BEGINNINGS OF CHEMICAL EDUCATION IN BELOIT, LAWRENCE AND RIPON COLLEGES

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The liberal arts colleges located in Beloit, Appleton and Ripon were founded within a few years of one another when Wisconsin was achieving statehood and establishing its state university. The early development of chemistry in the University was reviewed recently by Ihde and Schuette. It is the purpose of the present paper to review the parallel rise of the subject in three of the state’s liberal arts colleges.

BELOIT COLLEGE

The Fourth Convention of the Presbyterian and Congregational Churches of Illinois and Wisconsin was the active group which secured from the Wisconsin Territorial Legislature in 1846 the charter for the school to be founded near the border of the two states. The founding fathers of the institution included Yale graduates, and the plans for the college reflected the ideas and ideals of the venerable institution at New Haven.

Instruction in college subjects was offered to several students in the fall of 1847. There was as yet no building and no faculty. The teaching was entirely in the hands of Mr. Sereno T. Merrill who was director of the Beloit Seminary which had been founded earlier to prepare students for college entrance. This arrangement continued until the following spring when Joseph Emerson (B.A. Yale ’41) arrived to take over the professorship of languages and Jackson J. Bushnell (B.A. Yale ’41) became professor of mathematics and natural philosophy.

The chair of chemistry and natural sciences went unfilled until the fall of 1849 when Stephen Pearl Lathrop arrived in Beloit. Lathrop was a graduate of Middlebury College (B.A. ’39) and the Medical College of Vermont at Woodstock (M.D. ’43). The years prior to his coming to Beloit were spent as a science teacher at Middlebury College, Assistant Geologist for the State Geological Survey, and principal of the Female Seminary at Middlebury.

The first college catalog stated that “Arrangements have been made for providing apparatus illustrating the departments of Chemistry and Natural Philosophy which will be ready for use
at the beginning of the coming collegiate year. One term of chemistry was offered during the junior or senior year, Silliman’s book being used as a text.

Lathrop was lured away from Beloit in 1854 to become the first occupant of the chair of Chemistry and Natural History at the University of Wisconsin. In order to make demonstrations before the students of the state institution it was necessary for him to borrow apparatus from the older college downstate. It was four years before the Lathrop vacancy was filled by a qualified chemist. Chemistry and natural science were not taught during the first three of these years. In 1857–58 William Hayes Ward (B.A. Amherst ’56) served as tutor in these subjects. He left at the end of the term to prepare for the ministry at Andover Theological Seminary.

Henry Bradford Nason (B.A. Amherst ’55), who had just completed his doctorate in chemistry under Friedrich Wöhler at Göttingen, arrived in 1858 to take over the courses in chemistry, physiology, geology, and mineralogy. The offerings in chemistry were still limited to one term per year since Nason held a similar chair in Rensselaer Polytechnic Institute at Troy, N.Y., to which he commuted semi-annually. Scientific apparatus was further improved during this period when Nason made purchases during trips to Europe. Of particular interest is the Chemical Society of Beloit College sponsored by Nason. This society was one of the earliest college societies of its type. Thomas C. Chamberlain, who later became one of the world’s leading geologists and was for some years president of the University of Wisconsin, was one of the members.

Nason decided in 1866 to devote his full time to the post in Rensselaer Polytechnic Institute. He filled this position with distinction for many years. A measure of the respect which he attained was shown in 1890 when he was elected president of the American Chemical Society. He was succeeded at Beloit by Elijah Paddock Harris, (B.A. Amherst ’55, Ph.D. Göttingen ’59) who had been teaching at Victoria College in Canada during the previous six years. Harris added a term of organic chemistry to the offerings at Beloit. His stay was terminated after two years when he returned to Amherst College to become Professor of Chemistry, a post which he held there until his retirement in 1907.

A third Amherst graduate with a Göttingen Ph.D. under Wöhler then appeared upon the scene at Beloit. James H. Eaton soon discontinued the course in organic chemistry but expanded the general course to a full year. Laboratory work was intro-
Elijah P. Harris, Beloit
1866-1868

Erastus G. Smith, Beloit
1881-1921

Russell Z. Mason, Lawrence
1854-1865
duced for the first time in 1869. A third term of chemistry was soon added and the students were now receiving instruction in qualitative and quantitative analysis and in spectrum analysis.

