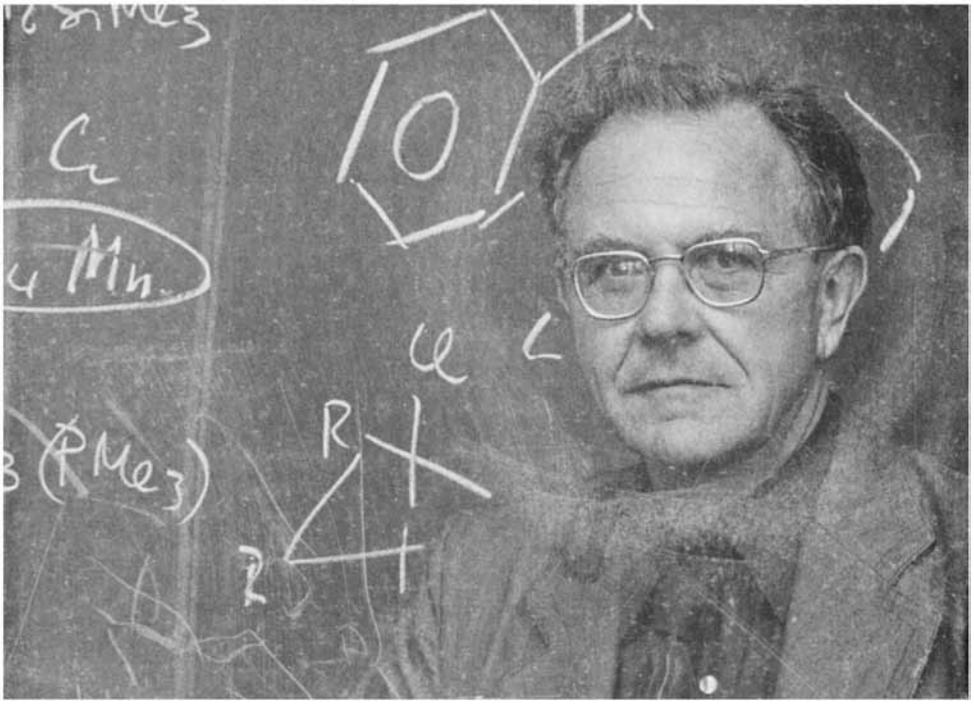


Sir Geoffrey Wilkinson

Geoffrey Wilkinson arrived at the Imperial College of Science and Technology from Todmorden Secondary School as a Royal Scholar in September 1939, and in September 1988 retires from the College's Sir Edward Frankland Professorship in Inorganic Chemistry. In those forty-nine years much happened.

After he had graduated top of his year, the Joint Recruiting Board decreed that he should 'stay on for research.' Soon afterwards however, some of the brighter young British scientists were recruited for the nuclear energy project, and with others, some of whom were also to become famous (or infamous), Wilkinson sailed from Greenock on the 11'th January 1943 aboard the R.M.S. *Andes* for his first crossing of the Atlantic. He worked on nuclear problems at Montreal and Chalk River until 1946 when he moved to the University of California at Berkeley, where he became the first non-American cleared by the Atomic Energy Commission for work in the Lawrence Radiation Laboratory.

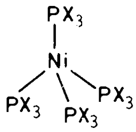
1950 saw a move to the Massachusetts Institute of Technology (M.I.T.) and the transfer of his interests to the co-ordination chemistry of the transition metals, a subject he continued to develop prolifically at Harvard between 1951 and 1955. January 1956 marked Wilkinson's return to England to take up what was then the only established chair of inorganic chemistry in the United Kingdom at the University of London's Imperial College of Science and Technology.

Geoffrey Wilkinson has received many national and international honours among which are first holder of both the Ludwig Mond and the Sir Edward Frankland awards of the Royal Society of Chemistry, a Royal Medal of the Royal Society, Foreign Associate of the National Academy of Sciences, U.S.A., Foreign Member of the Royal Danish Academy of Science and Arts, Centennial Foreign Fellow of the American Chemical Society, the Lavoisier Medal of the French Chemical Society, honorary degrees from Edinburgh, Granada, Columbia, and Bath, the Hiroshima University Medal, and the Galileo Medal of the University of Pisa, and of course, the Nobel Prize in 1973.

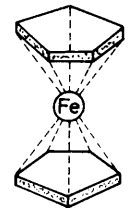
The researches of Sir Geoffrey Wilkinson are recorded in almost five hundred papers in the international journals of science; and the quality and quantity of his contributions to chemistry continue unabated. He was elected a Fellow of the Royal Society in 1965 and knighted in 1976.

Between 1946 and 1951 there appeared more than twenty important papers on nuclear chemistry including the first publication of yield curves for the thermal neutron fission of ^{235}U, while in Berkeley he made more new isotopes than anybody before (and probably since).

