Additions and Corrections

Vicinal ^{113}Cd,^{1}H$^{\beta}$-Cysteine Coupling in Cd-Substituted Metalloproteins Follows a Karplus-Type Dependence [*J. Am. Chem. Soc.* **1994**, *116*, 377–378]. Oliver Zerbe, Dean L. Pountney, Wolfgang von Philipsborn, and Milan Vašák*

Page 377, Figure 1 legend: The Karplus-type relationship should be $^{3}J(\mathrm{Hz}) = c(\cos^{2}\phi) - b(\cos\phi) - a$, where $c = 36$, $b = 13$, and $a = -1$.

Handbook of Industrial Surfactants [*J. Am. Chem. Soc.* **1994**, *116*, 822]. Reviewed by Royston Roberts

The publisher of this handbook should be listed as Gower: Brookfield, Vermont.

Theoretical Analyses of the Tautomeric and Conformational Equilibria of Histamine and ($\alpha R,\beta S$)-α,β-Dimethylhistamine in the Gas Phase and Aqueous Solution [*J. Am. Chem. Soc.* **1994**, *116*, 4898–4909]. Peter I. Nagy,* Graham J. Durant, Wayne P. Hoss, and Douglas A. Smith*

Note Added in Proof: In a recent paper, Worth and Richards[1] found the t3H+ isomer as the dominant structure for the histamine monocation in solution. This difference from our conclusions is attributed to the use of the AMBER force field in the solution simulations. AMBER has been found to underestimate the t3H+ internal energy relative to g3H+ when compared to high-level ab initio calculations[2] and thus too great a weight is given to the solvation term in favor of the trans form.

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(1) Worth, G. A.; Richards, W. G. *J. Am. Chem. Soc.* **1994**, *116*, 239.
(2) Nagy, P. I.; Bitar, J. E.; Smith, D. A. *J. Comput. Chem.* In press.

Double-Exchange and Vibronic Coupling in Mixed-Valence Systems. Electronic Structure of [Fe$_4$S$_4$]$^{3+}$ Clusters in High-Potential Iron Protein and Related Models [*J. Am. Chem. Soc.* **1994**, *116*, 5362–5372]. Emile L. Bominaar, Sergueï A. Borshch,* and Jean-Jacques Girerd*

The following references to the NMR work on HiPIP's should have been included: Banci, L.; Bertini, I.; Capozzi, F.; Carloni, P.; Ciurli, S.; Luchinat, C.; Piccioli, M. *J. Am. Chem. Soc.* **1993**, *115*, 3431–3440; Banci, L.; Bertini, I.; Ciurli, S.; Ferretti, S.; Luchinat, C.; Piccioli, M. *Biochemistry* **1993**, *32*, 9387–9397.

A general reference on NMR studies of iron sulfur proteins is the following: Bertini, I.; Ciurli, S.; Luchinat, C. *Angew. Chem.* **1994**, in press.

Book Reviews

Multiple Bonds Between Metal Atoms. Second Edition. By F. Albert Cotton (Texas A&M University) and Richard A. Walton (Purdue University). Oxford University Press: New York. 1993. xxii + 787 pp. $95.00. ISBN 0-19-855649-7.

This book is a comprehensive treatise of dinuclear metal–metal bond literature prior to 1990 with selected results from 1991–1992 included in a postscript chapter. Admirably, this second edition is not merely a factual revision of the first book but rather a completely reorganized text that reflects the evolution of the metal–metal bond field since the first edition appeared in 1981. As in the first editor, the writing style is concise, interesting, and informative. Sections of the introductory chapter have been rewritten, but the authors wisely chose to include most of the earlier edition's historical overview, which is critical reading for those who plan to enter the field or for those who are interested in fundamental principles of multiply bonded compounds. An important and welcome change is the primary organization of six of the eleven chapters by element rather than metal–metal bond order, which is much more convenient for locating specific compounds. Chapter 5, devoted to triply bonded compounds of the type M$_2$X$_6$, is similar to Chapter 5 in the first edition and is particularly well-done. Chapter 9 on metal–metal bonds in other structural contexts including tri-, tetra-, and hexanuclear clusters, organometallic compounds, and bioctahedra of the edge- and face-sharing varieties is a useful addition. Structural correlations, thermodynamics, and spectroscopic properties of multiply bonded compounds are detailed in Chapter 10, which superficially resembles Chapter 8 in the first edition but is a more detailed account of current theories regarding the solid-state and solution behavior of M–M-bonded compounds. Sections on the intriguing rotational disorder problem found in the packing of quadruply bonded compounds in the crystalline state and the theory of internal flips of the M–M unit have been added to the structural discussion in Chapter 10. Throughout the book, the authors provide useful tables of compounds arranged according to bond order and ligand type, and there are ample illustrations, equations, and figures to guide the reader. Acronyms for ligands are defined in footnotes to the tables and in the text. Literature references are current and comprehensive, and the index is very well-done.

