EARLY HISTORY OF THE DEPARTMENT OF CHEMISTRY OF THE OHIO STATE UNIVERSITY[1]

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Abstract. Sidney Norton, appointed in 1873, was the first professor of chemistry at Ohio State, and for 20 years the only faculty member of the department. In these early years the annual student enrollment in chemistry was often less than 50. The growth of the department began in 1893 with the appointment of William McPherson as an assistant professor. By 1900, two more faculty members were added, and at the end of the first half century of its existence, there were 9 senior faculty members aided by a junior staff of about 40 assistants and graduate assistants. The undergraduate enrollment then totalled about 2,000 and the number of graduate students about 100.

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From the standpoint of exact nomenclature, the Department of Chemistry of the Ohio State University had its beginning in 1878 when this university title was given to the institution first known as the Ohio Agricultural and Mechanical College. At the time of the change in institutional title, however, chemistry was being taught in the same building, in the same way as it had been for the preceding 5 years, so that 1873 may reasonably be taken as the actual year for the start of the department.

The Department of Chemistry was one of the original 10 departments of the Ohio Agrictultural and Mechanical College. Sidney Augustus Norton, named by the first Board of Trustees in 1873 as Professor of General and Applied Chemistry, was the second faculty member appointed for this new institution. Probably a principal factor in his selection was his unusually varied background of education and teaching experience. He received his early education in the public schools of Cleveland, OH, and was a member of the first class to be graduated from the first high school of that city. He entered as a freshman at Western Reserve College, then located at Hudson, OH, but left after one year to enroll at Union College, Schenectady, NY, from which he graduated with a B.A. degree in 1856 as the first in a class of 90 students. He taught for one year at the Bartlett School, Poughkeepsie, NY, but returned to Union College in 1857 for graduate study in chemistry under Professor Joy. He received his M.A. from Union College in 1859. In 1958 he was appointed Instructor in Natural Science at Cleveland High School and remained there until 1867 when he was appointed to a similar position at Mt. Auburn Young Ladies Seminary in Cincinnati. In 1968 he was appointed Professor of Chemistry at Miami Medical Colleges, Cincinnati. Neither of these positions abosrbed all his energy, for he was concurrently a student at Miami Medical College from which he received his M.D. degree in 1869. His formal education was completed by 16 months of study abroad while on leave of absence from his professorship at Miami Medical College. He studied chemistry under Engelbach at Bonn, under Kolbe at Leipzig, and under Bunsen at Heidelberg. Professor Norton returned to his position in Cincinnati in 1870 and remained there until 1872, when he was appointed Acting Professor of Physics at Union College for the academic year preceding his appointment to the professorship at the Ohio Agricultural and Mechanical College. Professor Norton was for 20 years the sole faculty member of the Department of Chemistry. In the

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course of his teaching career at Ohio State he received an honorary Ph.D. degree from Kenyon College in 1878 and LL.D. degree from Wooster College in 1881.

In the beginning, the chemistry department occupied a small suite of rooms on the third floor of the first building on the campus, later known as University Hall. Only 2 courses were offered, one being a lecture course that extended over the academic year. This included inorganic chemistry, organic chemistry, and applied chemistry. The other, a laboratory course, extended over 3 years and consisted mainly of qualitative and quantiattive analysis. The enrollment in the lecture course in the first year was only 5 students. In the second year (1874) the total enrollment in chemistry was 14, including 2 students in the laboratory course. From this very small beginning the enrollment increased slowly; there were 31 students enrolled in 1876 and 61 in 1887.

One indication of the slight resources of the chemistry department in the first few years was a request made by Professor Norton to the Board of Trustees in 1875 for a grant of $77 to purchase a dictionary of chemistry. This request was granted and he later acknowledged it in a report to the board as follows, "At present the chemical library of the University consists of a Watt's Dictionary—a valuable book but one not fully supplying our need . . . . We have begun to take a chemical journal."

Professor Norton had no assistance, except volunteer help given by students without compensation, until 1879 when Mr. David O'Brine was officially appointed a student assistant. He continued to help Professor Norton until 1887 and was succeeded by Mr. Frederick Keffer, who served until 1892.

