

Professor Oswald S. Tee

A Tribute



Oswald S. Tee, known far and wide as Ossie, was born in Northampton, U.K., on 16 December 1941, into a rural family with traditions in farming and auto mechanics, though his maternal grandfather (Oswald Hamilton) had been a chemist who worked for a time as an assistant to Sir William Ramsay. He was educated through his B. Sc. Degree at the University of Leicester, where he received a much appreciated introduction to reaction mechanisms from R.D. Guthrie and S. Trippet. In 1963 following the sage advice of his tutor, Mike Blandamer, he resolved to pursue his education in Canada, where he enrolled at McMaster University, in Hamilton, Ontario. At McMaster he carried out research for the M. Sc. degree with John Warkentin, a young Assistant Professor at the time. After an explosive disagreement with bentoyl peroxide his research project was switched to the base catalyzed enolization of 2-butanone, a classic problem in physical organic chemistry since the days of Arthur Lapworth. This work was successful and was particularly distinguished by the determination of site-specific rates using H/D exchange. He further broadened his background by returning to England for a Ph. D. with Alan Katritzky at the University of East Anglia, where he studied acid catalyzed H/D exchange of pyrimidines during the heyday of mechanistic studies of heterocycles. This was finished in three years and he returned to Canada for postdoctoral work with Keith Yates, at the University of Toronto.

In Toronto he carried out independent studies of the “Principle of Least Motion”, which were published initially as a single author paper in *JACS* that put him in the international limelight even before obtaining an independent position.

In 1970 he acquired his charming wife Sue, whom he had met at McMaster in 1964.

Their marriage was precipitated by him obtaining a position as Assistant Professor at Sir George Williams University in Montreal, which became Concordia University in 1974. There he continued to work on "Least Motion", and he began studies of the bromination of pyrimidines, which in turn led to a wider interest in bromination of phenols, and to the first observation of cyclohexadienone intermediates in water. Later he began the study of cyclodextrin catalyzed reactions, which in recent years has been his major interest. Because of his wide-ranging interests and expertise he has engaged in frequent collaborative projects, and the combination of skills in these efforts has been especially rewarding.

He was a student in Canada at a time of rapid growth in Canadian chemistry, and became acquainted with many others who also become leaders in the field. Due to his congenial nature, for which "outgoing" is too mild a description, those he came in contact with also remembered him. He was in a strong position to participate in the development of the distinctive Canadian identity in chemistry, especially due to the happy circumstance that he was resident in Quebec and nominally fluent in French. He has occupied many positions of leadership in the Canadian Society for Chemistry-Chemical Institute of Canada, first with the Executive in the Montreal Section, then in all positions on the executive of the Organic Division, including Conference Program Chair and Divisional Chair. He was a member of the CSC Board, and was given the first portfolio of Public Awareness, where he spearheaded the birth of National Chemistry Week in Canada. Ossie has long been a leading spirit in the Ontario-Quebec Minisymposium on Physical Organic Chemistry, which was held for the 29th time in 2001. This highlighted Canadian excellence in this field to a worldwide audience. He has served frequently as an organizer of conferences and symposia, and has been an active participant at such meetings across Canada and around the world. He is renowned for his after dinner speeches on such occasions, which have entertained many. In recognition of his many contributions he was made the Fellow of the Chemical Institute of Canada in 1993.

His scientific leadership and extensive administrative service played a major role to the rise of Concordia University to its present respected position. He also was active on the world scene in the International Union of Pure and Applied Chemistry, and has lectured extensively in Canada, the U.S., New Zealand, Australia, the UK and Ireland, France and elsewhere in Europe (Spain, Switzerland, Italy, Belgium, Italy, and Croatia). His sabbatical leaves in California with Joe Bunnett, in France with Jean-Marie Lehn, and Australia with Chris Easton, also strengthened the ties between these countries and Canada.

With all these activities he still has found time for his pastimes of music appreciation and bird watching, and he has been an excellent friend to all. Canadian and indeed world chemistry continues to be enriched by his presence.

