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A retrospective commentary on the influence of George H. Cady on the development of modern fluorine and inorganic chemistry

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We recognize George H. Cady as a founder of fluorine chemistry as we know it today. He viewed himself as an inorganic chemist with a real love for the interesting behavior of fluorine. He was a practical physical chemist. When it became necessary to get on with solving an experimental problem, he would devise and build an apparatus, such as the low temperature co-distillation system, without which we would never have been able to make headway on the hypofluorite and peroxide chemistry of that period.

He loved new challenges that evolving physical techniques presented and insisted that we use all available techniques to identify and characterize our compounds, such as vapor pressure, density, infrared, elemental analysis, and particularly the new fluorine NMR. His lab was surely one of the very first to be able to routinely obtain NMR data for a full range of compounds from uranium hexafluoride to fluoride anion. Our able technician, Barney Nist, and our most able graduate colleague, Claude Merrill, were able to coax increasingly high quality data from a quite primitive machine. George always 'demanded' (asked for) the best that could be obtained under the circumstances.

As has already been stated, his interests were very broad. He was an excellently learned scientist who happened to come along at a time when the field of inorganic chemistry was in its transition to the modern era! Let us look for a moment at a couple of examples to illustrate that point.

He was fortunate to have been able to do research with Joel Hildebrand, one known for his longevity as well as the practical physical chemistry on the thermodynamics and behavior of regular solutions. The work on the KF/HF system made it practical for us to have molecular fluorine as we do today, an item of commerce. After having completed my research with George Cady, it was most interesting to become a faculty colleague of Joel Hildebrand. During this time we had many opportunities to talk about Cady and that period in the research history of the Berkeley school of physical chemistry.

By many criteria, George Cady was a very conservative man. However, when it came to getting on with an experiment or to educating his students, he was as progressive as they come. The development of co-distillation and the use of fluorine NMR for structural resolution are pioneering examples.

In 1958 a text appeared that revolutionized inorganic chemistry. It brought what had been known as 'Werner' chemistry to the public in the form of 'coordination chemistry'. This book was *Mechanisms of Inorganic Reactions* by Basolo and Pearson. This milestone was not missed by George Cady. There was no instructor at the University of Washington in this area, so George Cady organized a seminar to study this book. As I recall, the group at that time, spring 1959, was enrolled and we studied the book. It is fair to say that none of us knew anything about this subject, including George Cady, but that was no reason not to sit together and collectively learn what we could. That collaborative effort was always a hallmark of his endeavors.

If we now look particularly at those areas of chemistry that he influenced, we can still see their importance as seen from the papers presented in this symposium.

(1) Who ever would have believed that the hypochlorites that Cady started studying would play such an important role in atmospheric chemistry today?

(2) The hypofluorites, particularly CF_3OF, have been a steady source of new, important, commercial fluids.

(3) Catalytic gas-phase direct fluorination of hydrocarbons still has its place in the development of new materials.

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(4) Fluorinated fullerenes would have fascinated him due to his interest in and knowledge of carbon electrode chemistry.

(5) Guest–host chemistry relates to his interest in the clathrates.

(6) 'Naked' fluoride and complexation of F^- from his interest in its analytical chemistry.

(7) Rare-gas chemistry in which he was an early participant continues to yield rich findings.

One could go on and run the risk of not mentioning someone's work and its relation to one of the many sub-fields that we have heard this week. As is obvious, the work of George Cady provided the solid underpinnings to join with the international community in developing a cadre of coworkers and now their coworkers to carry on this sophisticated, ever well understood body of research.

It is a year tomorrow that we lost this friend. Eleven months ago, Felix Aubke, Jean'ne Shreeve and I met in Seattle to discuss the practicality of this symposium. By the attendance and contributions of workers this week, we have demonstrated another of George Cady's influences on our community, that is the establishment of the Fluorine Division of the American Chemical Society as a working body for the transfer of knowledge and as an appropriate group in which we can assemble and pay our respects when that time comes.

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