Soon after the name of the institution was changed to The Ohio State University, 3 new departments were added which were allied to the chemistry department and in which were taught certain courses in applied chemistry: the Department of Mining and Metallurgy (1879), the Department of Agricultural Chemistry (1884), and the Department of Pharmacy (1885). As a consequence it became necessary to provide a separate building to house the chemistry department and 2 of these new departments. The General Assembly in 1881–82 appropriated $20,000 for the construction of a 2-story laboratory building, which was completed in September 1882. The second floor was occupied by the Department of Chemistry and the first floor, initially, by the Department of Mining and Metallurgy, which later shared floor space with the Department of Agricultural Chemistry. At this time the course offerings in chemistry were revised. The first year course consisted of lectures in inorganic chemistry for two-thirds of the year followed by lectures in organic chemistry. The second course consisted of a year's work in qualitative analysis and the third course was a year's work in quantitative analysis. The fourth course, which was new, included organic analysis and toxicology.

Unfortunately, the first building for housing chemistry and the allied departments was not of fireproof construction, and on the morning of February 12, 1889 it was totally destroyed by fire. Temporary quarters for chemistry were provided in a classroom building later known as University Hall. The General Assembly, then in session, promptly appropriated $40,000 for another, larger building, which was ready for occupancy in September 1890.

In 1892, William McPherson (B.Sc. Ohio State, 1887; M.Sc. 1890), who had previously taught for 5 years in the high school at Toledo, OH was appointed as the assistant to Professor Norton. He was destined to have a distinguished career at the university. His outstanding abilities as a teacher and administrator were recognized very soon, for he was promoted to Assistant Professor in 1893, to Associate Professor in 1895, and to Professor in 1897. Moreover, Professor McPherson was given a D.Sc. degree by the university in 1895. He was the leading spirit in the organization of the Columbus Section of the American Chemical Society in 1897, and later served as its chairman. At the end of 1897 he took a leave of absence for graduate study in organic chemistry at the Uni-

versity of Chicago, from which he received his Ph.D. in 1899.

Soon after Professor McPherson became a member of the department considerable dissatisfaction arose in the university because no laboratory work was being given in the first year course in in chemistry. The dissatisfaction reached such a pitch that the head of the Department of Agricultural Chemistry withdrew all first year students from the general chemistry course and provided for them in his own department a first year course that included laboratory work. This action was followed by the withdrawal of all freshman engineering students from general chemistry and their assignment to the new course in the Department of Agricultural Chemistry. Because of these withdrawals, the chemistry department proper lost a large part of its student enrollment. Professor Norton attempted to solve this serious problem by introducing some laboratory work into his general chemistry course, but the dissatisfaction persisted. As a consequence he was forced to resign as head of the chemistry department in 1895 and Professor McPherson was appointed in his place. Professor Norton continued to serve the department until 1899, when he was retired as Professor Emeritus.

As the new head of the chemistry department, Professor McPherson took immediate steps to make laboratory work an essential part of the first year course in chemistry, and all the freshmen in agriculture and engineering were again enrolled in general chemistry. The introduction of a large amount of laboratory work into general chemistry, however, required additional staff. This took the form of graduate teaching assistants who were given the title Fellow and Laboratory Assistant. Two were appointed initially: William Lloyd Evans (B.Sc. Ohio State, 1892) and Richard M. Hughes (A.B. Miami University, 1893). Both of these men later had distinguished careers in teaching and administration. Because of increased numbers in the courses in analytical chemistry, Charles William Foulk (B.Sc. Ohio State, 1894) was appointed in 1896 as Assistant in Chemistry. He was promoted to Assistant Professor in 1898.

Various changes in the chemistry curriculum were initiated by Professor McPherson. Organic chemistry was added as a separate course in 1894, a course in theoretical chemistry was offered beginning in 1895 and a four year curriculum in industrial chemistry was established in 1896. Systematic graduate study and research leading to the M.Sc. degree was started at about the same time.