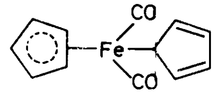
His work in co-ordination chemistry began at M.I.T. in 1951, with papers on the nickel(0) complexes of the phosphorus halides $Ni(PX_3)_4$ (**I**), and the demonstration that PF_3 formed a stable complex with haemoglobin. The first paper from Harvard in 1952, simply entitled 'The Structure of Iron Bis-cyclopentadienyl,' stands now as one of the most fundamental contributions ever to chemistry. The formulation of the structure as a 'sandwich' (**II**), without such tools as n.m.r. spectroscopy or *X*-ray diffraction is all the more remarkable. Thereafter emerged a stream of now classical papers where the 'sandwich' concept was extended to many more metals, including lanthanides and uranium, and related ligands. At this time, not only was the chemistry of 'π-bonded' organometallics undergoing explosive growth, but new families of 'σ-bonded' organometallics such as $Fe(C_5H_5)(CO)_2CH_3$ were being made. Of particular significance, stemming from one of the earliest uses of n.m.r., was the observation that in $Fe(C_5H_5)_2(CO)_2$ (**III**) the ^1H spectrum showed two bands, one of which was assigned to the σ-C_5H_5 group as evidenced by i.r.



(I)



(II)



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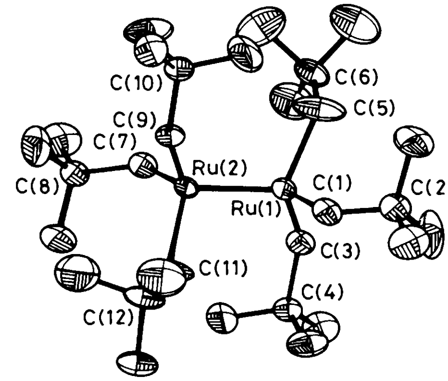

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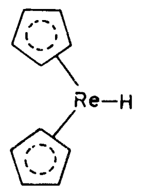

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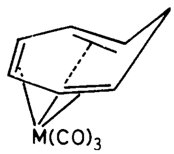

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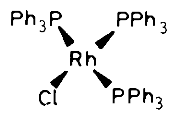

(VI)

spectroscopy and the stoicheiometry. The broadness of the band led to the proposal: 'that the metal atom is executing a 1,2-rearrangement at a rate greater than the expected chemical shift of 200—300 cycles per second; the σ-cyclopentadienyl ring may thus be regarded as rotating.' This was 1956 and marked the birth of fluxional organometallics. That year also saw the synthesis of the first transition-metal silyl compound, and a publication on $Re(C_5H_5)_2H$ (**IV**). The presence of H on Re was proved not only by i.r. but by the high-field n.m.r. resonance now considered characteristic for such H atoms. The formation of $[Re(C_5H_5)_2H_2]^+$ was also the first protonation of an electron lone pair on a metal complex.

After his move to London the diversity and originality of the chemistry increased apace: metal complexes of cycloheptatriene (**V**), norbornadiene, cyclopentadiene, azulenes; cyclohexadienyls; hydrides such as $Mo(C_5H_5)_2H_2$, $Ta(C_5H_5)_2H_3$, and $[Rh(en)_2H_2]^+$ (en = ethylenediamine); $SnCl_3^-$ complexes; a remarkable series of metal carboxylates; the protonation of olefin and carbon monoxide complexes and the discovery of the first metal thiocarbonyls and metal–CS_2 complexes.

Then the mid-1960s saw yet another exceptional breakthrough, into homogeneous catalysts for a range of important reactions; especially notable were the two rhodium complexes $Rh(Ph_3P)_3Cl$ (**VI**) and $Rh(Ph_3P)_3(CO)H$. The former is now universally known as Wilkinson's catalyst. Stabilized transition-metal alkyls with ligands as diverse as methyl, cyclohexyl, and trimethylsilylmethyl were synthesized beginning in the 1970s; but who, even in the 1960s would have predicted WMe_6, $ReOMe_4$, $Ru_2(Me_3CCH_2)_6$ (**VII**), and $Os(C_6H_5)_4$.

Wilkinson's recent chemistry has been marked by unabated creativity with ingenious use of phosphine ligands, phenylimido complexes, phenoxo complexes, metal polyhydrides, aluminohydride complexes, and the tetrahedral aryls and cyclohexyls of Re, Ru, Os, and Cr.

Even this albeit brief and inadequate account of selected highlights of Geoffrey Wilkinson's work cannot avoid mention of his contribution to the text 'Advanced Inorganic Chemistry.' The teaching of inorganic chemistry throughout the world was changed by the appearance of this major work in 1962; subsequent editions, the 5th edition has now appeared, have brought major advances and perspectives to the attention of researchers, teachers, and students alike.

We note the 'official' retirement of Sir Geoffrey to become a Senior Research Fellow of Imperial College and we salute his towering achievements, knowing however that as he enters his fiftieth year in chemistry we shall doubtless continue for many years to see yet more surprising results from his truly original thinking.

E.W.A.