THE UNIVERSITY OF ILLINOIS
THE STATE UNIVERSITY
Urbana
Edmund J. James, Ph.D., LL.D., President

THE UNIVERSITY INCLUDES THE FOLLOWING DEPARTMENTS:
The Graduate School,
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The College of Dentistry (in Chicago),
The School of Pharmacy (in Chicago; Ph.G. and Ph.C. courses),
The Summer Session (eight weeks).

Experimental Stations: U. S. Agricultural Experiment Station; Engineering Experiment Station; State Laboratory of Natural History; State Entomologist's Office; Biological Experiment Station on Illinois River; State Water Survey; State Geological Survey; Mine Rescue Station.

The Library collections contain (March 1, 1914) 291,000 volumes, including the Library of the State Laboratory of Natural History, the Quine Medical Library, and the Library of the School of Pharmacy.

For catalogs and information address

THE REGISTRAR,
Urbana, Illinois.
UNIVERSITY OF ILLINOIS

DEPARTMENT OF CHEMISTRY

History, Equipment, Members of the Faculty, Students and Announcement of Courses for the Year 1916-1917

The Cosmic Elements
Basil Valentine

Published by the University of Illinois
URBANA
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THE UNIVERSITY CALENDAR

1916

Jan. 3, Monday, 12 m. Instruction resumed
Jan. 27, Thursday Semester examinations begun
Feb. 3, Thursday Semester examinations ended

SECOND SEMESTER, 1915-1916

Feb. 7, 8, Monday, Tuesday Registration days
Feb. 9, Wednesday Instruction begun
Feb. 12, Saturday Lincoln Day
March 31 to April 3 Chemistry inspection trip
April 18-21, Tuesday-Friday Spring meeting of American
Chemical Society
April 19, Wednesday Dedication of Chemistry Building
April 20, Thursday, 12 m. Easter recess begun
April 25, Tuesday, 12 m. Instruction resumed
May 13, Saturday, 12 m. Latest day for the receipt by the
Dean of the Graduate School of certified copies of doctors'
theses.

June 1, Thursday, 8 a. m. Final examinations begun
12 m. Latest day for acceptance of undergraduate theses.
June 3, Saturday, 12 m. Latest day for receipt by the Dean
of the Graduate School of certified copies of masters' theses.
June 8, Thursday Final examinations ended.
June 11, Sunday Baccalaureate address
June 14, Wednesday Forty-fifth Annual Commencement.

SUMMER SESSION, 1916

June 19, Monday Registration day
June 20, Tuesday Instruction begun
Aug. 10, 11, Thursday, Friday Final examinations.
FIRST SEMESTER, 1916-1917

Sept. 18, 19, Monday, Tuesday
Sept. 20, Wednesday
Nov. 6, Monday, 5 p.m.

Nov. 17-19, Friday to Sunday
Nov. 29, Wednesday, 12 m.
Dec. 4, Monday, 1 p.m.
Dec. 21, Thursday, 11 a.m.
Jan. 3, 1917, Wednesday, 1 p.m.
Jan. 25, Thursday
Feb. 1, Thursday

Registration days
Instruction begun
Latest day for announcement of subjects of all undergraduate and graduate theses.
Annual home-coming
Thanksgiving recess begun
Instruction resumed
Holiday recess begun
Instruction resumed
Semester examinations begun
Semester examinations ended

SECOND SEMESTER, 1916-1917

Feb. 5, 6, Monday, Tuesday
Feb. 7, Wednesday, 8 a.m.
Feb. 12, Monday
April 5, Thursday, 12 m.
April 10, Tuesday, 12 m.
May 12, Saturday, 12 m.

May 31, Thursday
June 7, Sunday
June 13, Wednesday

Registration days
Instruction begun
Lincoln Day
Easter recess begun
Instruction resumed
Latest day for receipt by Dean of the Graduate School of certified copies of doctors' theses.
Final examinations begun
Baccalaureate address
Forty-sixth Annual Commencement
BOARD OF TRUSTEES

THE GOVERNOR OF ILLINOIS ........................................ Ex Officio
EDWARD F. DUNNE ............................................... Springfield
THE PRESIDENT OF THE STATE BOARD OF AGRICULTURE .... Ex Officio
LEN SMALL ......................................................... Kankakee
THE SUPERINTENDENT OF PUBLIC INSTRUCTION .... Ex Officio
FRANCIS G. BLAIR ............................................... Springfield

TERM EXPIRES

WILLIAM L. ABBOTT, 72 W. Adams Street, Chicago ........... 1917
OTIS W. HOIT, Geneseo ........................................ 1917
MARY E. BUSEY, Urbana .......................................... 1917
ELLEN M. HENROTIN, 1656 N. LaSalle Ave., Chicago ....... 1919
JOHN R. TREVETT, Champaign ................................ 1919
FLORENCE E. WATSON, Iola .................................... 1919
LAURA B. EVANS, Taylorville ................................. 1921
ROBERT F. CARR, Chicago ..................................... 1921
ROBERT R. WARD, Benton .................................... 1921

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HARRISON E. CUNNINGHAM, Urbana ........................ Secretary
HAZEN S. CAPRON, Champaign ............................... Treasurer
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EXECUTIVE OFFICERS

Edmund Janes James, LL.D., President.

David Kinley, Ph.D., LL.D., Vice-President, Dean of the Graduate School.

Eugene Davenport, M.Agr., LL.D., Dean of the College of Agriculture.

William Freeman Myrick Goss, M.S., D.Eng., Dean of the College of Engineering.

Kendric Charles Babcock, B.Litt., Ph.D., Dean of the College of Liberal Arts and Sciences.

Nathan Austin Weston, Ph.D., Acting Dean of the College of Commerce.

William Chandler Bagley, Ph.D., Director of the Summer Session.

DEPARTMENT OF CHEMISTRY

William Albert Noyes, Ph.D., LL.D., Director of the Chemical Laboratory and Professor of Chemistry.
The first building at the University, Rear view

The Department of Chemistry began its existence in the basement of the rear wing of this building. From a photo taken about 1875.

The Chemical Library as it appeared in November, 1892

This was the first departmental library established at the University. Only the most frequently used reference works were kept here. Photo by W. E. Tower, '94.
INSTRUCTIONAL STAFF


PARR, SAMUEL WILSON, B.S. 1884, Univ. of Ill.; M.S. 1885, Cornell Univ. Prof. of Applied Chemistry, 919 W. Green (U.).

