

A Tribute to Peter Yates



After a long and illustrious career Professor Peter Yates has recently changed his status to that of Emeritus Professor at the University of Toronto. This is an appropriate time to reflect on his accomplishments and also give expression to the appreciation of his guidance, inspiration and friendship to hundreds of students and associates.

Peter Yates was born in Wanstead in Essex county, England on August 26, 1924. He received his undergraduate education at Queen Mary College (University of London), earning his B.Sc. degree in 1946. Subsequent to graduation Peter toyed with the idea of accepting a job in a rubber plantation in Malaysia. Fortunately for the chemical world Dalhousie University was

successful in attracting him to a graduate fellowship. After completing his M.Sc. at Dalhousie he went to Yale University where he obtained his Ph.D. with E. D. Bergmann. During 1950-51, he was a post-doctoral fellow at Harvard with R. B. Woodward. This was followed by a year of instructorship at Yale. In 1952 Yates joined the faculty of Harvard University and stayed there until 1960 in which year he joined the University of Toronto as a Professor. In 1986 he was named University Professor.

Peter Yates has distinguished himself as a teacher and researcher. He has made outstanding contributions in many areas of organic chemistry such as structure elucidation of natural and unnatural products by spectroscopic methods, investigation of reaction mechanisms, synthetic methods and mechanistic and synthetic photochemistry.

Yates's interest in photochemistry goes back to the early 60's and perhaps has its origin in his studies on reactive intermediates and molecular rearrangements. He has made important contributions in a number of areas of photochemistry, but special mention must be made of his work on the photochemistry of cyclic ketones in solution. Yates has shown that the photolysis of cycloalkanones may proceed *via* a diradical scission mechanism or *via* a concerted ring expansion mechanism and that the two processes are competitive. His work has defined the structural requirements for the ring expansion of cyclic ketones to cyclic acetals *via* oxacarbenes. Further, the stereochemistry of the products was established and a theoretical foundation for the rearrangement was laid. It should be noted that this work has potential application in the synthesis of modified glycosides. Yates has also demonstrated that photocyclization of β -alkoxy ketones proceeds *via* γ - or δ -hydrogen abstraction, δ -hydrogen abstraction occurring *via* a 7-membered transition state due to enhanced stability of the resulting α -oxoalkyl radical. He has also extensively investigated the photolysis of a variety of cyclic α -ketols. His work on dihydrofuranones and dihydrothiophenones has shown that heteroatoms can influence Norrish type I cleavage. Yates has been a pioneer in the synthesis of cage compounds by photocycloaddition of 4-pyrones and related compounds.

Yates's creativity and intuition has found expression in a number of areas besides photochemistry. His early work on copper catalyzed decomposition of diazoketones has paved the way for the development of an efficient synthetic method. Yates's seminal observation that certain Diels-Alder reactions are accelerated by Lewis acids has added a new dimension to the area of (4+2) cycloaddition. One of the early examples of intramolecular Diels-Alder reaction is due to Yates and it uses a cyclohexadienone generated *in situ* by a modified Wessely oxidation. This reaction has generated a lot of interest. In the area of natural products synthesis, his work on cedrenoid sesquiterpenes, haplophytine and coronofacic acid are particularly noteworthy.

Yates has published nearly 250 papers and he has received acclaim and recognition for his achievements in the form of a number of awards and honours. These include the Merck, Sharp and Dohme Award (1963), Centennial Award of Canada (1967) and the Chemical Institute of Canada medal (1984). He is a fellow of the Royal Society of Canada and the Japan Society for the Promotion of Science. Yates has been on the Board of Editors and Advisory Board of a number of journals. He has held important positions in organizations such as the International Union of Pure and Applied Chemistry, Royal Society of Canada and The Chemical Institute of Canada.

It will be a serious omission not to reflect on the personal qualities of Yates. Beneath the quiet reserve, Peter is a gentleman to the core and his courtesy towards his students and associates is exemplary. His devotion to chemistry is inspiring and one invariably finds it a pleasure working with him. On behalf of his numerous students and associates I take this opportunity to wish Peter continued success and good health.

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