

Cyclopropanes in Organic Synthesis

The book *Cyclopropanes in Organic Synthesis*, written (not edited!) by Oleg G. Kulinkovich, is the result of a heroic effort to compile cyclopropane-based methodologies in a work on target-directed organic synthesis. In 11 chapters, the author describes various aspects of the fascinating chemistry of this smallest cycloalkane. The book shows that the chemistry of cyclopropanes is far from being just a laboratory curiosity—a prejudice that one sometimes finds when discussing the subject with inexperienced students. The cyclopropane moiety might even be compared with a Swiss Army knife, since this highly strained ring opens the way to a multitude of unusual (but often very useful) transformations. Only the practiced eye will recognize that a specific structural pattern might be available by ring-opening of a cyclopropane, or that a certain compound might be synthesized by ring-enlargement from a corresponding three-membered ring.

The book covers both the very early literature in the area and most of the recently published work. Chapter 1 begins with a brief discussion of the structure and reactivity of cyclopropanes. Besides the bonding models, reactive cyclopropane-containing species such as cyclopropyl and cyclopropylcarbinyl cations, anions, and free radicals are briefly discussed, and many references to relevant literature are provided. Chapter 2, “Ring-Cleavage Reactions”, summarizes different reaction modes and goes beyond the title by including ring-enlargement reactions. Emphasis is given to different substitution patterns, such as halogen or donor-acceptor substitution. In Chapter 3 the author reminds the reader about the various synthetic methods that are available to give access to the cyclopropane motif.

The second part of the book, Chapters 4–11, deals with various triangulation strategies, i.e., how the deconstruction of cyclopropanes is utilized in a plethora of natural products syntheses. In a chapter dealing with acyclic compounds, the author dem-

onstrates that not only numerous substitution patterns but also olefin and carbonyl groups are easily accessible via cyclopropane motifs. The following chapters cover the formation of cyclobutane derivatives and normal rings. Common themes here are the ways in which the cyclopropane method is of benefit for the modification or installation of substituents, and how the highly strained system can be involved in cyclization reactions leading to enlarged ring systems. Chapter 10 deals with target structures that are available by Rh-catalyzed [5+2+1]-cycloaddition reactions, and with other topics. The fascinating and limitless potential of cyclopropanes for the synthesis of naturally occurring heterocyclic compounds is highlighted in the last chapter, describing how the introduction of heteroatoms can modulate and enlarge the spectrum of reactivity.

I enjoyed reading the book. I have only a few minor criticisms. As in many other books, the orbital representation of the Walsh model is wrong (as it neglects the mixing between filled and unfilled orbitals of the same symmetry). A more uniform size of the structures (even on the same page, the size differs between the schemes), and a legend for each scheme (there are none) would have helped the reader. In many recently published books I find that the standard of copy-editing and typesetting gets worse and worse. As well as correcting several typos and grammatical errors, a clearer presentation of the tables and an index of keywords would have been useful.

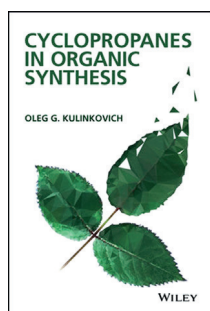
Overall, *Cyclopropanes in Organic Synthesis* provides an excellent snapshot of the state of the art in cyclopropane-based synthesis of natural products. I am convinced it is the richest source of information in this field. I strongly recommend this book for chemists seeking to use cyclopropane-based strategies in their synthetic endeavors.

Daniel B. Werz

Institut für Organische Chemie
Technische Universität Braunschweig (Germany)

International Edition: DOI: 10.1002/anie.201603984

German Edition: DOI: 10.1002/ange.201603984



Cyclopropanes in Organic Synthesis

By Oleg G. Kulinkovich. John Wiley and Sons, Hoboken 2015. 432 pp., hardcover, € 135.00.—ISBN 978-1118057438