Additions and Corrections

Zirconocene Complexes of Imines: General Synthesis, Structure, Reactivity, and in Situ Generation To Prepare Geometrically Pure Allylic Amines [*J. Am. Chem. Soc.* **1989**, *111*, 4486–4494]. Stephen L. Buchwald,* Brett T. Watson, M. Woods Wannamaker, and John C. Dewan

Page 4490: In the experimental procedure given for the preparation of **2c**, the second and third sentences should be deleted. There is no need for the addition of chlorotrimethylsilane or for the addition of a second equivalent of *n*-butyllithium. We thank Daniel A. Gately (Colorado State University) for pointing out this error.

Practical, High-Yield, Regioselective, Rhodium-Catalyzed Hydroformylation of Functionalized α-Olefins [*J. Am. Chem. Soc.* **1993**, *115*, 2066–2068]. Gregory D. Cuny and Stephen L. Buchwald*

Page 2067: The n:iso ratio given for entry 15 in Table I should be (n:iso = 2.8:1). We thank Professor W. R. Jackson (Monash University) for pointing out this error.

Book Reviews

Electrochemical and Electrocatalytic Reduction of Carbon Dioxide. Editor-in-Chief, B. P. Sullivan (University of Wyoming); Associate Editors, K. Krist (Gas Research Institute) and H. E. Guard (Office of Naval Research). Elsevier: Amsterdam, The Netherlands. 1993. xiii + 299 pp. $212.50. ISBN 0-444-88316-9.

There has been a considerable amount of recent work focused on the problem of CO_2 reduction. One difficulty with this area is that much of the work has been done by electrochemists, photochemists, and inorganic and organometallic chemists with their results being reported in a wide variety of journals. The wide spread of different journals covering this area makes it difficult to follow the progress and direction of the field. This volume does a nice job of bringing together many diverse approaches to the reduction of this important molecule.

The first short chapter by F. Richard Keene sets the thermodynamic foundation for any proposed CO_2 reduction scheme. This chapter is followed by an excellent comprehensive review by Carol Creutz of the binding of CO_2 to transition metal centers. In his introduction to the third chapter, Peter Ford admits that a chapter on the catalysis of the water gas shift reaction may be out of place in a book about CO_2 reduction. However he then points out that this reaction, when run in reverse, is simply the hydrogen reduction of CO_2 to CO and water. In his contribution he emphasizes the mechanisms of homogeneous catalysis of the water gas shift reaction. A chapter by Dan Dubois and the group at the National Renewable Energy Laboratory discusses the electrochemical concentration of CO_2 via redox active CO_2 carriers. Concentration of atmospheric CO_2 is necessary to prevent additional CO_2 from being added to the atmosphere, which would result if carbonate minerals or natural CO_2 reservoirs were used as CO_2 sources for the production of fuels. Although artificial systems easily outstrip the efficiency of green plants in converting solar energy to electricity or chemical fuels, we will have difficulty in competing with their ability to produce complex molecules from such a dilute source of CO_2.

In Chapter 6, B. Patrick Sullivan and F. Richard Keene discuss the mechanistic aspects of transition metal catalyzed CO_2 reduction, specifically C–H bond-making and C–O bond breaking steps. A similar and very detailed discussion by Karl Freese, Jr., of Interfacial Sciences, Inc., focuses on the mechanisms and product formation in the electrochemical reduction of CO_2 at metal electrodes. Next, Anthony F. Sammells and Ronald L. Cook review work, much of it their own, using high current–high overpotential systems for CO_2 reduction using metal and perovskite electrodes. The last chapter by Nathan Lewis and Gary Shreve reviews the progress in photochemical and photoelectrochemical CO_2 reduction. These authors cover reduction by homogeneous photocatalysts, particulate semiconductor systems, and semiconductor electrodes both as catalysts and coupled to solution catalysts.

The editors have done a good job of organizing this topic so as to avoid overlapping discussion in the various chapters, which often occurs in a volume of this type. An additional chapter on coupling electrochemical energy directly into biological CO_2 reduction pathways would have been appropriate, since there is significant literature in this area. I am hesitant to suggest that every researcher interested in CO_2 reduction buy this book, since its cover price is rather high for a 299 page book. However it will be a valuable reference work, and perhaps a nearby library would have the budget to obtain this volume.

Bruce Parkinson, *Colorado State University*

Organic Reactions. Volume 41. Edited by Leo A. Paquette. John Wiley & Sons: New York. 1992. xvii + 645 pp. $90.00. ISBN 0-471-54409-4.

Organic Reactions has been published since 1942, and more than forty volumes have now appeared. These volumes contain authoritative reviews of preparatively important organic reactions. They are designed to provide chemists with valuable practical information about the reaction, including its scope, limitations, and the selection of specific experimental conditions. Because *Organic Reactions* serves a useful purpose and has maintained a tradition of excellence, it is acquired almost automatically by most chemistry libraries and by many individual chemists.

Volume 41 is a particularly important addition to the series. It consists of a shorter chapter on the divinylcyclopropane–cycloheptadiene rearrangement, written by Tomáš Hudlicky and coworkers, and a longer chapter on organocopper reagents, written by Bruce Lipshutz and Saumitra Sengupta. Each chapter will be widely consulted, and each will simultaneously serve as a valuable source of references and as a stimulus for future research.

The chapter on the divinylcyclopropane–cycloheptadiene rearrangement highlights a reaction that is both theoretically interesting and preparatively valuable. The review is thorough, and more than 80 pages of tables listing specific examples and reaction conditions are included as well as several pages of representative experimental procedures. Moreover, simple heterocyclic permutations of the basic rearrangement are discussed. In addition, it is up-to-date (the literature is covered through December 1990, and much unpublished information is provided), and it is written by a team intimately familiar with practical aspects of the subject. Unfortunately, the chapter contains annoying minor errors, including incorrect structures and phrases such as "...with some degree of stereospecificity". In addition, the authors occasionally create confusion by using a single, stereochemically defined structure to represent other stereoisomers in subsequent discussion. Finally, conclusions are not always presented as clearly and concisely as possible. Nevertheless, the chapter is unquestionably valuable.

The chapter on organocopper reagents reviews a subject of major importance in organic chemistry. It updates earlier reviews of Posner in *Organic Reactions* (**1972**, *19*, 1; **1975**, *22*, 253) by broadly surveying substitutions, conjugate additions, carbocuprations, metallocuprations, and other reactions characteristic of organocopper reagents. All types of organocopper species are discussed, including those derived from Grignard reagents using both catalytic and stoichiometric amounts of copper, lower-order and higher-order lithiocuprates, and simple neutral organocopper reagents. Special attention is given to newer developments such as the use of organocopper complexes activated by the addition of Lewis acids. A measure of the importance of the subject and the thoroughness of the review is the length of the reaction tables (more than 300 pages) and the large number of representative experimental procedures (more than 30) and references (almost 1700, including some from 1991).

The chapter on organocopper reagents is exceptionally well written: The development of ideas is logical, the prose is graceful, and the exposition is unusually clear. Only two very minor improvements could be made. One would be to indicate even more clearly that the structure of higher-