

A CENTURY OF ACADEMIC CHEMICAL GROWTH IN ILLINOIS

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Two Illinois universities existed before 1877, namely, Northwestern (1851) and Illinois State University (1857) at Normal. University of Illinois started at Urbana in 1886 as a Land Grant institution under the federal Morrill Act (1862) which stipulated that a state could be given 30,000 acres of forest land for each senator and representative then in Congress to endow and maintain a college primarily devoted to teaching agriculture and the mechanic arts. Other Illinois state universities appeared later: Southern Illinois University at Carbondale and Edwardsville, Eastern Illinois University at Charleston, Western Illinois University at Macomb, and Northern Illinois University at DeKalb. These universities came to the Chicago area: University of Chicago in 1892, DePaul University (1898), Loyola University (1909, a descendent of St. Ignatius College, 1870), and Illinois Institute of Technology (1940, a merger of Armour (1892) and Lewis (1896) Institutes). Illinois also has many fine colleges with strong traditions.

When one realizes that Cannizzaro's development of Avogadro's hypothesis, Kekule's structure of benzene, and Mendelejeff/Meyer's periodic law all appeared during 1860-1870 it makes one wonder what may have been taught here a century ago. Some notion may be gleaned by considering the program of Oliver Marcy who taught at Northwestern from 1862-1899. His title was Professor of Natural History and Physics. Besides physics and chemistry, he taught zoology, moral science, philosophy, natural theology, mathematics, geology, physiology, logic, and Greek. It took a well rounded person to teach chemistry in those days! At that time it appears that this type of thing was more the rule than the exception.

Listing schools of Illinois in order of their doctoral programs is a better way to examine significant chemical growth. Here, University of Chicago was unquestionably the leader. Five years after it started (1897) it granted the Ph.D. degree in organic chemistry to Lauder W. Jones. The first Ph.D. at Urbana was in 1903 to William M. Dehn, also in

organic chemistry. Northwestern awarded one chemical Ph.D. in 1896 but not till a quarter of a century later did it have its next, namely, C. S. Hamilton in 1922 along with three others. The first doctoral award at Illinois Institute of Technology was in 1943 to R. H. Saunders.

Great chemists and strong leaders were responsible for these developments. Chicago started with a chemical giant, John Ulric Nef. His work on bivalent carbon, isocyanides, fulminates, and carbohydrates profoundly influenced a generation of chemists. His untimely death at age 53, caused by pneumonia, snatched a great leader from American chemistry.

In 1894 Nef appointed 3 to his staff: H. N. McCoy (uranium, europium), Alexander Smith (general inorganic chemistry), Julius Stieglitz (organic), each of whom made outstanding contributions. Later arrivals were W. D. Harkins (1912), Martin Hanke and T. F. Young (1923), W. C. Johnson (1927), M. S. Kharasch (1928). R. S. Mulliken was nominally in physics from 1928-1961, at which time he became professor of chemistry.

At Illinois, the chairman (1890-1904) and head of State Water Survey was A. W. Palmer. S. W. Parr, a revered professor who was well known for the Parr bomb and for his studies on coal, taught from 1891-1927. The start of Illinois as a famous research institution, however, dates from the chairmanship of W. A. Noyes (1907-1926). In this period these chemists and others brought fame to the University: Edward Bartow (water), C. W. Balke (tantalum), Roger Adams (organic), Oliver Kamm (qualitative organic analysis), C. S. Marvel (organic), G. F. Smith (perchloric acid, quantitative analysis), W. C. Rose (biochemistry). R. C. Fuson, R. L. Shriner, and John Bailar, Jr. were appointed between 1926 and 1928.

At Northwestern Medical School in Chicago from 1891-1907, John H. Long did pioneering work in the chemical phase of medical education. On the Evanston campus, graduate work started in earnest after World War I with W. Lee Lewis as chairman. In 1920 he lured F. C. Whitmore away from Minnesota and between them they obtained substantial grants from the Public Health Institute for work on organic arsenicals (Lewis) and organic mercurials (Whitmore). When Lewis resigned in 1924, I came as replacement. Whitmore headed the department with dynamic leadership. Research grants from American Petroleum Institute to both Whitmore and me were very helpful. With his grant, Whitmore started his work on hydrocarbons, developing the carbonium concept for which he became known internationally. Whitmore's earlier contact with Lauder Jones, then Dean at Minnesota, was basic for this work. Jones was advocating an electron-deficient nitrogen atom to explain

the Lossen rearrangement of hydroxamic acids and this served as the springboard for Whitmore to jump to an electron-deficient carbon atom in hydrocarbon rearrangements. My API grant was put to use in studying the pyrolysis of hydrocarbons.

Staff additions during this period included C. M. Suter and R. K. Summerbell in 1928, F. T. Gucker, Jr. in 1929, and Malcolm Dole in 1930. V. N. Ipatieff left Russia in 1930 to become associated with Northwestern for experimental work in catalysis and high pressure.

Growth of chemistry in the state of Illinois for the last 5 decades has been too vast to include, but it had a solid foundation on which to build.