By providing this timely revision of their first book, which covered the first two decades of the field, the authors have once again succeeded in producing a useful reference book and an excellent special topics teaching text. This book fills a void in the textbooks of inorganic chemistry, as the compounds described in this monograph are not treated in much detail in any major book dedicated to coordination or organometallic chemistry. The vast nature of the field involving metal–metal bonds between transition elements and its promise for continued expansion are evident from the size of this book, which is approximately 300 pages longer than the first edition. It belongs on the bookshelves of all chemists interested in the synthesis, spectroscopy, and structures of transition metal compounds.

Kim R. Dunbar, *Michigan State University*

Catalytic Asymmetric Synthesis. Edited by Iwao Ojima (State University of New York at Stony Brook). VCH: New York. 1993. 476 pp. $110.00. ISBN 1-56081-532-9.

The development of simple chiral transition metal complexes that catalyze synthetic transformations and produce molecules of high enantiomeric purity is rapidly becoming one of the most prolific areas of research in organic chemistry. This book provides the reader with a detailed account of the most significant advances in catalytic asymmetric synthesis and many excellent lead references.

There are nine chapters dealing with a variety of reactions effected by asymmetric catalysis: Asymmetric Hydrogenation, by H. Takaya, T. Ohta, and R. Noyori; Asymmetric Isomerization of Allylamines, by S. Akutagawa and K. Tani; Asymmetric Cyclopropanation, by M. P. Doyle; Asymmetric Oxidation (Catalytic Asymmetric Epoxidation of Allylic Alcohols, by R. A. Johnson and K. B. Sharpless; Asymmetric Catalytic Epoxidation of Unfunctionalised Olefins, by E. N. Jacobson; Asymmetric Oxidation of Sulfides, by H. B. Kagan; Catalytic Asymmetric Dihydroxylation, by R. A. Johnson and K. B. Sharpless); Asymmetric Carbonylation, by G. Consiglio; Asymmetric Hydrosilation, by H. Brunner, H. Nishiyama, and K. Itoh; Asymmetric Carbon–Carbon Bond Forming Reactions (Asymmetric Allylic Substitution and Grignard Cross Coupling, by T. Hayashi, Asymmetric Aldol Reactions, by M. Sawamura and Y. Ito); Asymmetric Phase Transfer Reactions, by M. J. O'Donnell; Asymmetric Reactions with Chiral Lewis Acid Catalysts, by K. Maruoka and H. Yamamoto. There is also an appendix listing all the catalysts discussed.

The highlight of this book is the chapter on oxidations, which has two outstanding contributions by Sharpless and one by Jacobson on asymmetric C–O bond formation. Their standards of excellence will no doubt provide the bench mark for comparative work for many years.

However, this book is not without flaws. One major criticism is that illustrations of catalysts are at the beginning of most chapters and thus they do not appear with the relevant text. There are also a number of examples of reactions being discussed without a schematic representation.

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Nonetheless, it is an excellent text, and I would highly recommend it to anyone involved in asymmetric synthesis.

P. Andrew Evans, *University of Delaware*

Crown Compounds: Toward Future Applications. Edited by Stephen R. Cooper (Washington University). VCH Publishers: New York. 1992. x + 325 pp. $125.00. ISBN 1-56081-024-6.

The body of literature on crown ethers and related macrocyclic ligands is extensive. Therefore, monographs and books on the subject are crucial to scientists who wish to quickly gain a general knowledge of this fast-moving research area. This volume consists of a series of chapters in which some of the most important contributors to the field of macrocyclic ligands review rather briefly their own research work. The book differs from other recent volumes on the same or similar topics by the authors' attempt to project future applications of these ligands. However, the degree by which this goal is accomplished varies widely from chapter to chapter.