GRINDLEY, HARRY SANDS, B.S. 1888, Univ. of Ill.; D.Sc. 1894, Harvard Univ. Professor of Animal Nutrition. 918 W. Green (U.).

BARTOW, EDWARD, A.B. 1892, Williams Coll.; Ph.D. 1895, Göttingen Univ. Director of State Water Survey and Professor of Sanitary Chemistry. 1007 W. Oregon (U.).


MCFARLAND, DAVID FORD, A.B. 1900, A.M. 1901, Univ. of Kans.; M.S. 1903, Ph.D. 1909, Yale Univ. Asst. Professor of Applied Chemistry. 906 Gregory Place (U.).

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MacInnes, Duncan Arthur, B.S. Univ. of Utah, 1907; M.S. 1909, Ph.D. 1911, Univ. of Ill. Associate in Chemistry. 614 Michigan (U.).

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Hecker, Charles Henry, Ch.E. 1909, A.M. 1911, Ph.D. 1913, Univ. of Cincinnati. Instructor in Chemistry. 904 W. Green (U.).

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†Kamm, Oliver, B.S. 1911, M.S. 1913, Ph.D 1915, Univ. of Ill. Instructor in Chemistry. 901 W. Nevada (U.).


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*Resigned December 1, 1915.
†Resigned February 1, 1916.
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WELLS, LANSING SADLER, A.B. Univ. of Mont. Graduate Assistant. 403 S. Wright St. (C.).

*Resigned December 1, 1915.
†Died January 3, 1916.
DEPARTMENT OF CHEMISTRY


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SCIENTIFIC STAFF


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WHITTUM, FRED HORACE, B.S. Univ. of Ill., 1911. Asst. Chemist in Dept. of Applied Chemistry. 1107 W. Oregon St. (U.).


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JONES, ORAH, A.B., Clerk in Office of State Water Survey. 507 E. Green St. (C).
GEYER, HELEN F., Stenographer, Division of Applied Chemistry. 702 W. High St. (U).
HART, LIZA, Stenographer, State Water Survey. 515 Neil St. (C).
DAY, NELLE, Stenographer, State Water Survey. 806 W. Stoughton St. (C).
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MILLAR, RUSSELL WARD, Student Assistant. 504 Daniel St. (C).
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CRAWFORD, CHARLES C., Storekeeper. 1205 W. Clark St. (U).
PEEL, THOMAS, Lecture Assistant. 1009 Railroad Ave. (U).
MOCK, FORREST, Assistant Storekeeper. 202 E. Illinois St. (U).
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KLOTZCHE, BERNARD T., Laboratory Helper (Student). 1003 W. California St. (U).
FAIRBANKS, BERTHIER, Laboratory Helper (Student). 617 W. Healey St. (C).
MOON, Cecil, Laboratory Assistant, State Water Survey.
MOODY, D. L., Janitor. 405 E. Daniel St. (C).
PERRY, FRANK M., Janitor. 504 E. Healey St. (C).
BROWNING, JOHN EDWARD, Night Janitor. 1202 W. Clark St. (U).
ROE, JOHN, Messenger. 201½ E. Park St. (C).

*Resigned January 1, 1916.
HOME OF THE DEPARTMENT OF CHEMISTRY FROM 1878 TO 1902
PHOTO BY S. W. STRATTON, '84

THE CHEMICAL LABORATORY AS IT APPEARED SOON AFTER ITS ERECTION IN 1902. PHOTO BY S. W. PARR, '84
The inaugural ceremonies and formal opening of the University of Illinois* occurred March 11th, 1868. The Board of Trustees met on that date and received the first annual report of the Regent (President) of the University. In this report occurs the first reference to chemical work in the institution, as follows: “It is especially important that an appropriation should be made to fit up, at once, a chemical laboratory.” At the same meeting of the Board, on recommendation of the Regent, it was voted to appoint Professor J. A. Sewall of the Illinois State Normal University, Normal, Illinois, to the chair of Chemistry. Dr. Sewall declined the appointment. His only connection with the University was to deliver the first annual address before the Literary Societies in June of that year. The records do not give any of the details from which we might surmise the reasons for his withdrawal. However, the State Normal, founded in 1857, had a remarkably strong faculty, was an exceedingly popular institution, and occupied a leading place in the educational work of the state. Moreover the environment was attractive, thanks to a public spirited citizen who had planted trees by the thousand over most of the area likely to be occupied by the new town of Normal, so that it was rapidly assuming the appearance of a park or forest.

The Urbana-Champaign institution, on the contrary, was located on a most uninviting strip of flat open prairie one mile from either town; it was to inaugurate a novel and untried educational program, the published announcement of which had already awakened more antagonism than support and the students in attendance at the time numbered seventy-seven.

It may be remarked, in passing, that the writer of this sketch obtained his first chemical experience in Dr. Sewall’s laboratory. In the capacity of the ubiquitous small boy with perhaps overgrown curiosity, he was watching some advanced students assemble a hydrogen generator. For some reason, not altogether clear at this remote date, but which would not be difficult to surmise, the outfit exploded with a liberal distribution of acid upon everything in the

*Originally the Illinois Industrial University, until changed by Act of the Legislature, June, 1866.
neighborhood. There were no permanent injuries except to clothing. The coat, which was a new one, had to be worn just the same in spite of the leopard spots. This might be designated as an early experience in applied chemistry.

In August, 1868, there was better success, as indicated by the following extract from the minutes of the Board:

"Professor Sewall having declined the appointment tendered him to the Chair of Chemistry, the committee, under authority given by the Board, secured the services of Prof. A. P. S. Stuart, late of Lawrence Scientific School, Harvard University, and now recommend Prof Stuart to the Board for permanent appointment to the chair of Chemistry."

The following action further appears upon the minutes of the Board under date of Nov. 18th, 1868:

"That Prof. A. P. S. Stuart be and is hereby elected to the chair of Chemistry at a salary of $2,000 per annum to take effect from and after September 1st, 1868."

In the minutes of the Board for March 12, 1869, containing the second annual report of the Regent, it appears that the initial cost for equipping the laboratory was $978.00. There was submitted also by Professor Stuart a plan of compensation for chemicals used by the students. Since the provisions therein embodied contain many features which have been of fundamental importance in the development of the department they are given somewhat in detail as follows:

"For a course of two hours daily, excepting Saturday, during a term of twelve weeks the sum of $12 shall be deposited by each student. For a course occupying four hours daily the sum deposited shall be $24, and for a course of six hours the sum deposited shall be $36. An account shall be kept by the Professor of Chemistry with each student; all articles shall be charged to him at cost and a credit entered for all articles returned in good condition, except that a charge of 20 per cent of the cost shall be made for the use of same. Such percentage, however, shall not exceed $3 for the term. Students shall pay the cost value of the apparatus broken or destroyed by them individually."