When Eaton died suddenly in 1876 his chair remained unfilled for five years. His courses in chemistry were offered by other faculty members until 1880. During that year C. Gilbert Wheeler, a Harvard graduate who had studied at Heidelberg and Berlin, divided his time between Beloit and Chicago Medical College. Wheeler offered two courses in inorganic chemistry using Norton's text and two courses in organic chemistry using his own text.

The following year saw the appointment of Erastus Gilbert Smith (B.A. Amherst '77, Ph.D. Göttingen '83) to the Professorship of Chemistry and Mineralogy. He was the fourth chemistry appointee at Beloit to have graduated from Amherst College and studied at Göttingen during the days when chemical instruction in that German university was under the influence of Friedrich Wöhler. Smith's stay at Beloit was a long and significant one. By the time of his retirement as Emeritus Professor of Chemistry in 1921, chemistry instruction at Beloit had evolved to modern form. The department had greatly expanded both with respect to variety of courses offered and the facilities for instruction.

In 1892 the department moved into the new Pearsons Hall of Science, designed by D. H. Burnham, famous Chicago architect. Completion of the building greatly stimulated the work in chemistry and saw the department offering one-term courses in general chemistry, qualitative analysis, and organic chemistry before the end of the century. Quantitative analysis was a two-term course. Physical chemistry was added in 1905. Other courses, such as sanitary chemistry, applied chemistry, chemistry for teachers, and electrochemistry, were offered at various times.

By 1906 the instructional load was sufficient to require a second staff member. Howard Dexter Smith (B.S. Rhode Island College '01, Ph.D. Tufts '06) served as Instructor in Chemistry for three years. When he left to take a position at the Lowell Textile Institute he was succeeded by Ben L. Glascock (B.A. Texas '07, Ph.D. Pennsylvania '09). Glascock remained only one year and was followed by Andrew F. McLeod (Ph.D. Chicago '06). McLeod had taught soils at Wisconsin, and organic and biochemistry at Chicago before coming to Beloit. When he left Beloit in 1919 he had attained the rank of Associate Professor.

Paul Winslow Boutwell, a Beloit graduate of 1910, received his Ph.D. in agricultural chemistry at the University of Wisconsin
in 1916. He joined the department at Beloit in 1920 and became head of the department the following year upon the retirement of Professor Smith. He was joined in that year by the late William J. Trautmann who had just received his doctorate at Wisconsin.

The rise of the present era of chemistry at Beloit followed a strong tradition of chemical education from the days the college opened its doors. The first occupant of the chair was a graduate of a recognized medical school. From then until 1921, the subject was taught, except for two short interludes, by American graduates of Amherst College who took their doctoral degrees in chemistry at Göttingen during the days when the influence of Wöhler was profound.

**LAWRENCE COLLEGE**

Territorial Governor Henry Dodge, early in 1847, signed the charter establishing Lawrence Institute of Wisconsin. The circumstances surrounding the founding of this college were associated with the activities of Eleazir Williams, claimant to the title of the “Last Dauphin.” Williams, an Episcopal missionary among the Wisconsin Indians, was financing his activities with money borrowed from Amos Lawrence, a Massachusetts merchant. In order to avoid foreclosure on the 5,000 acres of Wisconsin land which Williams had pledged as security, Lawrence purchased the land. Since his own health was poor the land was deeded to his son, Amos Adams Lawrence.

The idea of establishing a denominational college on the Fox River Valley land was soon germinating in the mind of the younger Lawrence. The lack of Episcopal strength in Territorial Wisconsin caused him to turn to the vigorous Methodist sect. In 1846 he proposed to Reverend William H. Sampson, presiding elder of the Fond du Lac District of the Rock River Conference, that he would give $10,000 for the founding of a college on the Lawrence lands provided that the sum would be equalled in the territory. The money was raised, the charter was granted, and a site was chosen on the banks of the Fox River. The site, to the disappointment of Lawrence, was not on his lands but near Lake Winnebago. The village which grew up in the vicinity was incorporated in 1857 as Appleton, being named for Samuel Appleton of Boston, a distant relative of Mrs. Lawrence. Work was begun on the first college building in the fall of 1848 and instruction began a year later.