In June 1899 Professor Foulk was granted a two year leave of absence for graduate study in Germany, which he spent as a student of Ostwald at Leipzig. William Edwards Henderson (Ph.D. Johns Hopkins, 1897), who had been teaching at Ohio University, was appointed temporarily to replace Professor Foulk. He introduced courses in inorganic preparations and the history of chemistry, and considerably improved the course in theoretical chemistry, which was the forerunner of the later courses in physical chemistry. The department grew so rapidly around 1900 that when Professor Foulk returned from his leave, Professor Henderson was retained as a permanent member of the staff. This made possible further expansion of the course offerings in chemistry. Professor Henderson was promoted to Associate Professor in 1901 and Professor Foulk was likewise promoted in 1902.

The second chemistry building, which was named Chemical Hall, proved to be no more fire resistant than its predecessor. On the evening of February 19, 1904, it was totally destroyed in a spectacular fire that also destroyed a new addition and large quantities of recently purchased apparatus and chemicals. This was a very serious blow to the department. The General Assembly, then in session, immediately appropriated $15,000 for fitting out temporary quarters, chiefly in Townshend Hall, and $100,000 for the construction of another chemistry building, which was completed in time for the opening of classes in September 1906. This third structure still exists as the original part of the present Derby Hall.

The first year course in chemistry con-

tinued to grow in numbers to such an extent that additional staff was needed. In 1905 William Lloyd Evans (M.Sc., Ohio State 1896; Ph.D., Chicago, 1905) was appointed Assistant Professor to be in charge of the course in general chemistry. His lectures in this course were delivered with great vigor and zest, and he very soon came to be recognized on the campus as an exceptionally effective and inspiring teacher. To his students he was affectionately known as 'Billy' Evans.

In 1906 James R. Withrow (Ph.D., Pennsylvania, 1905) was appointed Assistant Professor in charge of the programs in industrial chemistry and chemical engineering, which had grown considerably. In the same year Clarence C. Vogt (A.B., Wooster, 1904) was named Instructor. In 1908 both Professor Foulk and Professor Henderson were promoted to full professorships, and William Evans was promoted to an associate professorship. The latter became a full professor in 1911.

At the invitation of Professor McPherson, the editorial office of Chemical Abstracts was moved from the University of Illinois to Ohio State in 1909, and given quarters in the chemistry building. This move was very advantageous to the chemistry department since it made available to the staff current issues of many chemical journals at a time when the holdings in the university library were far from adequate. It was also advantageous to Chemical Abstracts, both at the beginning and later, for various members of the department served as assistant editors or as abstractors. In the light of later developments it is somewhat difficult to realize that at the beginning and for a few years afterwards a single small room was sufficient to house all the editorial activities of Chemical Abstracts.

The first of a long series of successful college and high school textbooks and laboratory manuals by Professors McPherson and Henderson appeared in 1905. These came to be widely used, especially after 1915, and did much to make the department known nationally. Twenty-three original and revised editions of these books were published. Thirteen had Professors McPherson and Henderson as the only authors, and the rest had one or more additional authors. The second group even included a Chinese edition published in Shanghai in 1922.

In the period from 1900 to 1910, staff interest in an adequate graduate program increased markedly. Towards the end of this period a few students were working for the Ph.D. degree. In 1909 Clarence C. Vogt became the first to be awarded the Ph.D. in chemistry at Ohio State. Professor McPherson was instrumental in establishing the Graduate School at Ohio State University, and in 1911 he became its first dean. He continued to serve as chairman of the chemistry department, and even continued to do some teaching.