Further:

"All money received from students for chemicals and apparatus shall constitute a distinct fund from which the Professor of Chemistry may draw to purchase supplies from time to time as occasion may require."

In the budget presented to the Legislature in 1869, an asking of $30,000.00 appears with the result that $5,000.00 was appropriated.
With the revenue thus provided the first laboratory was equipped and operated. It was located in the basement of the south wing of the original University building. This building, shown in the accompanying cut, occupied the space now taken by the base ball diamond at the north end of the athletic field. It fronted northward on University Avenue.

The need for more room developed at an early date. In his annual report for March, 1871, the Regent, referring to Legislative action, says:

"An appropriation of $50,000 was asked for a laboratory building. Other needs compelled a denial of the request. This is the more to be regretted because long before a suitable building can be erected the department will have utterly outgrown its accommodations. It may be found wise to prepare temporary quarters for it in the basement or some other part of the new building."

The "new building" referred to was the present University Hall, then in process of erection.

At the annual meeting of the Board, March, 1872, the Regent in his report refers to the "College of Chemistry" and urges that the agricultural interests and the size of the University require that a chair of Agricultural chemistry be established, which should be filled before the next year. He again calls attention to the need of more room thus:

"Our laboratory, wholly insufficient for a University of this character, has tables for thirty-four students to work at once. It has this year been crowded to the overflow, two sets of students succeeding each other at the same tables. The number of students specializing is not large—fourteen—but other calls will increase the demand. * * * It will be necessary to transfer the laboratory to the basement of the new building until a new one can be built."

The equipment of the laboratory had been materially increased as a result of a trip to Europe by Professor Stuart during the summer of 1871 for the purpose of selecting in person the apparatus desired. The list of accessions is interesting. One item of interest was a platinum retort for making hydrofluoric acid, weighing 1,000 grams, and costing $200.00. Included in the somewhat formidable list of gas apparatus, polarizers, saccharometers, goniometers, a Geisler's mercurial air pump, etc., were "two chemical balances of short beam type peculiar for their rapidity and accuracy of operation" and a Ross photographic lens listed at $100.00.

Professor Stuart continued to the end of the year 1873-4. The
Regent, notwithstanding his persistent efforts, had been unable to secure an appropriation for a new laboratory and was definitely planning, as the only alternative, to set aside more liberal quarters in the new University Hall. This was not acceptable to Professor Stuart and he resigned. His withdrawal doubtless hastened the securing of the new building.

Very little remains today of this early equipment. Two of the desks transferred from the original laboratory to the basement of the new building (the present law college) were moved a second time and now adorn the north end of what is known as Dr. McFarland's junk room. The Geisler air pump is a nearby companion of the old desks. The fine photographic lens is in the photographic department where, in comparison with modern lenses, it is reckoned as worth at least its weight in brass. The platinum retort was exchanged in 1903 for about $800.00 worth of much needed platinum dishes. Many of the original sets of reagent bottles remain in service today, but practically all of the other apparatus, including the "peculiar" short beam balances, were destroyed in the fire of August 15th, 1896.

One feature of Professor Stuart's administration should receive special mention. The journals and books of reference added to the library were well selected and gave to this department a distinction which it has consistently maintained. The list at this early date included the Annalen, Jahresbericht, Dingler's Polytechnisches Journal, The Handwoerterbuch der Chemie, Silliman's Journal, The American Chemist, The American Journal of Science, Berichte, Comptes Rendus, Journal of the Franklin Institute, the Philosophical Magazine, Watt's Dictionary of Chemistry, etc., etc. The University library was located on the floor immediately above the chemical laboratory in the south wing of the original building.

Professor Stuart was a student under J. P. Cooke at Harvard, with whom he was serving as an assistant in 1868. He had spent the previous year in study abroad. The laboratory at Harvard was one of the earliest in this country to be organized for student work, and that the new instructor brought with him enthusiasm for the same method of instruction is evident when we note the obstacles to be overcome. The only water available was from the college pump. There was no city gas supply and electricity by the meter route was of course unknown. A kitchen stove was installed in the laboratory and this was the only source of heat.
Whether it may be taken as an index of the low cost of living or the economical propensities of the professor is not stated, but it used to be remarked about the campus that he came at a salary of $2,000.00 per year, staid five years and took away $10,000.00 with which to start a banking business in the west. However, he was unmarried and lived in the building in a sort of supervisory capacity.*

Henry A. Weber was appointed Professor of Chemistry September 1st, 1874, and served until June, 1882. He had studied under Liebig at Munich and received his Doctor's degree from Ohio State University in 1879. He had been chemist to the Ohio Geological Survey since 1869.

Dr. Manly Miles served as Professor of Agriculture and Instructor in Agricultural Chemistry for one year—1875-6. In 1876, M. A. Scovell, B.S. in Chemistry, Illinois, '78, was elected Assistant Professor of Chemistry and had in charge the courses in Agricultural Chemistry. In 1880 he was made Professor of Agricultural Chemistry, which chair he held until 1882.

The appropriation for the new Chemical Laboratory was secured early in 1877 and amounted to $40,000.00. Plans for the building were prepared by Professor Ricker and approved by the Board at the March meeting, 1877. The architect in his plans had in mind a location on the north side of Green street, about where Engineering Hall is now situated. As has occurred on numerous occasions since, a very positive division arose in the Board as to the most suitable location. This point was not settled until the September meeting. Meanwhile bids had been called for and these referred of course to the plans as originally drawn. Since the building was completed and occupied in the spring term of that same year, it is evident that no time was spent in disturbing the original plans. These called for a main entrance at each end of the building, but in the new location the north entrance was too inconvenient for use and the south entrance led only to the janitor's garden. Neither entrance was ever opened. The basement entrance on the west side was utilized and after some years the south entrance was moved around to the west side. Unfortunately this pleasing bit of architectural effect is now lost from both the side and end of the building.

City gas was available and water under pressure was provided from a large steel tank supported in the mansard story and kept supplied by a pump in the basement. The source of supply came from a well. Two cisterns were available when the well went dry.

*Professor Stuart died at Lincoln, Neb., in 1895.
They were replenished from the laboratory down spouts and are still in commission.