Selected Publications of O. S. Tee

1. Tee, O.S.; Yazbeck, O.J. Transition state stabilization by micelles: thiolysis of *p*-nitrophenyl alkanooates in cetyltrimethylammonium bromide micelles. *Can. J. Chem.* **2000**, *78*, 1100.
2. Gadosy, T. A.; Boyd, M. J.; Tee, O. S. Catalysis of Ester Aminolysis by Cyclodextrins. The Reaction of Alkylamines with *p*-Nitrophenyl Alkanooates. *J. Org. Chem.* **2000**, *65*, 6879.
3. Tee, O. S.; Boyd, M. J. (1999). Aminolysis of Naphthyl Acetates catalyzed by Cyclodextrins. *Can. J. Chem.* *77*, 950.
4. Tee, O. S.; Donga, R. A. (1996). Catalysis of the Enolization of 2-Indanone by Cyclodextrins in Aqueous Solution. *J. Chem. Soc. Perkin Trans. 2*, 2763.
5. Gadosy, T. A.; Tee, O. S. (1996). Spectator Catalysis in the Cleavage of *p*-Nitrophenyl Acetate and *p*-Nitrophenyl Hexanoate by "Hydroxypropyl- β -cyclodextrin". *Can. J. Chem.* *74*, 745.
6. Chiang, Y.; Guo, H.-X.; Kresge, A. J.; Tee, O. S. (1996). Flash Photolysis of 2,2,6-Trimethyl-1,3-dioxin-4-one in Aqueous Solution: Hydration of Acetylketene and Ketonization of Acetoacetic Acid Enol. *J. Am. Chem. Soc.* *118*, 3386.
7. Allen, A. D.; Fujio, M.; Tee, O. S.; Tidwell, T. T.; Tsuji, Y.; Tsuno, Y.; Yatsugi, K. (1995). Ion Pairs in the Solvolysis of Secondary Systems. Salt Effect, ^{18}O Labeling and Polarimetric Studies of 1-(4'-Tolyl)-2,2,2-trifluoroethyl Tosylate. *J. Am. Chem. Soc.* *117*, 8974.
8. Tee, O. S.; Bozzi, M.; Clement, N.; Gadosy, T. A. (1995). Catalysis of the Reaction of *p*-Nitrophenyl Alkanooates with Cyclodextrins by Potential Inhibitors: Simple Allosteric Activation. *J. Org. Chem.* *60*, 3509.
9. Tee, O. S.; Gadosy, T. A. (1994). Acyl Transfer Mediated by Complexation. The Effect of Cyclodextrins on the Reaction of Nucleophiles with *p*-Nitrophenyl Acetate and Hexanoate. *J. Chem. Soc. Perkin Trans. 2*, 2307.
10. Tee, O. S.; Gadosy, T. A.; (1994). The Kinetics of Cleavage of Nitrophenyl Alkanooate Esters by γ -cyclodextrin and by "Dimethyl- β -cyclodextrin" in Basic Aqueous Solution. *J. Chem. Soc. Perkin Trans. 2*, 2191.

11. Tee, O. S. (1994). The Stabilization of Transition States by Cyclodextrins and other Catalysts. *Adv. Phys. Org. Chem.* **29**, 1.
12. Tee, O. S.; Iyengar, N. R.; Takasaki, B. K. (1993). Catalysis of the Deprotonation of β -Keto Esters by Cyclodextrins. *Can. J. Chem.*, **71**, 2139.
13. Allen, A. D.; Tidwell, T. T.; Tee, O. S. (1993). Large Salt Effects and Ion Pairing in Trifluoroacetylolysis Reactions forming Destabilized Delocalized Benzylic Carbocations: Kinetic Analysis of the Winstein Special Salt Effect. *J. Am. Chem. Soc.*, **115**, 10091.
14. Tee, O. S.; Bozzi, M.; Hoeven, J. J.; Gadosy, T. A. (1993). Spectators in the Cleavage of *p*-Nitrophenyl Acetate by Cyclodextrins in Basic Solution. Catalysis by Potential Inhibitors. *J. Am. Chem. Soc.*, **115**, 8990-8998.
15. Tee, O. S.; Du, X.-X. (1992). Multiple Behaviors in the Cleavage of Aryl Alkanoates by α - and β -Cyclodextrins. Processes involving Two Molecules of Cyclodextrin. *J. Am. Chem. Soc.* **114**, 620.
16. Tee, O. S. (1991). The Bromination of Phenols is Simple - Or is it? *Advances in Organobromine Chemistry*, **1**, 99.
17. Tee, O. S.; Bozzi, M. (1990). Spectator Catalysis by Alcohols in the Cleavage of an Aryl Ester by β -Cyclodextrin. Ternary Complexes and Structural Dependence. *J. Am. Chem. Soc.* **112**, 7815.
18. Tee, O. S.; Hoeven, J. J. (1989). Lack of Inhibition in the Cleavage of *p*-Nitrophenyl Acetate by β -Cyclodextrin: Evidence of the Absence of Aryl Group Binding in the Transition State for Esterolysis. *J. Am. Chem. Soc.*, **111**, 8318.
19. Tee, O.S. (1989). The Binding of Transition States by Cyclomaltooligosaccharides. *Carbohydr. Res.* **192**, 181.
20. Tee, O. S.; Paventi, M.; Bennett, J. M. (1989). Kinetics and Mechanism of the Bromination of Phenols and Phenoxide Ions in Aqueous Solution. Diffusion-Controlled Rates. *J. Am. Chem. Soc.*, **111**, 2233.
21. Tee, O. S.; Bennett, J. M. (1988). Catalysis of the Debromination of 4-Alkyl-4-bromo-2,5-cyclohexadienones in Aqueous Solution by α -Cyclodextrin. *J. Am. Chem. Soc.*, **110**, 3226.
22. Tee, O. S.; Iyenger, N. R. (1988). Metal Ion Catalysis of the Decomposition of Transient 2-Carboxy-2,5-cyclohexadienones in Aqueous Solution. *Can. J. Chem.*, **66**, 1194.
23. Tee, O. S.; Bennett, J. M. (1988). Catalysis of the Bromination of Phenols and Phenoxide Ions in Aqueous Solution by α -Cyclodextrin. *J. Am. Chem. Soc.*, **110**, 269.