The first classes were offered at the preparatory level under Principal William Sampson. James M. Phinney, A.M., a graduate
of Wesleyan University of Middleton, Connecticut, served as teacher of mathematics and natural science until 1852. The first catalog lists one quarter of chemistry offered in the first year of the college preparatory course. Johnston's text was used. In the second catalog, chemistry had been moved to the last two quarters of the first year, Gray's text being used. Second-year ladies were now included in the course.

The College Department was opened in 1853 when Edward Cooke began his six-year presidency. Reverend Cooke (A.M. Wesleyan '38) had been teaching and serving as principal in several Eastern seminaries before his call to Lawrence. During his first year the professorships of Mathematics and Astronomy and of Natural Science and Experimental Philosophy were unfilled, so the president taught these subjects. According to the catalog, one term of chemistry was offered to fourth-year students—of whom there were none as yet.

The Reverend Russell Zelotes Mason (A.M. Wesleyan '44) became Professor of Mathematics and Experimental Philosophy in the next year. He had been teaching mathematics and science at McKendree College at Lebanon, Illinois, the institution which had given President Cooke a D.D. the previous spring. The catalog now listed two terms of chemistry for the junior year. These two terms continued without change through 1863. Mason's title changed repeatedly, becoming Professor of Natural Science and General Physics by 1858. A year later he became acting president when Cooke resigned to take the pastorate of a Milwaukee church. Mason became president the following year, holding the position until 1865, when he resigned "on account of supposed religious heresies." He remained in Appleton in the mercantile and manufacturing business until 1879, when he moved to Silver Cliff, Colorado, to establish an assayer's office. He received an honorary LL.D. from the state university in 1866.

Mason's title became Professor of Ethics and Civil Polity in 1861, though he continued to teach the courses in science for two more years. Mathematics had been dropped from his shoulders with the coming in 1860 of Henry Pomeroy (B.S. Rensselaer '41, A.M. Union College '43) as Professor of Mathematics and Civil Engineering. Two terms of chemistry were still being offered, using Silliman or Gregory as alternative texts.

Reverend Samuel Fallows (B.A. Wisconsin '59, A.M. Wesleyan) became Professor of Natural Science and General Physics in 1863 but his time and efforts were largely devoted to recruiting the Fortieth Wisconsin Regiment which went to the front on June 14, 1864. Fallows accompanied the group, composed of pro-
professors and students from Wisconsin colleges, as lieutenant colonel. He never resumed his teaching duties at Lawrence though he became well known in religious and educational circles. His position was filled in 1865 by Welsh-born John Eugene Davies (B.A. Lawrence '62) who had just served in the Union Army for three years. Davies was doing work toward a medical degree at Chicago Medical College and in 1867 he left to take a faculty position at that institution. He received his M.D. a year later and became Professor of Natural History and Chemistry at the University of Wisconsin. At this institution his activities were gradually diverted from chemistry so that by 1874 he was confining his activities to physics and astronomy and soon thereafter solely to physics. He remained at Wisconsin until his death in 1900.

Chemistry became part of the professorial title in 1867, when James C. Foye became Professor of Chemistry and Physics. He had been teaching science and carrying out administrative work in several female academies since receiving his A.M. from Williams College in 1863. He remained at Lawrence twenty-six years. Chemistry was reduced to one term in the senior year during Foye's early years. Youman's book was used as a text.

Two terms of chemistry were not again offered until 1874. At that time Wilbur Fisk Yocum (B.A. Lawrence '60) changed from the professorship of Mathematics and Astronomy which he had held for four years to Professor of Natural History and Geology. When Yocum left two years later his chair went unfilled until 1886. During this time it was necessary for Foye to teach the courses in natural history and geology as well as those in chemistry and physics.

