

Introduction

Colin Eaborn was born in Churton, Cheshire, on 15 March 1923. When he was six months old, his family moved into North Wales. He received a B.Sc. degree from the University College of North Wales, Bangor, in 1944, and a Ph.D. in 1947. In the same year, he became an Assistant Lecturer at what later became the University of Leicester, but was then the very small and impoverished University College of Leicester (whose students studied for external degrees of the University of London), and was promoted to a Lectureship in 1950 and a Readership in 1954.

Eaborn was appointed in 1961 as one of the first four science professors to the Chair of Chemistry at the newly created University of Sussex, and took up this post in 1962. Much of his time for the next twelve years was devoted to the establishment of the School of Chemistry and Molecular Sciences and the general development of the University; he was the Dean of the School up to 1968 and the first Pro-Vice-Chancellor (Science) of the University, 1968–72. His success in building up chemistry at Sussex is indicated by the fact that (i) already by 1968 there were in that subject some 40 faculty, 120 research students, and 40 postdoctoral fellows and academic visitors; (ii) in 1964 the distinguished A.R.C. Unit of Nitrogen Fixation (headed until 1981 by Joseph Chatt) had been attached to the School, and (iii) in 1979 there were seven Fellows of the Royal Society in the School, two of them Nobel Laureates.

Among Eaborn's pedagogic innovations was the introduction of an undergraduate degree programme (the B.Sc. by Thesis), in which the student's primary commitment is to a research project, performance in this providing the sole basis for the degree class awarded. In spite of his heavy administrative commitments, he was able to maintain a vigorous research programme, assisted by R.W. Bott, and later D.R.M. Walton, who shared in the supervision of much of the work. From 1973 onwards, except for a brief further spell (1978–79) as Dean, he was able to return to research and teaching. In 1982 he was awarded a Fellowship by S.E.R.C. which enabled him to devote his full-time to research for five years.

Eaborn has been very active in chemical affairs at the national and international level. He was the senior Honorary Secretary of the Chemical Society in 1965–1970, Chairman of the British Committee on Chemical Education in 1966–68, Chairman in 1966–70 of the Royal Society/Royal Institute of Chemistry Committee of Enquiry into Relationships between University Courses in Chemistry and the Needs of Industry, a member of the Chemical and Allied Products Industry Training Board in 1969–73, Chairman of the Royal Society of Chemistry's Advisory Committee on Relationships between Higher Education and Industry in 1977–82, and a member of the Council of the Royal Society in 1978–80. He derives special pleasure from having served from 1972 as the British science representative on the

British-Italian Mixed Cultural Commission. He has been a Regional Editor of the Journal of Organometallic Chemistry since it began in 1963.

Eaborn worked for his Ph.D. with E.D. Hughes. His assignment was to demonstrate the existence at silicon centres of S_N1 , S_N2 , $E1$, and $E2$ types of reaction and to establish their stereochemical course. He admits that he fell far short of these objectives but takes consolation in the fact that for the most part they have defied the efforts of other organosilicon chemists. Nevertheless, he acquired an extensive knowledge of organosilicon chemistry upon which he has built in his independent researches. His association with Hughes and Ingold, and subsequently Winstein as a Rotary Foundation Fellow in 1950-51 at UCLA, led him to become one of the pioneers of the mechanistic approach to organometallic chemistry. His first publications were concerned with syntheses of compounds required for mechanistic studies, and led him to the now classic concept of the Conversion Series for transformation of organosilicon halides and related species into one another.

Colin Eaborn's research activities have extended over a wide range of organosilicon and, to a lesser extent organo-germanium and -tin, chemistry. He carried out seminal mechanistic studies of several important reactions, such as the solvolysis of compounds containing Si-H or Si-N bonds. His main research contributions, largely in the order in which the programmes were initiated, can be classified as shown in (a)-(f), with (f) currently the dominant theme.

(a) *Elucidation of the factors governing the ease of cleavage of C-Si, C-Ge, or C-Sn bonds by nucleophiles or electrophiles.* This work (which as early as in 1954 led Eaborn to make the first proposal of the existence of hyperconjugative electron release from C-Si bonds) was not only of importance for interpretation of the reactivity of organometallic compounds, but also gave much information about substituent effects in electrophilic aromatic substitution and about stabilities of carbanions, and (with G. Seconi) about kinetic isotope effects in reactions of carbanions with hydroxylic solvents (including the significant observation that the magnitude of the effect depends not only on the stability of the carbanions but also on the extent to which this stability arises from conjugative delocalization of the lone-pair). Very recent work (with J. Chojnowski and W. Stańczyk) has indicated the generation of species such as $Me_2Si=O$ and the ethanoate ion analogue $MeSi(OH)O^-$ as intermediates in C-Si bond cleavages.

Such mechanistic studies incidentally led Eaborn to demonstrate that cleavages of C-Si and C-Sn bonds could be used in organic synthesis, a concept which is finding increasing application.

(b) *Determination of the effects of a wide range of substituents in aromatic hydrogen exchange, the simplest electrophilic aromatic substitution.* This involved thorough studies of aromatic detritiation in trifluoroethanoic acid, and was initiated because of the close analogy which Eaborn drew between such exchange and cleavage of aryl-silicon bonds by acids. Roger Taylor was his first research student on the topic, and he later cosupervised their joint programme, and subsequently developed a very successful independent programme.

