Additions and Corrections

Effects of Ion-Pair Structure on Relative Basicity in Chloroform: Acid–Base Equilibria Controlled by Steric Repulsion, π-Stacking Interactions, and Hydrogen Bonding within an Ion Pair [*J. Am. Chem. Soc.* **1993**, *115*, 5324–5325]. KEI MANABE, KIMIO OKAMURA, TADAMASA DATE, AND KENJI KOGA*

The ratio of the binding constants of compounds **1–4** with picric acid should be 3:66:88:1. The discussion in the text was based on this ratio and therefore there is no change in the conclusion of the paper.

Analysis of the Monoalkylation and Cross-Linking Sequence Specificity of Bizelesin, a Bifunctional Alkylation Agent Related to (+)-CC-1065 [*J. Am. Chem. Soc.* **1993**, *115*, 5925–5933]. DAEKYU SUN AND LAURENCE H. HURLEY*

Page 5931, column two, line four from the bottom: Reference 30 should appear after the word "previously".

Page 5931, ref 27: The reference number should be 28, not 25.

Book Reviews *

Isotopes in Organic Chemistry. Volume 8. Heavy Atom Isotope Effects. Edited by E. Buncel (Queen's University, Ontario) and W. H. Saunders, Jr. (University of Rochester). Elsevier: Amsterdam, London, New York, and Tokyo. 1992. xii + 335 pp. $225.50. ISBN 0-444-88926-4.

No series on isotope effects in chemistry would be complete without a volume devoted to heavy atom effects. Volume 8 contains six chapters: (1) Heavy atom isotope effects in molecular rearrangements, by Henry J. Shine (Texas Tech University; 40 pp, 82 refs); (2) How to measure heavy atom isotope effects: general principles, by Piotr Paneth (Technical University, Lodz, Poland; 27 pp, 81 refs); (3) Heavy atom isotope effects in enzyme-catalyzed reactions, by Paul F. Cook (Texas College of Osteopathic Medicine; 63 pp, 98 refs); (4) Information derived from variation in the natural abundance of ^{15}N in complex biological systems, by G. Shearer and D. H. Kohl (Washington University; 55 pp, 130 refs); (5) Heavy atom isotope ratios in bone as guides to prehistoric diets, by Margaret J. Schoeninger (University of Wisconsin; 57 pp 180 refs); and (6) Heavy atom isotope rate effects in solvolytic nucleophilic reactions at saturated carbon, by Vernon J. Shiner, Jr. and F. P. Wilgis (Indiana University; 97 pp, 183 refs). Each chapter succeeds in providing a complete stand-alone review of the subject as well as incorporating a significant amount of recent (late 1980s to 1992) material not previously reviewed elsewhere. All were readable, well-organized, and interesting. While the topics of Chapter 4 and particularly that of 5 are less clearly focused on *organic* chemistry (the title of the series), they each added a genuine measure of interest and point the way to new and less conventional applications of isotope chemistry.

Chapter 1 is a well-written, comprehensive treatment of the use of heavy atom isotope effects to elucidate the mechanisms of intramolecular rearrangements. The review does a valuable service in bringing the reader up-to-date since the earlier 1964 and 1970 reviews by Arthur Fry. There are a great many useful tables of data and specific examples, well-illustrated with structures, including those from the author's own work on benzidine and photo Fries rearrangements.

Chapter 2 is a relatively brief, but clear and practical, outline of information about when and how to use heavy atom kinetic isotope effect (HAKIE) techniques. It contains a fair number of recent references drawing on the author's own work as well as that in collaboration with Marion O'Leary. Particularly useful is the first section "Should Heavy Atom Kinetic Isotope Effects be Measured?" cautioning that only if theoretical calculations show that different mechanisms will give different KIEs will any useful information be available from experiment. Other sections deal with selection of radioactive, stable, natural-abundance, or enriched isotopes, competitive vs direct measurements, and correlation of experimental results with mechanism.

Chapter 3 is a comprehensive treatment with many applications of how HAKIEs and especially the powerful and useful technique of multiple isotope effects can be applied to the understanding of enzyme-catalyzed reactions. A useful summary appears on p 127. At least 27 enzyme systems, the majority studied by W. W. Cleland and collaborators, are treated. All of the work discussed has been carried out in the last decade, making the review quite useful although some of the material appears as well in Cleland's 1991 chapter in Enzyme Mechanism from Isotope Effects (P. Cook, Ed.; CRC Press). A detraction from the chapter under review is a frequent lack of referencing both of the material discussed and of the many data tables.

Chapter 4 focuses on how variation in the natural abundance of ^{15}N can be used to study the nitrogen cycle in complex ecological and physiological systems. The chapter provides a complete literature review with major sections devoted to net NO_3^- uptake under steady state conditions by one-celled organisms and to denitrification. The sections called "future research" are useful in describing the further potential of this approach.

Chapter 5 emphasizes interesting results rather than chemistry or theoretical treatment. The many references are varied, coming from anthropology, archeology, nutrition, and geochemistry, and introduce the chemist to an interesting application of isotope studies, ones to which other chemists, including O'Leary and Myron Bender, have contributed. The central theme involves the extent to which isotope composition of bone and other tissue reflects that of the diet and therefore how it may be interpreted to assess prehistoric human diet.

Chapter 6 is a masterful major review of a large topic: HAKIES in solvolytic nucleophilic reactions at saturated carbon. It is meticulous, thorough, and beautifully presented and organized. The review spans some 45 years of isotope effect and solvolysis studies and cites many earlier reviews. About 12% of the references have appeared within the last six years. The authors have provided a most valuable service to anyone interested in physical organic chemistry or embarking on or involved in KIE work. Sections include those on historical review (isotope effect theory, HAKIEs, and solvolysis mechanisms), an excellent section summarizing current understanding of solvolysis mechanisms, especially Scheme 1, followed by sections on isotopic (Cl, O, S, N) substitution in the nucleophile and the leaving group, and carbon isotope effects (α, β, and γ). Many useful tables enhance the value of the review.

K. Barbara Schowen, *The University of Kansas*

Atomic Spectra and Radiative Transitions. Second edition. By Igor I. Sobelman Springer-Verlag: Berlin. 1992. xiv + 356 pp. $54.00. ISBN 0-387-54518-2.

This paperback book is in the Atoms + Plasmas series and is a second

*Unsigned book reviews are by the Book Review Editor.