Laboratory work in analytical chemistry and mineralogy was introduced in 1882. Two years later a third term was added as a senior elective. Eight hours per week during this term were devoted to instruction in qualitative analysis. Clarke's "Chemistry" and Foye's "Chemical Problems" were now used as texts. Experimental demonstrations were given daily in the lectures. Foye's instruction, if we are to trust reminiscences of alumni, was not particularly inspiring. One alumna later said, "In 1885, when I was a Freshman, there was hardly any such thing as science as it is now understood. Professor Foye (sic) held up to our admiring gaze certain things which he looked at and declared them to be red or white, and we stood in a circle to receive shocks from an electric machine. But it was not until Professor Cramer came back in '86 that the modern era began."
Professor Frank Cramer, to whom she refers, became Professor of Natural History and Geology in 1886. He had just received his baccalaureate degree at Lawrence the previous spring. Since he had been close to graduation a year earlier he had been able to spend a year at Yale in special scientific study. He proved to be a popular and inspiring teacher at Lawrence but was forced to resign in five years on account of ill health. He went to California where he was active in establishing the Preparatory School for Boys at Stanford University.

The thirty-year presidency of Samuel Plantz, beginning in 1894, saw great changes in Lawrence University. The six presidents preceding Plantz had all been Methodist ministers, four of them being graduates of Wesleyan University. Academic emphasis had been on Greek and Latin, with little thought being given to the place of the natural and social sciences in the contemporary world. Plantz, a graduate of Lawrence in 1880, went on to the ministry but brought back to his alma mater a new enthusiasm to give the institution a real place in the life of Wisconsin. A vigorous campaign for endowments was initiated and faculty members with more extensive and specialized training were added to the staff. Only a few Ph.D.’s were on the faculty when Plantz became president, and their degrees were most often of the honorary variety; i.e., Foye had received a doctorate from Asbury University (later De Pauw) in 1882. After the coming of Plantz, there was a concerted effort to add German and American Ph.D.’s to the faculty.

When Foye left in 1892 to take charge of the chemistry instruction at Armour Institute his chair was filled by Earle D. Shepard, A.B. After only two years he was replaced by Charles Watson Treat (Ph.B. De Pauw ’90, A.M. ’93). Treat had also done summer work at the Lick Observatory, at Stanford, and continued to do summer work at Chicago. President Plantz’s activities soon led to the endowment of Treat’s chair of physics and chemistry by Philetus Sawyer, prominent Oshkosh lumberman and politician. By 1901 the two subjects had achieved sufficient importance to bring about a separation. Treat continued giving the instruction in physics until 1918. Lewis Addison Youtz (Ph.B. Simpson ’90, Ph.D. Columbia ’02) came in 1901 to direct the instruction in chemistry until his retirement in 1934.

The construction of the Stephenson Hall of Science in 1898 gave added emphasis to the sciences. Isaac Stephenson, well known in Wisconsin political circles on account of his purchase of a Senate seat, was the chief donor toward the project.
The catalog of 1904 reveals courses in general inorganic, qualitative and quantitative analysis, organic—including eight hours of laboratory work per week, physical chemistry and industrial chemistry. Student assistants were now helping with laboratory instruction.

Youtz continued as the sole chemistry professor until Florence Stouder (B.A. Denver ’19, Ph.D. Illinois ’25) was added to the staff in 1924. Upon her marriage in 1929 to Archie D. Power, Professor of Physics, she was succeeded by Stephen Foster Darling (B.S. Minnesota ’22, Ph.D. Harvard ’28).

RIPON COLLEGE

The citizens of Ripon were ambitious, in 1851, to have an institution of learning in their small community. A charter was secured from the state legislature and construction was begun on a stone building for Brockway College. Financial difficulties soon stopped progress. The Winnebago District of the Convention of Presbyterian and Congregational Ministers and Churches turned deaf ears to appeals for aid, but Reverend J. W. Walcott of Menasha took over administration upon payment of $400. Instruction at the preparatory level began in the spring of 1853.

