James Lynn Hoard

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James Lynn Hoard, or Lynn as he was known to his many friends and colleagues, was a central figure on the faculty of Cornell's Chemistry Department for 35 years before his formal retirement in 1971. For more than a decade, in the ensuing years, he continued his distinguished career in structural crystallography, appearing daily at his office immersed in the painstaking scholarship that was characteristic of his entire career.

The sixth of seven children, Hoard was born on a family farm in Beckham County in the Oklahoma Territory. He was five when his family moved to Seattle, Washington where he spent his formative years. He studied the piano and for a number of years considered undertaking a career in classical music and interrupted his undergraduate studies for a year of music study. He was blessed with a remarkable memory and a strong sense of enquiry that eventually led to a lifetime of scholarship.

In 1927, Hoard was graduated from the University of Washington *magna cum laude* in chemical engineering. He was also awarded Phi Beta Kappa, the first chemical engineering student at that institution to be so honored. He continued at the University of Washington, earning a Master's degree in chemistry in 1929. He then went on to graduate work at the California Institute of Technology. This institution was rapidly rising as a major world center in science and it was there that he met and worked with Linus Pauling, forming a lifelong friendship. Pauling, reflecting on those early days with Hoard, wrote: "One memory I have of him, from several occasions, is the following. He would have learned about something surprising that had been discovered in the field of science, perhaps just told to him by me. He would stand for some minutes with a look on his face that suggested strongly to me his feeling of surprise and pleasure about the new discovery—his mouth held somewhat open and his eyes seeming to flash with pleasure."

Following Pauling, Lynn Hoard became one of the early pioneers in the application of x-ray diffraction techniques to the determination of crystal and molecular structures. In those days, the challenge of truly arduous calculations required both determination and structural insight of the investigator. In the midst of the Great Depression, Hoard brought his newly acquired skills to Stanford University where he served as an instructor for three years. After a brief term at Ohio State University, he joined Cornell in 1936.

It was characteristic of Hoard's approach to science that he did not—indeed, by nature, could not—turn away from difficult or seemingly intractable problems. His determination and self-confidence led him to pursue them

relentlessly even if it took a decade of effort. Thus, at Cornell, he undertook the study of the element boron and its binary compounds. The structures of these systems are among the most complicated in the Periodic Table. His initial achievement was the landmark structure of boron carbide which established the icosahedron as the basic building block of boron and borides. Later structures of the element itself and related systems led to an authoritative treatise in 1965 that stands today as a primary reference in the field.

In another area, Hoard's work in the structural chemistry of discrete coordination compounds comprises a touchstone for other investigators. His analyses, from the first report of a seven-coordinate complex through pioneering studies of eight-, nine-, and ten-coordinate complexes, have been marked by a singularly comprehensive view of the field.

This is particularly evident in his enunciation of stereochemical principles governing eight-coordination, an invariably cited standard. He also produced an extensive series of papers on coordination compounds of ethylenediaminetetraacetic acid (EDTA) that remain the outstanding source of carefully measured and critically evaluated structural data for these important systems. A dramatic illustration of the value of the insights developed by Hoard was his prediction and subsequent discovery of a seven-coordinate complex of iron (III), a complex that had been thought to be unrealizable.

Hoard's analyses of metalloporphyrin stereochemistry provided analytical underpinnings to a new era in the understanding of hemoproteins and their biological functions. His exacting interpretations of model compound crystal structures led him to set forth quantitative first principles as a basis for understanding such phenomena as cooperativity in the reversible oxygenation of hemoglobin. This approach led others to revise theories of biological processes and to seek and find key results in previously overlooked experimental observations.

Hoard's versatility as a scientist was evident in his work with the Manhattan Project during World War II. In addition to determining the structure of a critical compound of uranium, he conducted a large and successful project on the development of a smokeless propellant for JATO units for the Navy. He also participated in studies of diffusion mechanisms in polymeric materials.

Although he published some 115 papers, Hoard was not a facile writer. He combined faultless syntax with precision and economy of expression. Each paper became a labor of love, written and rewritten, paragraph by paragraph, sentence by sentence, clause by clause. He devoted the same attention to papers from other authors sent to him for review, sometimes spending days reforming ideas, recalculating and giving freely of his own contributions.

Editors, recognizing this, sent him more than his fair share to review. He applied the same stringent criteria to his teaching and would spend hours trying to improve the clarity of a single important concept.

Lynn Hoard loved Cornell and Ithaca and was reluctant to travel, although he frequently did so in later years. He came to Ithaca with his bride, Florence Fahey Hoard of Seattle, and raised a family of three sons, David and the twins Thomas and Laurence. In the early years, although under constant pressure from Lynn's participation in the Manhattan Project and his intense dedication to research, they nevertheless completed a major family project. They helped to design and manage the construction of a unique home which they were to share for forty-five years. Modeled along the lines of a Frank Lloyd Wright design, it has been an Ithaca landmark, graced by carefully planned and beautifully kept gardens.

Hoard's scientific contributions were widely recognized, even at the early stages of his career. In 1946, he was awarded a Guggenheim fellowship which he pursued at the California Institute of Technology. He received a second Guggenheim award in 1960 and then a very rare third fellowship in 1966. It was this third sojourn, spent largely in Cambridge, England that spurred his interest in the relationships between metalloporphyrin structures and biological mechanisms in hemoglobin.

In recognition of his great body of work in three important areas of structural chemistry, Hoard was elected to the National Academy of Sciences in 1972. This was followed in 1977 by the American Chemical Society Award for Distinguished Service in the Advancement of Inorganic Chemistry. Perhaps the most significant recognition he received was the warm esteem in which he was held by his Cornell colleagues, students and friends for more than a half-century.

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