Book Reviews

The Bioorganic Chemistry of Enzymatic Catalysis. By Myron L. Bender, Raymond J. Bergeron, and Makoto Komiyama. Wiley, New York. 1984. xiii + 312 pp. 16 × 23.5 cm. ISBN 0-471-05991-9. $39.50.

The intent of the authors has been to provide a textbook which bridges the gap between organic chemistry and biochemistry by indicating the relevance of basic principles of organic chemistry to the understanding of the complexities of enzymatic reaction mechanisms. The authors have succeeded admirably and in so doing have produced an extremely well-written, logically organized account that should be of general value to medicinal chemists, biochemists, pharmacologists, (bio)organic chemists, and enzymologists, and of special value to those in this diverse group who are particularly interested in designing mechanism-based inhibitors of specifically chosen enzymes as selective chemotherapeutic agents.

The topics covered in the first seven chapters of the book include proton transfer reactions (specific and general acid/base catalysis), catalytic effects of salts and solvents, and nucleophilic and electrophilic catalysis. The emphasis in these chapters, as in the rest of the book, is on the understanding of basic physical chemical principles which are illustrated with subsequent examples of enzyme mechanisms specifically relevant to these principles. The final five chapters discuss (1) coenzymes, whose chemical properties are emphasized primarily rather than those of the enzyme with which they interact; (2) metal ions as superacid catalysts or redox catalysts; (3) intramolecular catalysis; (4) multiple catalysis in which more than one catalytic mechanism occurs simultaneously; and (5) catalysis by covalent or noncovalent complexation of substrate(s) with the enzyme. The authors, throughout the book, provide criteria for determining the type of catalytic mechanism associated with a specific reaction. Their integrated approach to using enzymes as models for organic reactions and, vice versa, organic reactions as models for enzyme mechanisms, provides a uniquely valuable perspective for the reader.

An essential consideration in the rational design of mechanism-based enzyme inhibitors as chemotherpeutic agents is a clear understanding of the chemical properties of the chosen target site. This volume should greatly assist the medicinal chemist in approaching this aspect of drug design. Although the authors have intended this book as a student text, they have provided such an excellent review of the basic chemical principles of enzyme catalysis that this volume will be of great interest and value to a wide spectrum of scientific researchers.

Roswell Park Memorial Institute **Janice R. Sufrin**
Buffalo, New York 14263

Chemistry and Biochemistry of the Amino Acids. Edited by G. C. Barrett. Chapman and Hall, London. 1985. x + 684 pp. 16.5 × 24 cm. ISBN 0-412-23410-6. $99.

Every so often there appears a volume that, despite some obvious flaws, is a must addition for the serious scientist. This is just the case with G. C. Barrett's "Chemistry and Biochemistry of the Amino Acids". Not since Greenstein and Winitz's definitive work on amino acids published nearly 25 years ago has there been an effort to cover this important field in one comprehensive work. It was clearly an ambitious project to attempt to fill this glaring gap, one that strives admirably to update a quarter-century of progress.

It is typical in multiauthored books that quality of topic coverage varies widely from chapter to chapter, and this volume is no different. Especially noteworthy in their treatment are Chapter 3 on β and higher homologous amino acids, Chapter 5 on metabolic and pharmacological studies, and chapters on peptide synthesis and plant biosynthesis.

One interesting format used in the amino acid synthesis chapter and the chapters describing structures of unusual amino acids is their extensive use of tables with numerous references. Text is sparse, but the tables and references provide a wealth of useful information.

The last half of the book, Chapters 12–22, provide useful introductions to and updates on various chemical and physical methods of analysis or purification. Particularly successful are the sections on gas chromatography, especially as a tool for enantiomeric analysis, X-ray crystallography (despite the daunting array of data), mass spectrometry, and problems associated with amino acid degradation upon hydrolysis. Even though the treatment of hydrolysis is not exhaustive, this material should be required reading for anyone involved in protein/peptide amino acid analysis. Less useful are chapters on ORD and CD and NMR, which both lack proper perspective with too little emphasis on applications, and the section on colorimetry and fluorimetry, which overlaps too much with the chromatography chapters, yet fails to discuss DABITC or DABSYL techniques. The chromatography chapters serve as a good basic introduction to the techniques; however, the experienced chromatographer will note the lack of recent information, especially in the LC chapter, and the out-of-date material on PTH separations. A glaring omission is that of amino acid analysis using PITC, necessitated by its recent introduction in 1984. Yet this technique is the fastest growing AAA method commercially available.

There are also numerous instances of overlaps between chapters (it seems difficult to avoid in edited books with numerous authors), a notable lack of post-1982 references, despite the 1985 publication date, and several weak chapters. Nonetheless, there is a huge amount of useful data in many significant areas, and I find myself reaching for "Amino Acids" on my shelf quite frequently. Every library must have a copy, and those who work with amino acids should have one, too.

Waters Chromatography Division **Steven A. Cohen**
Millipore Corp.
Milford, MA 01757

New Cardiovascular Drugs. 1985. Edited by Alexander Scriabine. Raven Press, New York. 1985. x + 308 pp. 16 × 24 cm. ISBN 0-88167-114-2. $49.50.

This book represents the third volume of an interesting series that appears still to be in search of an identity and an appropriate title. The first two volumes, published in 1983 and 1984, were entitled "New Drugs Annual: Cardiovascular Drugs".