The Board voted an assignment of $125.00 as a sort of honorarium to the architect. This would seem to be reckoned on a basis of about 0.3 of one per cent. Doubtless the fixing of architects' fees has not been left permanently with the Board.

The method of instruction followed by Professor Weber was quite German in character. Laboratory work began with qualitative analysis. The work in elementary chemistry consisted of lectures and recitations only. There were no recitations in any of the courses following the elementary text. It was said of the department at this time that in it one could attain to the very highest or the very lowest stage of chemical knowledge, depending entirely upon the zeal of the student. The grades turned in were much the same for either type. As a natural result the department became attractive to many students who could not make things go in other lines of work.

An unfortunate disagreement with the Board in 1882 resulted in the withdrawal of both Professors. It does not appear that the circumstances attending the termination of their appointment affected in any degree their subsequent careers. Dr. Weber was engaged from 1882 to 1884 as Superintendent and Director of a large establishment for the manufacture of sugar from sorghum, located at Champaign, and was Professor of Agricultural Chemistry at Ohio State University, Columbus, from 1884 until his death in 1912. Professor Scovell was the exceedingly successful and highly esteemed Director of the Kentucky Agricultural Experiment Station from 1885, and also Dean of the College of Agriculture from 1909 until his death in 1912. It may be of interest to note that he was offered the same appointment at Illinois in 1894 but he chose to remain at the University of Kentucky.

Professor William McMurtrie was appointed head of the department September, 1882. The position of Professor of Agricultural Chemistry was not revived. The funds of the institution seemed not to warrant any expenditure that could possibly be avoided. This may be inferred from the fact that the total legislative appropriation for the biennium 1881-83 was only $41,300.00, or approximately $20,000.00 per year, and of this only $5,700 per year was designated as for instruction.

Professor McMurtrie graduated from Lafayette College in
1871. His experience and training had been largely along Agri-
cultural lines. He was assistant chemist in the U. S. Agricultural
Department in 1872 and chief chemist in 1873. He was designated
as Agent and Special Representative of the Government at the Paris
Exposition in 1878 and Special Agent of the Agricultural Depart-
ment in the study abroad of the beet sugar industry. He served
thus in the capacity of "Agricultural Technologist" for the Govern-
ment until the time of his appointment here in 1882. Dr. Mc-
Murtrie was a strict disciplinarian and he at once set about
establishing for the department a more exacting standard of accom-
plishment. The text-book used was the abridged work of Roscoe
and Schorlemmer, and his first assignment to the beginning class
in general chemistry was to commit to memory without skip or
flaw the list of elements from aluminum to zirconium. His first
assistant was Howard Slauson, a graduate of the department in
1882, and his second assistant was a senior, A. W. Palmer. In
addition to the regular chemical work the course in mineralogy was
given by the chemical department.

Dr. Palmer, who withdrew in 1884, returned from study at
Harvard, where he received his Doctor's degree, in 1886. He was
given the same official title as when he went away, that of First
Assistant in Chemistry. It was largely through his influence that
the work for beginners was changed from qualitative analysis to
experimental laboratory exercises in general chemistry. Everyone
connected with the department appreciated the remarkable ability
of Dr. Palmer, both as related to his wide and accurate knowledge
of chemical detail and in the matter of effectiveness as an instructor.
When Professor McMurry resigned, therefore, in 1888, to become
the Chief Chemist for the Royal Baking Powder Company, his
logical successor in the department was Dr. Palmer, but for some
reason, possibly because of his very youthful appearance, he was
not appointed. This fact, together with the meagre recognition
 accorded him for the two years previous in the matter of advance-
ment in title, were doubtless large factors in causing Dr. Palmer
also to resign and go abroad for study.

The year opened in September, 1888, with Dr. J. C. Jackson as
Professor of Chemistry. The Agricultural Experiment Station had
just been organized with the Chemical laboratory for the station
installed on the top floor of the Chemistry building. Dr. A. G.
Manns was in charge and H. S. Grindley, Assistant. Dr. Manns
had graduated from the department in 1885, studied abroad and received his Doctor's degree at Berlin in 1888. The work of Professor Jackson was far from successful. Indeed, the affairs of the department were so rapidly approaching a state of chaos that he withdrew December 31st, 1888, and Dr. Manns was asked to conduct the classes for the remainder of the year. Dr. Palmer was communicated with by cable, the result being that he resumed his work again September, 1889, as Assistant Professor of Chemistry. He was advanced to a full Professorship at the end of the first year.

While abroad Dr. Palmer studied first at Göttingen, where, by reason of the overcrowded condition of the laboratory and, doubtless also, because of strong recommendations from Harvard, he was given a place in Victor Meyer's private laboratory. He studied later under Hofmann at Berlin, where he began his work on the arsines which culminated three years after his return to Illinois in establishing the existence of that series.

It should be noted that at this time a new life and altogether different aspect of affairs were in evidence at the University. The most potent factors were doubtless the change in name from the "Industrial" University to the "University of Illinois" in 1885, and the increased revenue from the action of the federal government in the Hatch Act of 1887 and later in the Morrill Land-College Aid Act of 1890. These two measures were to augment the revenues at the outset by over $30,000.00 annually. This was a relatively large sum since the total state appropriation for the year 1889-90 was only $31,750, of which $16,000 was designated as for "expenses and instruction." The total state appropriation for the biennium 1889-91 was $59,000.00.

The attendance during the year 1889-90 reached 469—including the Preparatory students—and in the following year, 1890-91, passed the 500 mark. Under date of March 6th, 1890, Dr. Palmer, because of the greater number of students in attendance, asked that the Board increase the assignment of funds for the importation of chemicals and apparatus from $650.00 to $1,000.00. This was granted.

Parallel with the increase of students was a new policy of arranging class exercises in connection with all courses, either in the form of lectures or quizzes. All this, together with the course in mineralogy, called for an actual teaching schedule of about 8 hours per day for Dr. Palmer, the two assistants being called upon for an equally heavy schedule in supervision of the laboratory work. The
need for more help was obvious. Since 1882 the teaching force had consisted of a Professor, a first assistant who was usually a recent graduate from the department, and a second assistant who was a chemical senior. The first provision for increasing the staff is indicated in the minutes of the Board for Dec. 9, 1890, where it is recorded that S. W. Parr was

"Appointed to the Chair of Analytical Chemistry * * * the division of labor between him and Professor Palmer, already in the service of the University in the department of Chemistry, being left for subsequent arrangement."

