld is an exhaustive review of a small but important area, with almost 300 references listed. Filler's article on effects of the pentafluorophenyl group on reactivity is a useful addition to previous treatments of the synthesis and properties of perfluoroaromatic compounds, although somewhat lacking in critical comment. As presented here, the fourth topic, ionic addition of halomethanes to fluoroolefins, does not really merit its own review since only two addends are considered. The data and discussion are rather trivial and the article's effectiveness would have been improved by severe editing.

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