Preface

It has been a great pleasure and simple task for me to organize a special volume of the *Journal of Organometallic Chemistry* to commemorate Professor Jack Halpern's 60th birthday. A few biographical notes seem appropriate.

During the last 35 years, since his first academic appointment (in the metallurgy department at the University of British Columbia here in Vancouver), Jack Halpern has established himself as a world leader in homogeneous catalysis, particularly on kinetic and mechanistic aspects. His early interests in more classical oxidation—reduction and substitution reactions developed, along with the subject of organometallic chemistry in the 1960's, and bioinorganic chemistry in the 1970's, to wider interests, more especially within catalytic phenomena.

The metallurgical interests (hydrometallurgy using H_2 or CO) came with Jack Halpern to the chemistry department here in 1956, and it was during the late 50's and early 60's that his pioneering work on H_2 activation and reductive carbonylation processes was done, the latter showing, for example, the importance of key carboxylate intermediates. The homogeneous hydrogenation of maleic acid using chlororuthenate(II) species, described in 1960—62, was one of the first systems found to be effective for olefinic substrates and was certainly the most well understood at that time. The interest in H_2 activation was, and has been, maintained following an appointment in 1962 at the University of Chicago, which is still Jack's "home base."

The elegant, definitive studies on hydrogenation of olefinic acids, including asymmetric hydrogenation of prochiral substrates, using rhodium complexes, must be familiar to all organometallic chemists. Jack Halpern's interaction with scientists at Monsanto in this area (and that of carbonylation) provides an example supreme of effective academy/industry liaison (see the article by J.F. Roth in this volume). The more recent findings that metal hydridocarbonyls can function as hydrogenation catalysts via H atom transfer have important implications, for example, in the development of such catalysts for aromatic substrates.

A long time interest in the solution chemistry of metal alkyls (especially of Co and Pt) has led, from consideration of kinetic and thermodynamic data on a range of cobaloxime systems and vitamin B_{12} itself, to an estimation of Co—C bond energies and the factors, largely steric, that influence the strength of such a bond. The homolytic cleavage of the Co—C bond is a key step in B_{12} mechanisms. Knowledge of such bond energies is critical in many homogeneously catalyzed reactions, particularly for activation of saturated hydrocarbons via oxidative addition ($M + C{-}H \rightarrow H{-}M{-}C$), an exciting subject now at the embryonic stage.

Jack Halpern has also made significant contributions in the area of O_2 activation by metal complexes. The early concept of "oxygen atom transfer" to ligands (L) within metal-dioxygen species $M(O_2)L$, a mechanistic picture first proposed in the 1960's by Halpern and other groups, was shown (in 1977 by Halpern) to occur in many cases via nucleophilic displacement by excess L of the O_2 as free peroxide, which was the true oxidant. Such a mechanistic feature has since been found common in a wide range of "oxygen atom transfer" processes.

I have noted above research areas, particularly within organometallic chemistry, which are more familiar to me, and where Jack Halpern's influence has been seminal. The topics, however, are merely meant to represent the flavor of his achievements in the solution mechanisms area, which have been extremely diverse.

By way of the collection of dedicated papers in this volume, your friends and colleagues in the chemical community wish to express their thanks, Jack, for your pioneering work, expressed in the many key papers, the enthusiastic seminars and conference lectures, and informal discussions, as well as for your very fine companionship. Finally, a very happy sixtieth birthday from us all!

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