The appointment was ordered to take effect the first of January, 1891.

No formulation of the arrangement which seemed best fitted to indicate the division of labor was made for several years. At the August, 1894, meeting of the Board, however, the following record is entered:

"It is recommended that Professor Palmer be charged with the general business affairs of the Chemical laboratory and that Professor Parr's title be changed from that of Professor of Analytical Chemistry to that of Professor of Applied Chemistry and that their departments be separately organized as agreed upon between themselves."

It was thought that by thus organizing a distinct department for studying the industrial problems and conducting special courses in technological subjects, more importance would seem to be accorded such work and a better recognition of it on the part of the authorities would result. Especially was it hoped that in the assignment of funds, the needs of such a department would be recognized. It is difficult to appreciate at the present time the insistent demands which then existed on the part of all the departments for funds. The institution was growing in numbers and needed equipment out of all proportion to the money available. By the device of a second, independent department, the assignment of library funds for books was practically doubled, but special appropriations for work in industrial chemistry were discouragingly meagre.

Simultaneously with the establishment of this second department of Chemistry the courses in Chemical Engineering were arranged and adopted as the prescribed schedule for the department of Applied Chemistry. The formulation of this course followed and was printed in the catalog for that year under the caption "Course in Applied Chemistry with Engineering Subjects." A two years' course in Pharmacy not leading to a degree was introduced in 1892, with W. E. Sanford appointed as second assistant in chemistry and
giving instruction in the pharmaceutical courses. In 1893-4 this was expanded to a four years' course in chemistry and pharmacy with the degree of B.S. A very complete pharmacy and prescription room was established on the third floor.

Two noteworthy improvements were introduced in 1892 in the working arrangements for the advanced students on the second floor. A new balance room was enclosed in the space between the central store-room and the east wall, and the balances there installed were enclosed in individual compartments with a counterpoise front which could be locked. Keys were given out to the men assigned to a balance. The balances were thus protected from dust and also from use by unauthorized persons. The cases were attractive in appearance and exceedingly satisfactory in operation. The other feature was the establishment after no little argument with the librarian, of a departmental library. The location given to it was the balance room and the shelving was constructed along the west wall. This was the first concession of the sort on the part of the library authorities and was the initiation of a system which has now become thoroughly established. At that time, however, the Professors drew out the desired books on their personal checks and returned everything to the main library at the end of the year. This balance room and departmental library as shown in the cut was located in the space now occupied by rooms Nos. 304 and 306 of the present law building.

An interesting event of this period was the starting of the Chemical Club. It was organized Nov. 22, 1892. Through the research propensities of Miss Sparks the membership roll for 1893-4 has been unearthed. It contains 20 names which might well be put in suitable form for preserving in the archives of the club. All four members of the instructional staff are in the list and every one of the student members later become graduates of the department.

In the fall of 1892 some relief from the heavy schedule of courses resulted from turning over the work in mineralogy to Professor Baldwin, head of the department of Mining Engineering. In the following year the collections and entire responsibility for the conducting of that work were transferred to the department of Geology.

The legislative session of 1895 allowed an item in the budget of $5,000 for the biennium following, which was designated, "For changes in the chemical laboratory," and which was understood to be for the inauguration of a State Water Survey. This work was
provided for, therefore, as indicated in the minutes of the Board for June 27, 1895, as follows:

"From the special appropriation of $5,000.00 for changes in the chemical laboratory, which was intended to cover the expense of carrying on a systematic survey of the waters of the state."

—there is appropriated the sum of $2,750.00 for alteration, furniture, apparatus, and the services of a chemist. The work was at once inaugurated under Dr. Palmer's direction with Mr. C. V. Millar, B.S. in Chem. '93, M.S. in '94 as "Assistant in Chemistry on the State Water Survey."

In the spring term of 1899 the honorary chemical fraternity, Phi Lambda Upsilon, now grown to national status, was organized. The promoters and charter members were F. C. Koch, Horace Porter and P. Rudnick of '99, and Harry Hasson, "Artie" Johnston and E. B. Safford of '00.

In the early morning of Aug. 15, 1896, the laboratory was struck by lightning. The entire upper floor was burned. This included the Pharmacy, the Photographic rooms, the Museum and the laboratory of the Agricultural Experiment Station. On the second floor everything north of the central store room was burned. This included Dr. Palmer's private laboratory, with the result that many valuable papers and records were lost. The large steel tank near the roof had its supports burned away and it fell through to the basement, completely wrecking the two store rooms in its path. A new roof of different pattern was at once put on, but only such repairs and board partitions were provided as would make the interior usable temporarily, it being confidently expected that at the coming session of the legislature funds would be appropriated for making good the loss, with a new and larger building which the great increase of students made imperative. The outcome was $5,000 appropriated to replace apparatus lost in the fire.

The legislative session of 1897 was wholly favorable to a liberal appropriation for a new library, doubtless as greatly needed as a new chemical laboratory, and since two large buildings from one session were not to be thought of, the chemical interests stood aside, with the understanding that their turn would come next. But with the legislature of 1899 the psychological moment seemed to have arrived for obtaining a large main building for the Agricultural College and again the chemists lost out. In 1901, however, an appropriation of $100,000.00 was secured for the Chemistry Building. This amount was less than half of what the department considered
essential. The question to be decided, therefore, was whether to build one-half of the laboratory and equip the same for work, or to plan a building which would take care of the increase in students for the coming twenty-five years, but with very little in the way of equipment. If the first plan were followed it was absolutely certain that a second large appropriation would have to be asked for within ten years and the outlook for such a procedure was altogether discouraging. The other plan, therefore, was followed with the result that when the contract was let for the building there was only $800.00 left for equipment. This was sufficient to place four new desks in the Quantitative laboratory and supply a few hoods. Every desk in the old building was moved over. Many of these were marred from the effects of the fire and all were battle scarred from twenty years of strenuous use. It certainly was a distressing feature in making the new building ready for occupancy in the fall of 1902 to see these old wrecks hoisted by rope and tackle to the third story and skidded into place for service again with the Freshmen. Fortunately at the next session of the legislature, in 1903, an item of $20,000.00 was allowed under the designation of "material and equipment for the chemical laboratory." This item was repeated in the budget for a number of succeeding sessions and very materially relieved the situation. At least the departments were able to keep fairly abreast of the rapid increase in the number of students.

