

NEW BOOKS

R. E. Valter

RING-CHAIN ISOMERISM IN ORGANIC CHEMISTRY*

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Ring-chain conversions underlie an extremely large number of ring-formation, ring-opening, and recyclization processes and a whole series of other reactions in highly diverse heterocyclic systems. In the monograph under review, which was written by one of the prominent specialists in the field of ring-chain isomerism in the Soviet Union, the great body of experimental material which has been accumulated in this field has been summarized. The book is distinguished by its clear structure and plain presentation. Its format also leaves an agreeable impression.

The first, introductory chapter provides a general classification of ring-chain isomeric conversions and presents the reasons which prompted the author to differentiate between isomeric and tautomeric ring-chain processes. The second chapter contains a concise comparative characterization of the methods for investigating ring-chain tautomeric systems.

The next four chapters are devoted to a discussion of the specific types of isomerism, which result in the conversion of an acyclic system into a cyclic system by means of the intramolecular addition of a functional group at a multiple bond. The third chapter, which comprises almost half of the book, examines intramolecular addition reactions at C=O bonds. The structure of various acylcarboxylic acids and their derivatives (acid chlorides, amides, hydrazides, amidines, esters, and mixed anhydrides), hydroxy-substituted aldehydes and ketones, ketohydroxamic acids, oximino ketones, and acynitro ketones is discussed. The problem of the covalent hydration of nitrogenous heterocycles is touched upon in connection with the structure of aminocarbonyl compounds, and data on the structure of substituted ketones containing the NH group in a ureide, triazene, or heterocyclic fragment are presented. In the same chapter emphasis was placed on the problem of the intramolecular migration of acyl groups located on oxygen, nitrogen, or sulfur atoms, i.e., reactions which frequently involve a step of intramolecular addition. The last sections of the third chapter contain information on the structure of oxa-, aza-, and thiacyclics and on reactions involving the intramolecular addition of a CH group across a C=O bond. The fourth chapter discusses reversible intramolecular reactions involving the addition of OH, NH, and SH groups across the azomethine bonds of imines, hydrazines, oximes, and nitrones. Considering intramolecular addition reactions to nitrile groups, in the fifth chapter the author focuses his attention on the cyclization conditions and the influence of structural factors on this process. The next chapter presents a small amount of data on intramolecular addition reactions across carbon-carbon double bonds and I=O bonds.

The seventh, concluding chapter discusses perhaps the most important and, at the same time, the most complex questions associated with the general laws governing the influence of the structure of the molecule and the medium on the relative stability and nature of the interconversions of isomers. The greatest value for resolving these questions is attached to the quantitative data on the equilibrium constants and the rate constants of isomerization; however, these data are comparatively sparse and unsystematic. It may be hoped that the monograph under review will stimulate the further development of research in this area.

As a whole, Valter's book is of unquestionable interest for organic chemists working in very diverse fields of the chemistry of heterocycles.

* Zinatne, Riga (1978).