The current volume is a collection of 15 monographs on a wide array of cardiovascular drugs described as reflecting "... the status of cardiovascular drug research in the early 1980s". The contents represent not only interesting agents in clinical trials, but also five drugs marketed in the period 1977–1985.

The chapters of the book are categorized in accordance with the projected therapeutic use: Antihypertensives: diuretics (indacrinone, piretanide), ACE inhibitors (SCH 31846, pentopril, quinapril, β-blockers (bevantolol, esmolol, CGS 10078B), vasodilators (pinacidil), and calcium channel antagonists (nicardipine); Renal Vasodilators (ibopamine); Central Antihypoxic and Antimigraine Drugs (nimodipine); Cardiac Stimulants (acrihellin, milrinone); Antiarrhythmic Drugs (propafenone). All of the chapters for the most part follow the same format, covering aspects of an agent's chemistry, pharmacology, toxicology, metabolism, pharmacokinetics, and clinical experience. They are quite variable as to length (11–39 pages), number of references (11–139), currentness of references (0% newer than 1982 to 68% newer than

1982), and overall quality. A number of chapters contain significant amounts of unpublished data/comments relating to toxicology, clinical trials, and metabolism.

Despite the foregoing, somewhat critical comments, this Reviewer found the book to be a potentially valuable resource that should be in the libraries of pharmacologists and medicinal chemists working in the cardiovascular field. Noteworthy in this respect is the inclusion of toxicology findings. Medicinal chemists generally find it easy to locate or generate pharmacological data on standard agents for comparison with their candidate drugs; toxicology data on standards, however, is often difficult to find. The book is well-produced and relatively error free, and for a biologically oriented book, it contains chemical structures that are a pleasure rather than a horror to look at. The subject index is adequate, though not extensive.

Future volumes, if this series is to be continued, would benefit from inclusion of a cumulative index to Volumes 1–3, a clearer statement in each chapter as to the current developmental status of the agent in the U.S., and a more rigorous exclusion of chapters of marginal quality. Consideration should also be given to making the title more consistent with the contents, in deference to the naive purchaser.

Chemical Research Department **Richard C. Allen**
Hoechst-Roussel Pharmaceuticals Inc.
Somerville, New Jersey 08876

Metal Ions in Biological Systems. Volume 19. Antibiotics and their Complexes. Edited by Helmut Sigel. Marcel Dekker, New York and Basel. 1985. xxvi + 429 pp. 16 × 23.5 cm. ISBN 0-8247-7425-6. $85.00 (U.S. and Canada); $102.00 (other countries).

The discovery of ionophores resulted, about 20 years ago, from studies of bioenergetics, i.e., how mitochondria convert metabolic energy into ATP. From observations on inhibition of this process by guanidines and other relatively simple organic compounds to the use of valinomycin and other peptide antibiotics, it became apparent to B. C. Pressman and others that channels for cations were being created in mitochondrial membranes. Since then, a number of other antibiotics have been found to have the property of creating ion channels or of ion carriers, and this volume is concerned mainly, but not wholly, with this aspect of antibiotic–metal complexation. The relatively broad area of medicinal chemistry that became subject to this explanation of activity might best be illustrated by a quotation regarding the biological effects of monensin. "In addition to its aforementioned effects in increasing cardiac contractility, dilating coronary arteries, and promoting lymphocyte capping, monensin also stimulates the release of epinephrine from adrenals in the intact animal as well as isolated chromaffin cells, stimulates the release of prostaglandins from the renal medulla, the release of serotonin from platelets, but inhibits the secretion of procollagen from cultured fibroblasts and enzymes from pancreatic acinar cells".

The volume opens with an account by Pressman of the chain of events leading to the discovery of ionophores. This is followed by a chapter on tetracyclines and daunorubicin, not considered ionophores, which is concerned with their proton and metal binding properties. The interaction of metal ions with streptonigrin and its resulting antitumor activity is next considered. This is followed by a chapter on the bleomycin antibiotics and their metal complexes. These antibiotics are also not categorized as ionophores.

The following chapters on valinomycin; beauvericin and other enniatins; gramicidins; nactins; the monovalent and polyvalent carboxylic ionophores: lasalocid, monensin, calcimycin, and related antibiotics, are concerned with metal ion transport systems. The volume concludes with chapters on metal complexes of D-cycloserine and related amino acids; the iron-containing antibiotics, which may function to transport both iron or toxic ligands into or out of bacterial cells; and quantification of the factors underlying selective complexation by means of theoretical computation, by Gresh and A. Pullman. Through the common property of metal ion complexation, a diverse set of transport mechanisms has evolved, and the "molecular strategies for complexing and discriminating between cations ... challenge our most sophisticated technology".

These topics should be of interest to all medicinal chemists, as well as biochemists, pharmacologists, pharmaceutical scientists, and those whose interests fall in the overlapping areas of bioorganic and bioinorganic chemistry. The book follows the usual standards of writing, printing, and illustration that has characterized this series, and has 43 pages of author and subject indices. The editor and authors are to be congratulated for a most interesting treatment of a subject becoming of much importance.

Massachusetts College of Pharmacy and Allied Health Sciences **William O. Foye**
Boston, Massachusetts 02115