On February 2, 1904, occurred the death of Professor Palmer. He had been ill but a short time. The direction of the State Water Survey had brought on a tremendous amount of work and responsibility, especially in connection with the survey of the Illinois River before and after the opening of the Chicago Sanitary Canal. His second report covering the work from 1897 to 1902 and embodying the results of the Illinois River and Sanitary District Survey is a monument to his untiring industry and ability. He literally gave his life in the service of the University and the State.

Dr. H. S. Grindley, who had been appointed Assistant Professor of Chemistry in 1895 and Associate Professor in 1900, continued in charge of that department for the remainder of the year.

At the meeting of the Board for August, 1904, the following recommendation by the President was passed:

"(1) That the Department of Applied Chemistry be discontinued as such and that there be one Department of Chemistry. (2) That Professor Parr's
title be continued as that of Professor of Applied Chemistry and Associate Professor Grindley be made Professor of General Chemistry. (3) That the headship of the department be divided so that Professor Parr shall have general charge of all matters pertaining to instructors and instruction, and Professor Grindley as Director of Laboratory shall have charge of and be responsible for all business and material affairs. They will then so adjust matters that each shall have supervision over definite subordinates and courses of instruction, and each be directly responsible for the men and work so assigned.”

From September, 1904, therefore, the consolidation of the two departments was effected and the work carried on as above ordered until the appointment of Dr. W. A. Noyes as “Professor of Chemistry and Director of the Laboratory” beginning September 1, 1907. At the same time Dr. Grindley was appointed chief in Animal Chemistry in the Agricultural Experiment Station and Professor of Animal Chemistry in the College of Agriculture. The State Water Survey was put under the supervision of Professor Parr in February, 1904, and so continued until the appointment of Professor Edward Bartow, September 1, 1905.

The Illinois section of the American Chemical Society was organized April 24, 1906, with twenty-six members. At the present time there are 152 members of the section and all but thirty-seven are connected with the University.

In April, 1908, the Zeta Chapter of the National Chemical Fraternity, Alpha Chi Sigma, was installed.

The new building entered in 1902 soon became crowded to such an extent that distress signals were in evidence even when only one-half of the estimated time of twenty-five years had passed in which it was assumed there would be ample room. Indeed, the need for an addition to the building was urged upon the legislative session for 1913. The addition to the University fund from the mill tax, available after July 1, 1913, made it possible to proceed with the plans for the new addition and the contract was let August 14, 1914.

In this brief review it is of interest to note that the number of students specializing in chemistry has grown from 14 in 1872 to 245 in 1915, of whom 75 are in the graduate division.

We may infer also from the regent’s report of 1872 that about sixty-eight students from all departments constituted the general enrollment in chemistry. The total registration in all courses in the department for this first semester 1915-16 is 2,146.

The instructional force from 1869 to 1874 numbered one. From 1876 to 1882 there were four members on the staff. From 1882 to
1890 there were three. In 1902 at the time of entering the new building there were fifteen. For the current year 1915-16 the number is sixty-two.

In 1890 the assignment for the importation order, based in the main on the estimated laboratory deposits from students for the year to follow, was increased from $650.00, the former amount, to $1,000.00. The corresponding assignment for recent years has been $10,000.00 annually.

After the organization of the Graduate School at the University in 1895, the first examination for a Doctorate was in the Chemistry department, Dr. W. H. Dehn now of the University of Washington, having that distinction. He received his degree in 1903. The degrees of this order from the department last year were six. The prospective candidates for 1916 number fourteen.

In the matter of publications, for the year ending April 30, 1915, the output from the department numbered thirty-five titles, two of them being books.

It has been the purpose of this sketch to give the larger place to details connected with the early development of chemical work at the University. The events of the current years are familiar and can be better set forth in their proper relation when they, too, have become history.

DEPARTMENTAL DIVISIONS

For convenience in administration, the department is at present organized under the following divisions:

General Inorganic Chemistry and Qualitative Analysis.
Quantitative Analysis, including Agricultural and Food Analysis.
Organic Chemistry.
Physiological Chemistry.
Animal Nutrition.
Physical Chemistry, including Electrochemistry.
Industrial Chemistry, including Metallurgy, Assaying and Analysis.
Sanitary Chemistry, including Water Analysis.
AIMS OF THE DEPARTMENT

The Department of Chemistry serves the need of several distinct classes of students.

Chemistry touches modern life in such a great variety of ways that no one can be considered as having a satisfactory liberal education without some knowledge of the elementary principles of the science. The exercises in the laboratory also furnish excellent training in manipulation and in the co-ordination of observation with knowledge acquired from lectures and the textbook. The work in qualitative analysis during the second semester of the first year's work in chemistry gives a training in the study of logically connected relations scarcely equalled in any other branch of science. This gives a mental discipline fully parallel to that secured by the study of language or of mathematics.

Students of engineering, agriculture and household science require some knowledge of chemistry as an almost indispensable adjunct to their work.

The undergraduate courses leading to the degrees of Bachelor of Science in chemistry and in chemical engineering furnish professional training parallel to that given by courses in engineering or in agriculture. The demand for men with training of this kind has been such that nearly all of the graduates of these courses during recent years have found positions in industrial establishments immediately on graduation.

The statistics of the Universities of the country show that a larger number of students go on to the advanced degree of Doctor of Philosophy in Chemistry than in any other science. This is largely due to the fact that many industrial positions call for men with thorough training and the most important advances now being made in the application of chemistry in the arts rest on principles which can only be understood by those who are familiar with methods of research. The best positions open to teachers of chemistry also require the training which is indicated by an advanced degree. These conditions have led to a very rapid increase in the number of graduate students of chemistry at the University.

Chemistry is pre-eminently a science which is undergoing very rapid changes and developments. No university is worthy of the name, which does not contribute each year something toward this development. A very considerable part of the time and energy of the teaching staff ought to be spent on research work and there is
a much closer connection between effective teaching and productive research than is sometimes supposed.

The chemists of the world have long known that Germany has won a position far in advance of other nations in many lines of chemical manufacture, and that this pre-eminence is directly connected with those methods of training men for independent chemical research which were first developed and which have attained their best expression in German laboratories. The sudden exclusion of German products from our markets by the war has opened the eyes of the whole country to our inferior and dependent position in many lines of chemical manufacture and to the importance of establishing such industries on a better footing in America. It is the chemical laboratories that are most active in research which will furnish the trained chemists who are capable of meeting this new demand.

The teaching staff of the Department for 1915-16 includes 5 professors, 4 assistant professors, 4 associates, 8 instructors, 20 assistants, and 23 graduate assistants. There are also 2 graduate scholars, 5 fellows, and 2 research assistants of whom no teaching is expected.

