

SYNTHESIS

Editorial

Rolf Huisgen at Ninety - Laudation



Rolf Huisgen, whose 90th birthday we celebrate with this special issue of “Synthesis”, embodies the extraordinary development organic chemistry has undergone since the middle of the last century – and the endurance of this field as a fascinating intellectual playground. His ability to conceptualize mechanisms has led to the invention of numerous novel reactions, which have found applications in virtually all fields of chemistry. As such, Rolf Huisgen has done much to endow synthetic chemistry with the power and status it enjoys today.

Although his name is mostly associated with 1,3-dipolar cycloadditions, Rolf Huisgen has made many other contributions to chemical reactivity in the course of his long career. After a brief foray into natural product chemistry during his graduate work, he decided to dedicate himself to topics that seemed more rational and rewarding at the time and began his career with investigations on diazo compounds. This was quickly followed by studies on arynes, medium-sized-ring effects, electrophilic azo compounds, azomethine imines and, finally, his first papers on 1,3-dipolar cycloadditions as concerted reactions.

In his seminal 1963 review of these reactions,¹ Rolf Huisgen achieved what every scientist dreams of: “To see what everybody else has seen but to think what nobody has thought” (Szent-Györgyi). His brilliant conceptualization enabled extensive investigations that have significantly broadened the landscape of this class of reactions now so easily interpreted. In the course of his systematic studies that spanned several decades, more than a dozen new types of 1,3-dipoles were designed and synthesized. These can give access to an almost unlimited variety of five-membered heterocycles, many of which are highly important in biology and medicine. The name of a special class of 1,3-dipoles, the *münchnones*, probably reflects Rolf Huisgen’s love for a city in which he has spent almost his entire career. Indeed, Munich, with its magnificent collections of paintings, sculptures and machines, has provided the perfect backdrop for Rolf Huisgen as a scientist, scholar, and, not insignificantly, avid collector of German Expressionist Art.

Rolf Huisgen's work on concerted reactions, however, has gone far beyond 1,3-dipolar cycloadditions. His studies on the mechanism of [2+2] cycloadditions involving ketenes are remarkable for their thoroughness – and his willingness to consider non-concerted pathways. His investigations on the stereochemistry of electrocyclic ring closures demonstrated the predictive power of the Woodward–Hoffmann rules and have contributed much to the immediate and enthusiastic recognition of these. The fact that 8π - 6π electrocyclization cascades have subsequently been found in several biosynthetic pathways must have provided some satisfactions to a former student of Heinrich Wieland, the great Munich natural product chemist!

As a teacher and “Doktorvater”, Rolf Huisgen has also matched his advisor and predecessor. His list of scientific children, who are surveyed in his scientific autobiography,² is impressive and accounts for a significant proportion of chemistry chairs in Germany and beyond. Many undergraduate students who heard his lectures decided to dedicate themselves to organic chemistry and have subsequently made important contributions to the field. There are also numerous scientific grandchildren (and great-grandchildren) who have assumed positions in academia and industry and are now in charge of carrying on the tradition of the Huisgen School. Several of those have contributed to the present issue.

As Rolf Huisgen celebrates his 90th birthday, his scientific contributions are as relevant as ever. He continues to inspire and challenge chemists of the younger generation (or, rather, younger generations) with his impeccable style, thoroughness, and wisdom. His scientific legacy is universally recognized and his work is still highly cited. In fact, due to a merger of his ideas with new concepts in catalysis, chemical biology, and material sciences, his citation rate has even increased in recent years – not a simple achievement for a nonagenarian! We very much hope that Rolf Huisgen will enjoy the papers collected in this special issue, many of which simply would not have been possible without his seminal contributions to organic chemistry.

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(1) Huisgen, R. *Angew. Chem. Int. Ed.* **1963**, 2, 565-598.

(2) Huisgen, R. *The Adventure Playground of Mechanisms and Novel Reactions*. In *Profiles Pathways, and Dreams*; Seeman, J. I., Ed.; American Chemical Society: Washington, DC, **1994**.