K. Barry Sharpless

Dr. K. Barry Sharpless was born in Philadelphia in 1941. He studied chemistry at Dartmouth College where he did undergraduate research with Thomas A. Spencer to whom he is attached by friendship and a long collaboration in the field of steroid demethylation (first joint paper in 1964, last in 1975). For his Ph.D. work Sharpless joined E.E. van Tamelen's group at Stanford (thesis in 1968: "Featuring Enzymic Cyclization of Modified Squalene Oxides"). In a subsequent postdoctoral period he vacillated between biochemistry (with K. Bloch, Harvard) and inorganic chemistry (with J. Collman, Stanford) until he joined the faculty of the chemistry department at MIT in 1970 and settled for organic chemistry, more specifically, for the oxidation of organic compounds using inorganic reagents. Apart from another interlude on the Pacific Coast (Stanford 1977-1980) he has remained loyal to his institution and his field of research.

Sharpless's contributions cover a wide field and are documented in almost 150 papers and patents, many of them likely to be of lasting value. Among the oxidants he has studied are derivatives of sulfur, selenium, titanium, vanadium, chromium, molybdenum, tungsten, manganese, ruthenium and osmium, the corresponding synthetic transformation being hydroxylation, epoxidation and amination of C,C-double bonds as well as allylic amination and oxidation. The transition-metal mediated regio- and diastereoselective epoxidation of olefins with t-butyl hydroperoxide was first described by Sharpless and his group in 1973. It took seven more years until the enantioselective version of that reaction was discovered with Katsuki. The stoichiometric or catalytic epoxidation of allylic alcohols by peroxides in the presence of titanates and diethyl tartrate became an instant name reaction; indeed, it has been referred to as the reaction of the decade and its discoverer has stated in a somewhat jocular mood that "these new catalysts will work under more flexible conditions than biological systems; also, they don't need to work in water and don't have complicated cofactors and all this other garbage around that has to be gotten rid of when the product is purified". The Sharpless reaction has been exploited for the synthesis of numerous enantiomerically pure products in research laboratories and on an industrial scale. Recently, a highly enantioselective catalytic hydroxylation of double bonds with N-oxide/OsO_4/chiral base has been developed in Sharpless's laboratory. Many national and international awards and distinguished lectureships have followed the excellent work: Sharpless is a Fellow of the American Academy of Arts and Sciences and of the American Association for the Advancement of Science, he is a Member of the U.S. National Academy of Sciences, and he received the ACS Award for Creative Work in Synthetic Organic Chemistry and the Janssen prize in Belgium.

Besides chemistry, Sharpless likes other exciting activities such as adventurous journeys, competition motorcycle racing against colleagues, and his daily jogging.