THE CHEMICAL LABORATORY

The building erected in 1901-2 as a home for the Department of Chemistry resembled the letter "E" in shape, the extreme dimensions being 230 feet along the front and 116 feet along the wings. This building contained 77,884 square feet of usable space, which it was estimated would provide ample room for the needs of the department for at least 25 years. The growth has been so rapid that in 1914 work was begun upon an addition which has a larger capacity than the original building. The cost of the addition is more than double that of the original building. The completed building is in the form of a hollow square, 231 feet by 202 feet, containing 164,288 square feet of working space. The center is occupied by the main lecture room, which is lighted by a skylight; two large ventilator fans are housed in the court, which arrangement prevents annoyance from noise and vibration.

The old portion of the building is not fire proof, but is divided into three sections by fire walls, while the new part is built of fire proof material. The floors are a combination of reinforced concrete joists and hollow tile, the concrete covering the tile to a depth of 2 inches. Upon the concrete the electrical conduits are laid and these are covered with a top layer of concrete, rubbed to a smooth surface.
The top surface consists of a layer of "rezilite mastic" about one-eighth of an inch in thickness. This is a preparation of Elaterite, containing some asbestos fibre, which gives elasticity to the floor, and is superior to asphalt because it does not yield under the pressure of heavy furniture. The floors in the halls have the Terrazzo finish.

The roof is constructed of concrete slabs which are covered with wood sheathing, building paper and slate. The purpose of the wood sheathing is to give an air space for insulation purposes and to furnish a better means of laying the slate. Being entirely covered on all sides by fire proof material the sheathing does not increase the fire risk.

The minor partitions are made of "pyrobar" tile. A brick wall
separates the old and the new portions of the building, making it possible to completely shut off either side. There is almost no wood used in the new part, the largest amount being for doors and window frames. A majority of the rooms are finished with a wooden base board, chair rail, hang rail and picture moulding.

Abundant hood space is provided in all parts of the building. The hood construction used throughout the building consists of the following: The top is a single frame of plate glass with wire reinforcement, so set as to avoid as far as possible the gathering of dust; the linings are white tile; the doors are counterpoised, the weights being attached by means of a creosoted hemp rope. The pulleys and axles are made of wood. Each hood is connected with a flue which runs to the top of the building independently of other
hoods. Ventilation is by forced draft. In the larger laboratories the air is brought in at the corners of the room, and distributed at various openings along the ceiling while the foul air is forced out through the hood flues. In this way there is an even distribution of the fresh air in all parts of the room and the air is changed six times per hour. In the laboratories for elementary chemistry there are upon the student desks special ventilation conduits which are connected with exhaust fans capable of changing the air in these laboratories eleven times per hour. These conduits rise a few inches above the level of the table top, so that the gases are drawn downward and discharged into a large flue. The toilet rooms are provided with special exhaust fans giving very thorough ventilation.

The window sills in the halls and offices are of white marble,
and those in the laboratories are of alberene stone, which material is also used generally for shelves and table tops. All tables are supplied with gas, water, waste and suction; some also have blast, high pressure steam, distilled water and hydrogen sulfide. The building is completely wired with five electric systems: 10, 110 and 220 volt direct current and 110 and 220 volt alternating current. Many laboratories are also connected with the storage battery system. In the attic a large water distillation apparatus is placed as well as a hydrogen sulfide generator. The hydrogen sulfide is stored in a 500-gallon gas tank, which permits the distribution of the gas to various parts of the building under constant pressure.

Besides the main lecture room, which seats 390, the equipment
includes one smaller lecture room, 7 recitation rooms, 4 seminar rooms, a library, a museum and a room for the Chemical Club. Fire-proof vaults and an elevator are available from all floors.

The general plan of space distribution is to have most of the offices, the library and the research laboratories in the new part with the routine laboratories in the old; the office of the director and the general executive offices of the department are in the old portion of the building near the main entrance at the west front. The large stock room and the ventilation equipment are also in the
old part. There are five entire floors available for laboratory purposes in the new addition. Individual desks are provided for 1,280 students in general chemistry and qualitative analysis; 400 in quantitative analysis, and 192 in organic chemistry.

LIBRARIES

Centrally located, on the second floor of the new addition, there is an exceptionally well equipped departmental library. This library is situated in a pleasant, well lighted, fire-proof room, which is readily accessible to all members of the department; it comprises sets of all the important chemical journals, the latest hand-books and dictionaries on all branches of pure and applied chemistry, and the leading current chemical periodicals of the world. The department at present subscribes for more than one hundred journals and other serials. At the beginning of the year 1916, the library contains about 4,000 volumes of periodicals and about 3,000 other volumes.

In an adjoining seminar room is the Palmer Memorial Library, containing the private collection of chemical works and journals of the late Dr. Arthur W. Palmer, formerly head of the Department of Chemistry of the University of Illinois—to whose persistent energy and admirable foresight the University owes much for having made possible the excellently planned laboratory herein described. This collection was presented to the University, as a memorial, by Mrs. Arthur W. Palmer, of Urbana.

In addition to these facilities, the members of the department of course have access to the various other libraries which are located upon the University campus.

THE SEMINARS

Each division of the department is represented by a series of graduate courses aiming at the development of a thorough knowledge in some particular field. These courses are conducted by the combination method of seminar and lectures. By this method a familiarity with the original sources of the subject is obtained, together with the ability to organize and critically discuss the material.

The Divisions of Inorganic and Analytical Chemistry offer the study of the field of general chemistry from the standpoint of the
periodic system with special reference to the rarer elements and on the analytical side courses are offered in systematic qualitative and quantitative analysis. The application of the modern principles of theoretical chemistry underlie these courses.

The Division of Physical Chemistry presents its main course from the standpoint of molecular kinetics and thermodynamics. The derivation of the important laws of theoretical chemistry is studied in detail and special emphasis is given to the assumptions involved which limit the application of such principles. The main emphasis of the course is, however, the application of mathematics and physics to chemistry. To this end a major part of the time is spent in the solution of mathematical problems embodying the above principles. A limited part of the field is covered by laboratory study. Courses in electrochemistry are given from the same standpoint and in addition the technique of certain electrochemical measurements is studied.