24. Tee, O. S.; Spiropoulos, G.; McDonald, R.; Geldart, V.; Moore, D. (1986). Reversible Ring-Opening of Thiamine. Kinetic vs. Thermodynamic Control of the Reclosure. *J. Org. Chem.*, **51**, 2150.
25. Kornblatt, M. J.; Tee, O. S. (1986). Inhibition of Yeast Cytosine Deaminase by 5-Bromo-2-pyrimidinone and its Covalent Hydrate. *Eur. J. Biochem.*, **156**, 297.
26. Tee, O. S.; Takasaki, B. S. (1985). The Cleavage of Aspirin by α - and β -Cyclodextrins in Basic Aqueous Solution. *Can. J. Chem.*, **63**, 3540.
27. Tee, O. S.; Iyengar, N. R. (1985). Observation of Transient Cyclohexadienones during the Bromination of Phenols. Mechanisms of Enolization. *J. Am. Chem. Soc.*, **107**, 455.
28. Tee, O. S.; Bennett, J. M. (1984). The Effect of α -Cyclodextrin upon the Kinetics of Aqueous Bromination of Anisole. *Can. J. Chem.*, **62**, 1585.
29. Tee, O. S.; Trani, M.; McClelland, R. A.; Seaman, N. E. (1982). Observation of a Tetrahedral Intermediate and its Anion in a Hydrolysis Reaction. Ring-Opening of a Quinazolinium Ion. *J. Am. Chem. Soc.*, **104**, 7219.
30. Tee, O. S.; Paventi, M. (1982). Kinetics and Mechanism of the Bromination of 2-Pyridne and Related Derivatives in Aqueous Solution. *J. Am. Chem. Soc.*, **104**, 4142.
31. Tee, O. S.; Paventi, M. (1981). Covalent Hydration in 4-Pyrimidinones. Detection through Kinetics of Bromination in Aqueous Acidic Solution. *J. Org. Chem.*, **46**, 4172.
32. Banerjee, S.; Tee, O. S. (1976). Mechanism of Bromination of 6-Azaauracil in Aqueous Solution. *J. Org. Chem.*, **41**, 4004.
33. Altmann, J. A.; Tee, O. S.; Yates, K. (1976). Application of the Principle of Least Motion to Organic Reactions. 4. More Complex Rearrangements. *J. Am. Chem. Soc.*, **98**, 7132.
34. Tee, O. S.; Endo, M. (1976). The Pseudobase Behaviour of 1,3-Di-substituted- 1,2-dihydro-2-oxo-pyrimidinium Cations. *Can. J. Chem.*, **54**, 2681.
35. Tee, O. S.; Altmann, J. A.; Yates, K. (1974). Application of the Principle of Least Motion to Organic Reactions. 3. Eliminations, Enolizations, and Homenolizations. *J. Am. Chem. Soc.*, **96**, 3141.
36. Tee, O. S.; Endo, M. (1974). Synthesis of 1,3-Dialkyl-1,2-dihydro-2-oxopyrimidinium Salts by Direct Cyclization. *J. Heterocycl. Chem.*, **11**, 441.
37. Tee, O. S.; Banerjee, S. (1974). The Mechanism of Bromination of 2(1H)-Pyrimidinone, its N-Methyl, and its N,N'-Dimethyl Derivatives in Aqueous Acidic Solution. *Can. J. Chem.*, **52**, 451.
38. Tee, O. S.; Yates, K. (1972). Application of the Principle of Least Motion to

- Organic Reactions. 2. Molecular Rearrangements. *J. Am. Chem. Soc.*, **94**, 3074.
39. Tee, O. S.; Banerjee, S. (1972). The Mechanism of Bromination of Pyrimidin-2(1H)-one, its N-Methyl, and its N,N'-Dimethyl Derivatives. *J. Chem. Soc. Chem. Commun.*, 1032.
40. Tee, O. S. (1969). Application of the Principle of Least Motion to Organic Reactions. A Generalized Approach. *J. Am. Chem. Soc.*, **91**, 7144.
41. Katritzky, A. R.; Kingsland, M.; Tee, O. S. (1968). Acid-Catalyzed Hydrogen Exchange of some Pyrimidine Derivatives. *J. Chem. Soc. (B)*, 1484.
42. Warkentin, J.; Tee, O. S. (1966). Relative Rates of Base-Catalyzed Enolization in 2-Butanone. *J. Am. Chem. Soc.*, **88**, 5540.