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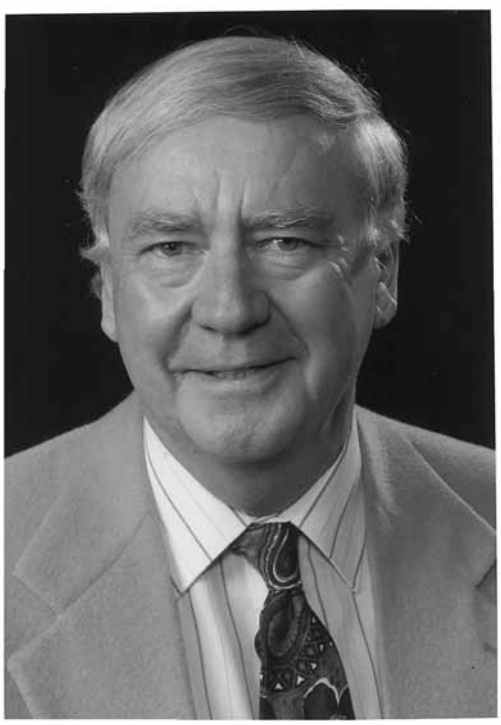
Preface



Alan Herbert Cowley

Alan Herbert Cowley was born in Manchester, UK, on January 29, 1934. He received his PhD from the University of Manchester in 1958, having worked with the late Professor F. Fairbrother on the halides of niobium and tantalum. Following a postdoctoral sojourn at the University of Florida, where he worked with Professor H.H. Sisler on borazine chemistry, Alan returned to the UK to take a research position with Imperial Chemical Industries. In 1962, he accepted an assistant professorship at the University of Texas at Austin and currently holds the Robert A. Welch Chair in Chemistry at that institution.

In over 420 publications, Alan has established himself as one of the leading figures in the renaissance of main group chemistry. Alan's earliest work was concerned with the synthesis, stereochemistry, and reactivity of homocatenates of the group 15 elements. From these efforts stemmed the syntheses of the first three-membered phosphorus ring, the first four-and five-membered arsenic rings, and the first example of a polyphosphine anion radical. He also pioneered the use of homocyclic group 15 compounds as reagents by recognizing their utility as sources of phosphinidene (RP) units. This led, for example, to the synthesis of the first P–As bond via a novel reaction in which a phosphinidene unit was inserted into a diarsine. However, one of Alan's most noteworthy contributions has been the isolation of compounds with multiple bonds between the heavier main-group elements. For many years such compounds were considered to be incapable of isolation. By intelligent choice of ligand bulk and electronic characteristics, Alan and his group were able to isolate the first examples of compounds with phosphorus–arsenic, arsenic–arsenic, and phosphorus–anti-

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mony double bonds. Moreover, by recognizing the isolobal relationships between phosphinidene (and heavier congeneric) moieties and organometallic fragments, he also played an important role in the development of a virtually new field — namely, the synthesis of compounds featuring multiple bonding between main-group and transition elements. Alan's isolation of a phosphavinylidene complex, for example, represented the first example of a phosphorus compound with a metal–phosphorus double bond, and in more recent work he was able to isolate the first example of a linear terminal phosphinidene complex. The preparation of these and related compounds has permitted the acquisition of spectroscopic and X-ray structural data pertinent to these novel bonding situations.

Over the past few years, Alan has had a particularly strong impact on the chemistry of the main-group metals, most notably that of gallium and indium. This had been a sorely neglected subject in organometallic chemistry; however, the area is becoming increasingly important due, in part, to the demands of the medical and materials science communities. Specific accomplishments in group 13 chemistry include the synthesis and structural assay of the first neutral galla- and indacyclopentadienes and the first examples of structurally characterized monomeric aluminum and gallium hydrides. Other significant developments include the synthesis of novel intermetallic compounds in which gallium or indium is bonded to a transition metal. Alan has also made noteworthy contributions to the chemistry of the low oxidation states of these elements, namely the synthesis of the first indium (I) tetramer and two new classes of compounds with gallium–gallium or indium–indium bonds.

Some of Alan's work in organometallic chemistry has also had impact in a practical sense. One such area is the synthesis and development of single-source precursors to important electronic materials such as gallium arsenide, indium phosphide, gallium nitride, and titanium nitride. Judicious choice of ligands has permitted not only the isolation and structural characterization of the requisite precursors, but also unprecedentedly facile modes of decomposition to produce the requisite semiconductors and insulators. These efforts have culminated in the award of two US patents. Other noteworthy achievements in the materials science area include the synthesis of novel aluminum–phosphorus and gallium–chalcogenide cubanes. A second area of practical importance concerns the developments of new reagents. Phosphenium ions (R_2P^+), for example, exhibit reactivity patterns similar to those of both carbenes and carbocations. Another example is his work on heterocuprate reagents. Thus, treatment of the novel tetramer, $(t\text{-}Bu_2PCu)_4$, with alkyl- or aryl-lithium reagents represents an excellent preparative route to a wide variety of synthetically useful heterocuprates. Not only are these more thermally stable than others previously reported, but they can also be isolated in crystalline form, thus enabling the first structural study of this important class of reagent.

Alan's outstanding research record has been recognized by his receipt of a wide variety of awards including a Guggenheim Fellowship, the Royal Society of Chemistry Award for Main-Group Chemistry, the American Chemical Society Southwest Regional Award, the Chemical Pioneer Award of the American Institute of Chemists, and a von Humboldt Prize. His high level of international recognition is also evident from his tenure of several endowed lectureships including the Jeremy I. Musher Memorial Lectureship (Hebrew University, Jerusalem), the Mobay Lectureship (University of New Hampshire), the Karcher Lectureship (University of Oklahoma), the Reilly Lectureship (Notre Dame University), the Stiefvater Memorial Lectureship (University of Nebraska), the Irvine Review Lecturer (St. Andrews University, Scotland), the Baxter Lectureship (Northern Illinois University), and the inaugural Etter Memorial Lecture (University of Minnesota). Alan was elected a Fellow of the Royal Society in 1988, and received the order of 'Chevalier dans l'Ordre des Palmes Académiques' from the French government in 1997.

Alan's enthusiasm for inorganic and organometallic chemical research remains undiminished and he continues to run a very active research group. I, along with his friends and colleagues, wish him many more years of fruitful scholarship.

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