The College continued an uncertain existence and even built another stone building, again largely by local efforts. The financial crisis of 1857 and the coming of the Civil War, however, forced the Convention to consider abandoning this educational venture. The school was closed during the year 1861–62 and the campus and building were leased to the government as a training place for the First Regiment of Wisconsin Cavalry. However, local loyalty again came to the rescue and sufficient funds were raised by subscription in 1862 for the Convention to recognize the college. Under the name of Ripon College, the school was rechartered in 1864. In 1868 the Convention relinquished all ecclesiastical control and the sole governing powers were vested in the trustees.

The first catalog was published for the year 1864–65. Two terms of chemistry were offered, one in general chemistry and one in organic and agricultural chemistry, both in the junior year. These courses were taught by Reverend William H. Ward, Professor of Latin, Natural Sciences and Physical Training. This was the same William Ward who had served as tutor at Beloit College in 1857–58 and who later became well known as the editor of the New York Independent. After two years, Professor Ward’s chemical efforts were replaced by those of Daniel
Merriman, A.M., whose official title was simply Professor of Natural Sciences.

The catalog of 1868–69 first includes the word “chemistry” in a professorial title but the Professorship of Chemistry and Natural History was unfilled that year. From 1869 to 1873 Lyman Beecher Sperry (A.M. Oberlin, M.D. Michigan ’67) filled the chair of Chemistry and Natural Science. The catalog of 1870–71 stated that “The Chemistry Department is provided with Laboratory and Lecture Room and there is considerable apparatus for the illustration of other Physical Sciences.” Under Sperry’s tutelege, two terms of inorganic and one of organic chemistry were offered.

Sperry’s chair was filled by Dr. Moses Barrett who died two months after coming to Ripon. William Gay Ballantine (A.M. Marietta ’68) came in February 1874 but stayed less than two years. Alvah H. Sabin (B.S. Bowdoin ’76, M.S. ’79) took the position in 1876. In 1877 a new building housing the Chemistry and Astronomy Departments was completed. Three terms of chemistry were offered during the sophomore year. Sabin left in 1880, becoming a specialist in paints and varnishes. He did considerable lecturing at various schools in the East and Middle West, including the University of Wisconsin in 1901–02.

During the years from 1880 to 1889 there was no permanent teacher of chemistry employed, but chemistry never lost its place in the curriculum. No matter what the special field of the man who taught the chemistry courses, chemistry was always included in his title. For example, two of the other faculty members who taught chemistry during this interval were Charles H. Chandler (B.A. Dartmouth ’68, M.A. ’71), Professor of Chemistry and Physics, and C. Dwight Marsh (B.A. Amherst ’77, M.A. ’80), Professor of Chemistry and Biology. As many as four terms of chemistry were offered during this time, but consisting only of general and analytical. Laboratory work was included as a regular part of the curriculum and the analytical courses consisted almost entirely of that type of instruction, ten hours a week being required.

With the coming of William Stowell Leavenworth (B.S. Hamilton ’89, M.S. ’92) in 1889, Ripon again had its chemistry and physics instruction on a more permanent basis. During his fourteen-year stay, the chemistry department expanded into something like its present organization. More and varied types of courses were offered and it became possible to major in the subject. A significant influence on this expansion was the building of Ingram Hall of Science, completed in 1900. The chemistry de-
partment occupied the third floor. The facilities available were a lecture room adequate for fifty students, a general laboratory for thirty-five students, a quantitative laboratory for sixteen, and a qualitative laboratory for twenty. In addition there was a private laboratory for advanced students, and a private laboratory for the incumbent professor. All laboratories were equipped with hoods and other standard equipment.

The catalog for 1900–01 listed the following courses in chemistry: general; two courses in qualitative analysis; quantitative analysis; organic; medical chemistry consisting of urinalysis and toxicology. In the next few years various other courses were offered intermittently; mineralogy, for example, and a second semester of organic especially for premedical students.

George F. Weida (B.S. Kansas '90, Ph.D. Johns Hopkins '94) was the first Ph.D. to hold the post of Professor of Chemistry at Ripon. His arrival in 1903 followed Professor Leavenworth's acceptance of a position at Olivet College in Michigan. Dr. Weida's short stay from 1903 to 1907 did not cause any significant change in the offerings or organization of the chemistry department except the introduction of a course in the history of chemistry. In 1907 Weida took a position as Professor of Chemistry at Kenyon College in Ohio.