The only permanent addition to the teaching staff between 1906 and the entrance of the United States into World War I was Cecil E. Boord (Ph.D., Ohio State, 1912). He was named Instructor in 1912 and was promoted to Assistant Professor in 1914. Normal staff activities of the department were somewhat disrupted when the United States entered World War I. In 1917 Professor McPherson served in Washington as civilian advisor to the Trench Warfare Section of the United States Army, but was soon commissioned as Captain. He was promoted to Major in January 1918, and to Lieutenant-Colonel in July 1918. He was responsible for maintaining liaison between the Edgewood Arsenal and the various chemical organizations on which the arsenal depended. Professor Evans served in the army for 2 years, first as Captain, and then as Major in the Chemical Warfare Service and as Director of the Chemical Laboratories at Edgewood Arsenal. Even though the other staff members remained at Ohio State, most of them were engaged in activities connected with the war. To help handle the routine teaching duties during the war period, Jesse E. Day (Ph.D., Ohio State, 1916), Marion Hollingsworth (Ph.D., Ohio State, 1919), and Cloyd D. Looker (B.Sc., Ohio State, 1918) were added as instructors. The sole emeritus professor of the department,

Sidney A. Norton, died August 31, 1918 at the age of 83.

At the close of the war, additional staff was needed because of a marked increase in enrollment in chemistry. Edward Mack, Jr. (Ph.D., Princeton, 1916) was added in 1919 as Assistant Professor in charge of the courses in physical chemistry. In the next year Wesley G. France (Ph.D., Michigan, 1921) was added as Assistant Professor to teach colloid chemistry, at that time an active field of research in chemistry. Professor Henderson was appointed Dean of the College of Arts, Philosophy, and Science in 1921, but he continued to do some teaching.

In the first 2 decades of the department's existence, undergraduate specialization in chemistry was not possible because too few courses were available. The undergraduate curriculum in industrial chemistry, established in 1896, led to the degree B.Sc. in Chemistry, and the chemical engineering curriculum, established in 1902, led to the same degree. Both of these curricula were designed to be focational. The first course of study that made specialization in chemistry possible as a liberal arts subject was established in 1920 and led to the B.A. degree.

From 1900 to 1921 financial support for graduate students in chemistry was largely in the form of teaching assistantships, though a few fellowships or scholarships from general university funds were awarded most years. In 1921 the department received, for the first time, unrestricted grants for fellowships from chemical companies; two industrial research fellows were appointed for 1921–22, and three fellows for the following academic year. The first postdoctoral fellow in chemistry at Ohio State was M. L. Dundon (Ph.D., Ohio State, 1922) who was appointed to a National Research Council Fellowship for the academic year 1922–1923.

Publication of original research by members of the department began in 1895, as is shown by the following list arranged in groups according to the date of appointment to the faculty:

I

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McPherson, W. and W. L. DuBois 1908 On the action of o-benzoylphenylhydrazine on the halogen derivatives of quinones. J. Amer. Chem. Soc. 30: 816–822.

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Foulk, C. W. 1915 Modified buret calibrating pipet and certain points in the use of such instruments. J. Ind. Eng. Chem. 7: 689–693.

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III

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V

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VII

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The total number of research papers (72) published during the period 1895–1923 is very small as compared to the number published by the chemistry staff in subsequent years, and the number (15) published prior to the midpoint (1909) of this period is small indeed. The low rate of publication, especially for the first half of this period, may be ascribed to several factors. In the first place, the staff was small and the teaching load was heavy. Much effort was expended in the organization of new courses, including the writing of textbooks and laboratory manuals for these courses. Furthermore, there were not many graduate students and little in the way of funds for the support of research. Conditions for research markedly improved near the end of this period, for 32 publications appeared in 1919 to 1923.

The publications list indicates that organic chemistry was the main research interest of the department in the period 1895–1923, for 36 of the 72 publications deal with the reactions, synthesis, and structure of organic compounds, and 7 others with the analysis or testing or organic compounds or mixtures of such compounds. There are 10 publications in the field of inorganic analytical chemistry, 10 in the field of physical chemistry, and 9 that deal with new forms of apparatus and with miscellaneous topics.

At the end of the first half century of its existence the Department of Chemistry had a senior staff of 5 full professors and 4 assistant professors aided by a junior staff of about 40 assistants and graduate assistants. The undergraduate course enrollment totalled about 2,000 annually, and the number of graduate students was just over 100. By this time it had outgrown its merely local reputation and was beginning to be widely recognized as one of the more important chemistry departments in the country.

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