(c) *The first authentic resolution of a chiral organosilicon compound, and the first resolution of an optically active organogermanium compound (achieved independently at the same time by A.G. Brook) and determination of the stereochemistries of many organogermanium reactions.*

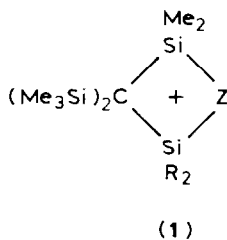
(d) *Studies (with R.A. Jackson) of the rich chemistry of the mercurials $Hg(MR_3)_2$*

($M = \text{Si, Ge, or Sn}$) and of the $[\text{MR}_3]^\cdot$ radicals generated therefrom. An important result was the demonstration of the first homolytic substitutions of aromatic hydrocarbons by silicon-centred radicals.

(e) *The development (initially with J. Chatt and subsequently A. Pidcock) of the chemistry of compounds containing Pt–Si, and later Pt–Ge or Pt–Sn, bonds.* Some of the organotin compounds proved to be useful for the synthesis of compounds containing Pt–aryl or Pt–alkyl bonds.

(f) *Development of the chemistry of organometallic compounds containing “trisyl” or related bulky organosilicon ligands.* Trimethylsilyl-substituted methyl ligands have an important rôle in organometallic chemistry. Eaborn’s contributions include the preparation in 1970 of $\text{LiC}(\text{SiMe}_3)_3$ and $\text{LiCH}(\text{SiMe}_3)_2$ and the development (begun in about 1977) of the chemistry of compounds containing the $[\text{C}(\text{SiMe}_3)_3]^-$ (“trisyl”, $[\text{Tsi}]^-$) ligand, or a related trisilylated methyl ligand, attached to silicon or another metal or metalloid. This led to isolation and X-ray characterisation (with P.B. Hitchcock) of some novel species, including the first (i) organosilicon (normal) cyanates and thiocyanates; and (with J.D. Smith) to (ii) the dialkylolithiate $[\text{Li}(\text{thf})_4][\text{Li}(\text{Tsi})_2]$ and its silver(I) and copper(I) analogues, (iii) the highly thermally stable alkyls $[\text{M}(\text{Tsi})_2]$ ($M = \text{Zn, Cd, or Hg}$), (iv) the crystalline two-coordinate manganese derivative $[\text{Mn}(\text{Tsi})_2]$, and (v) the alkylmanganese halide $[\text{Li}(\text{thf})_4][\text{Mn}_3(\text{Tsi})_3\text{Cl}_4(\text{thf})]$. The $[\text{Tsi}]^-$ ligand has now been attached by Eaborn’s group or by others to over thirty elements.

A study (currently jointly with P.D. Lickiss) of compounds containing the Tsi or related groups attached to functional silicon centres has revealed novel processes and mechanisms, including the first $\text{S}_{\text{N}}1$ reactions of silicon halides and the existence of bridged cations of type **1** ($Z = \text{Me}$). The operation of anchimeric



assistance by groups Z in the formation of species **1**, and related 1,3-silicon-to-silicon migrations of Z, have been demonstrated for $Z = \text{CH}=\text{CH}_2, \text{Ph, Cl, N}_3, \text{OMe, or OCOMe}$. Studies of the thermolysis of $\text{TsiSiPh}_2\text{F}$, involving loss of Me_3SiF , gave rise to the first observations of the rapid migrations of ligands between silicon centres in silaalkenes (e.g., $(\text{Me}_3\text{Si})_2\text{C}=\text{SiPh}_2 \rightleftharpoons (\text{Me}_3\text{Si})(\text{Me}_2\text{PhSi})\text{C}=\text{SiPhMe} \rightleftharpoons (\text{Me}_2\text{SiPh})_2\text{CSiMe}_2$). Several previously hidden modes of reaction of organosilicon halides, closely analogous in several cases to those of organic iodides, have been revealed.

Colin Eaborn has published some 430 research papers, but to many people he is probably best known for his textbook ‘Organosilicon Compounds’ published in 1960 but still in use today, which had a major influence on the development of organosilicon chemistry. A fine chapter (of over 500 pages!) with R.W. Bott on the formation and cleavage of C–Si bonds that appeared in 1968 in a short-lived series on the Organometallic Compounds of Group IV Elements tends to be known only to connoisseurs.

Colin Eaborn became a Fellow of the Royal Society in 1970. He received the Frederic Stanley Kipping Award of the American Chemical Society in 1964, the Organometallic Award of the Royal Society of Chemistry in 1974, and its Ingold Medal in 1976. He was a Robert Welch Scholar at Rice University, Texas in 1961–62; Erskine Visiting Fellow at the University of Canterbury, New Zealand, in 1965; a Distinguished Professor at New Mexico State University, Las Cruces, in 1973; and a Canadian Commonwealth Scholar and Visiting Professor at the University of Victoria, British Columbia, in 1976. He must formally retire from his Chair at Sussex in 1988, but intends to continue with his researches and as Regional Editor of *J. Organomet. Chem.*

The achievements of Colin Eaborn are remarkable for their range, diversity, and influence. Because of their great number, not all of his former co-workers or collaborators have been able to contribute to this special issue. However, we all wish to express to him our feelings of friendship, gratitude, and respect, and good wishes for many more years of fruitful scientific activity.

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