A further expansion in the course offerings came under Albert Franklin Gilman (B.S. Amherst '97, Ph.D. Denver '13), whose name first appears in the catalog of 1906–07. By the end of his first year at Ripon, Gilman was offering, in addition to the courses previously given, a term of physical chemistry and another term of organic.

In 1909 Burrell O. Raulston (A.B. Marysville '09) was employed as Instructor in Chemistry to relieve Gilman of a part of his rather extensive load. Raulston had been a student of Gilman at Maryville before the latter came to Ripon. Raulston was at Ripon only three years, and upon his departure a part of the teaching burden was taken by successive seniors who were majoring in chemistry. The first senior to hold this position of Laboratory Assistant in Chemistry was E. L. Krause who, after taking his M.A. at the University of Wisconsin, became Professor of Chemistry at Marietta College in Ohio. In 1917 Gilman left Ripon to accept a post at Huron College. In 1920 he became Professor of Chemistry at Carroll College.

Augustus Lawrence Barker (B.S. Alabama '10, M.S. '11, Ph.D. Wisconsin '22) became Professor of Chemistry at Ripon in 1917 upon the departure of Gilman.
GENERAL TRENDS

This review of chemistry instruction in three Wisconsin colleges reveals certain similarities as well as differences. Similarity is apparent in the manner in which teaching programs evolved. The teaching programs rather clearly fall into three periods: 1) the natural science, 2) the physical science, and 3) the chemical. This same trend was apparent in the development of chemical instruction at the University of Wisconsin.²

The natural science period occurred in the early years in each college. During this period the science courses, and often even the mathematics courses, were taught by one professor. He might be an M.D. but was as likely to be a minister. In alternating terms he was likely to teach physics and chemistry, botany and zoology, geology and mineralogy, mathematics and astronomy.

With growth of the colleges there was a transition to the physical science period where chemistry was taught along with physics and perhaps geology and mineralogy. Biology and mathematics were no longer part of the chemistry teacher’s repertory. The professor of chemistry and physics could no longer be called “Reverend” and was likely to have some graduate training in the sciences, possibly even a doctor’s degree. The offerings in chemistry were increased somewhat to include the organic and analytical aspects of the subject. Laboratory instruction was introduced during this period.

The chemical period began when a full-time professorship of chemistry was established. The occupant of the chair carried a Ph.D. in the subject, or acquired one during his period of tenure. Laboratory instruction was expanded and student assistants were added to the staff. Later an additional staff member of professorial rank would be added. The curriculum was enriched by courses such as physical chemistry, food analysis, and industrial chemistry.

The duration of each of the periods varied greatly in the different institutions. Beloit passed almost at once from the first to the second. The State University required almost two decades to make the same step, while Lawrence and Ripon failed to complete the transition before 1890. The State University, however, made the second transition rather quickly, while the other three colleges failed to complete the step before the beginning of the twentieth century.

Laboratory work was inaugurated at Beloit in 1869, at Ripon in 1880, and at Lawrence in 1882. Beloit was the first to acquire a separate building for the sciences (1892). The science build-
ings at Lawrence and Ripon were not constructed until 1898 and 1900, respectively. Separate professorships of chemistry were created at Beloit in 1898, Lawrence in 1901, and Ripon in 1904. The parallelism in the development of chemical instruction in these three colleges is particularly striking when the different organizational and economic circumstances of these schools is considered. The causes of these parallel trends must lie outside the immediate environment of the schools themselves. The increased importance attached to science in general and chemistry in particular at the turn of the century seems to be a factor in these trends. The Census Committee of the American Chemical Society reported at the Twenty-Fifth Anniversary Meeting in 1901 that since 1876 “accommodations for students and teachers have increased as one to twenty-five.” The expanding facilities for chemical education within these Wisconsin colleges can be interpreted as the manifestation of this more general trend.

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NOTES AND LITERATURE

1. Present Address: Boston University, Boston 15, Massachusetts.