

Bender M L. Mechanisms of catalysis of nucleophilic reactions of carboxylate acid derivatives. *Chem. Rev.* **60**:53-113, 1960.

This article is a review article which is not easy to abstract in the usual way. It is an attempt to make the fields of organic chemistry and biochemistry into one. That is, that there is a continuum between these two areas. [The SCI® indicates that this paper has been cited over 485 times since 1961.]

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"This review article is the product of many years of research. In earlier days many people thought that the separate disciplines of physical organic chemistry and biochemistry were distinct to themselves and there was no interaction between the two. This review article is an attempt to show that there is considerable interaction between these two areas and that there is in fact a continuum between these two areas. Enzymatic catalysis is certainly the ultimate in homogeneous catalysis, but it is connected to concepts which are seen in many simpler and less efficient kinds of catalysis such as general acid and general base catalysis, metal ion catalysis, intramolecular catalysis, bifunctional catalysis, and catalysis by complexation. This review article has had many consequences.

"One consequence had been a personal one. The article resulted in

my getting many offers, and ultimately in my moving from the Illinois Institute of Technology, where the article was written, to Northwestern University.

"A second consequence was interesting. Without my knowledge or consent, the article was translated into Russian, made into a book, and published there. The result of all this Russian activity was the construction of a new laboratory of Bioorganic Chemistry in Moscow.

"A final consequence was that this was the precursor of the book that I published in 1971 entitled *Mechanisms of Homogeneous Catalysis from Protons to Proteins*.¹ In this book, I show in great detail how one can proceed from elementary concepts of acidbase catalysis through various organic models of enzymes to enzymatic catalysis itself. This is essentially what I did in the review article, but the book is obviously more up to date. Whereas the review article was sixty pages long, the book is 686 pages long.

"I think that the reason that this article has been cited so often is that it was the first attempt to show that a continuum exists between organic chemistry and biochemistry. This is getting to be an accepted scientific concept these days. More and more scientists are entering this area both from the organic side and the biochemical side. The artificial barriers between organic chemistry and biochemistry are finally being demolished."

REFERENCE

1. **Bender M L.** *Mechanisms of homogeneous catalysis from protons to proteins*. New York, NY: Wiley-Interscience, 1971. 686 p.