The book starts appropriately with a chapter by Gokel and Nakano describing the use of weak intermolecular forces and flexible molecular frameworks to build receptors for cations and molecules. The second chapter is coauthored by Chen and Echegoyen, who discuss redox-active ligands and project the use of these compounds in efficient isotopic separations. The next chapter, by Newkome, summarizes briefly this author's interesting work with cascade polymers. In Chapter 4, Parker provides an account of the medical uses of macrocyclic ligands. This is indeed one of the chapters that best justifies the volume title. Adam and Lindoy (Chapter 5) describe briefly the use of molecular mechanics as a tool in the design of macrocycles. Chapter 6, authored by Kimura, is devoted to a review of macrocyclic tetra- and pentaamine ligands and their uses in the modification of the redox behavior of bound transition metal ions. In Chapter 7, Martell provides a detailed review of his work with binuclear macrocyclic ligands. This is the longest and most thorough chapter of the book. Tetraazamacrocyclic ligands are further reviewed by Kaden (Chapter 8) and Fabrizzi and co-workers (Chapter 9). In Chapter 10 Hancock describes the trend toward more preorganized ligands and the thermodynamic advantages that these more rigid systems provide. Seel and Vögtle (Chapter 11) discuss some interesting examples of cagelike hosts intended for binding of cations and molecules. Izatt and co-workers provide a thorough review in Chapter 12 of their work to improve chiral recognition in the interactions between chiral ammonium cations and appropriately designed macrocycles. Chapter 13, authored by Sutherland, provides an account of his work with a variety of molecular and cationic hosts. The next two chapters are devoted to crown thioethers. In Chapter 14, Kellog discusses the synthesis and chemistry of these ligands. Chapter 15, authored by the editor, focuses on the crown thioether chemistry of Tc and Re and its potential medical applications. In the final chapter, Bell provides an account of his work with torands. A useful subject index closes the book.

Although it is practically impossible to cover every aspect of current research in macrocyclic chemistry in a volume of these characteristics, the editor has managed to attain a good balance between the organic and inorganic domains in the macrocyclic arena. This volume will be a good addition to any institutional library. Practitioners or individuals interested in entering the field should consider its purchase as a good investment.

Angel E. Kaifer, *University of Miami*

Asymmetric Synthesis of Natural Products. By Ari M. P. Koskinen (University of Oulu). John Wiley and Sons, Ltd.: New York. 1993. x + 234 pp. $39.95. ISBN 0-471-93848-3.

This book is an outgrowth of a one-semester course given by the author and is intended for advanced undergraduate students and beginning graduate students. The book combines the topics of natural product chemistry with asymmetric synthesis and might be considered as a text for an advanced organic course. It should be noted that, despite the title, the book concentrates as much or more on natural product chemistry than it does on asymmetric synthesis. Consequently adoption of this text will work better for a natural product course than for a strictly advanced synthesis course.

After a brief introduction to natural products (Chapter 1), the author gives a cursory overview of chirality and the fundamental tenets of asymmetric synthesis (Chapter 2). Chapter 3 covers asymmetric synthesis and deals exclusively with additions to carbonyls and olefins. The remaining chapters (4–10) discuss individual natural product classes in order: carbohydrates, peptides, nucleosides, polyketides, isoprenoids, shikimic acid derivatives, and alkaloids. These latter chapters concentrate more on the structure, function, and biosynthesis of the natural products than on their asymmetric synthesis.

As is often the case with books that are an extension of an author's course, the material is presented in a rather idiosyncratic manner and, at times, reads more like a series of lectures than as an integrated text. In a number of places I wanted to raise my hand to request a further clarification. This was particularly true in Chapters 2 and 3, where the author uses a number of sophisticated ideas, such as symmetry operations or orbital distortion, with little if any organized background presentation. To his credit the author conscientiously refers the reader to a thorough and current bibliography (references through 1992) for further explanation, but nonetheless adoption of this book as a text would demand that the instructor use a good deal of lecture time clarifying the presentation of chirality and stereoelectronic effects. The chapters outlining the individual classes of natural products were more coherent and made for easy and enjoyable reading.

Since I teach a one-semester advanced undergraduate organic course in natural product synthesis, I am always looking for a text which the students enjoy reading and can handle independent of my lectures. Unfortunately, the weakest part of this book, its coverage of chirality and synthesis, makes it a poor choice for my primary text. However, I certainly will have our library purchase a copy and use it as a reference book for my synthetic course. In this book the author has made a valiant attempt to present a broad range of advanced topics to his audience in an approachable and engaging manner. Any shortfall in reaching this goal bespeaks as much to the difficulty of the task as it does to the quality of the effort.

Patrick G. McDougal, *Reed College*