The Division of Organic Chemistry presents a systematic study of its field from the standpoint of the atomic linking theory with special emphasis upon the application of the kinetic theory, mass action, and the correlation of physical properties with chemical structure. Problems involving these principles as well as problems of synthesis are uniformly required in this work and the accompanying laboratory study develops a practical knowledge of the field. On the analytical side courses are offered in qualitative and quantitative organic chemistry. The latter work covers a critical study of the quantitative chemistry of the proteins, alkaloids, glucosides, volatile oils and other constituents of animal and vegetable tissues.

The Division of Physiological Chemistry offers its main course as a study of foodstuffs, tissues, digestion, putrefaction, intermediate metabolism and the chemistry of the ductless glands. The emphasis is placed upon the problems of human metabolism. Accompanying laboratory work develops technique in the more difficult biochemical preparation and methods.

In co-ordination with the Department of Animal Husbandry of the College of Agriculture, a course in animal nutrition is offered, consisting of lectures, discussion and laboratory. Advantage is taken of the unusual facilities offered by the Agricultural Experiment Station to study problems on a practical basis.

The Division of Sanitary Chemistry offers a critical study of the sources of contamination of water supplies, together with the
purification of water for potable or technical purposes. This division is intimately connected with the State Water Survey so that special opportunities are offered for field studies on the industrial scale.

The Division of Industrial Chemistry gives a descriptive course of the more important chemical industries, emphasizing the study of their chemical control. In addition, metallography is studied from the standpoint of the correlation of constitution and microstructure of metals and alloys as well as the relation between properties and structures. In the laboratory opportunity is given to develop the technique of this field and apply the phase rule to such problems. This division is especially fortunate in its connection with the Engineering Experiment Station, which makes possible complete co-ordination of the chemical and engineering problems.

Each division, in addition offers one or more special courses dealing with some recent advancement in its particular field.

THE ILLINOIS CHEMIST

The Illinois Chemist is a quarterly magazine published in the interests of the Faculty, Alumni and students of the Department of Chemistry of the University of Illinois, under the auspices of the University of Illinois section of the American Chemical Society, the Chemical Club, the Alpha Chapter of Phi Lambda Upsilon and the Zeta Chapter of Alpha Chi Sigma.

In its first issue published in June, 1915, under the editorship of H. D. Valentine, '13, a graduate student, the purposes of the chemist are stated to be "to acquaint the students with the faculty and the organization of the department; to constitute a permanent journal recording the various activities throughout the many branches of the department; to be the connecting link between the alumnus in chemistry and his alma mater; and finally it is hoped that it will represent a chronicle of progress."

Control of the publication is vested in an editorial committee, composed of representatives from each of the above four organizations, and also from the chemical faculty.

The editor-in-chief and business manager and their assistants are chosen annually by this committee and all questions of policy are passed upon by it. S. D. Kirkpatrick, '16, is editor-in-chief, and A. W. Landstrom, '17, is business manager. The subscription price is 75 cents per year.
The publication has met with a very favorable reception and promises to fulfill admirably well the objects for which it has been started.

ORGANIZATIONS

The *University of Illinois Section of the American Chemical Society* was organized in 1906, and at that time was made up of those members of the Society residing in Illinois within a radius of fifty miles from the University at Urbana. The territory was extended in 1912 to include all members of the Society residing in Illinois between the thirty-ninth and forty-first degrees of latitude. The headquarters of the Section are at the Chemical Laboratory of the University, and all meetings are held there.

There are about one hundred and sixty members in the section, which ranks ninth in membership, and one hundred and twenty of these reside in Urbana-Champaign. All members in good standing receive the three journals of the society: The Journal of the American Chemical Society, of which Professor W. A. Noyes, the Director of the Chemical Laboratory, is editor-in-chief; The Journal of Industrial and Engineering Chemistry, and Chemical Abstracts.

Meetings of the Section are held monthly from September to May. During the year 1915 the following programs have been given:

- January 18—Professor C. G. Hopkins, "Some Problems in the Development of Southern Agriculture."
- February 16—Dr. J. H. Beal, "The Pharmacopoeia and National Formulary as Legal Standards."
- March 16—Dr. C. G. Derick and O. Kamm, "The Structure of Certain Reduced Naphthoic Acids"; Dr. C. G. Derick and St. Elmo Brady, "Oxygen Place-influence in Saturated Monobasic Paraffin Acids"; Dr. D. F. McFarland, "The Value of Inspection Trips in the Training of a Chemist."
- April 23—Mr. F. W. Kressmann, U. S. Forest Products Laboratory, "The Forest Products Laboratory and Its Chemical Problems."
- May 18—Mr. F. A. Morgan, Picher Lead Company, "The Production of Lead Ore and Pig Lead and the Manufacture of Certain Lead Products"; Mr. J. R. MacGregor, the Picher Lead Company, "The Manufacture of Sublimed White Lead and Other Lead Pigments."
- October 14—Drs. C. W. Balke and B. S. Hopkins, "The Determination of the Atomic Weight of Yttrium."
- November 15—"The Search for an Acid-Resisting Alloy": S. W. Parr...................Introduction.
Drs. D. F. McFarland and O. E. Harder, "A Systematic Study of Alloys of Chromium, Copper and Nickel."

Dr. D. F. McFarland, S. A. Braley and F. E. Rowland, "Methods of Analysis of Complex Alloys of the Cr, Cu, Ni, Type."


The spring meeting of the American Chemical Society will be held at the University of Illinois, April 18 to 21, 1916. Exercises celebrating the completion of the large addition to the Chemical Laboratory will be held at the same time.

The officers of the Section are:
Chairman—Dr. W. A. Noyes, University of Illinois.
Vice-Chairman—Dr. J. C. Hessler, James Millikken University, Decatur.
Secretary—Dr. G. D. Beal, University of Illinois.
Treasurer—Dr. B. S. Hopkins, University of Illinois.
Councilors—Dr. E. W. Washburn, University of Illinois; Prof. S. W. Parr, University of Illinois.
Councilors, ex-officio—Dr. W. A. Noyes, University of Illinois; Dr. Edward Bartow, University of Illinois; Dr. C. G. Derick, University of Illinois.

The Chemical Research Club is composed of the senior members of the faculty and staff who are giving instruction or conducting independent research in chemical subjects. The purpose of the club is to familiarize its members with the investigations in progress in other divisions and departments than their own. This makes it impossible for a member to say, as was said by a member of another university staff, "The balance of this room is used by my colleague, but I am not familiar with the investigation."

The members meet once a month for an informal dinner, after which the investigations in progress are reported on in turn. All of the reports presented are discussed informally by the members present, but all information given is regarded as confidential.

Chemical Journal Meetings of the members of the chemical staff with the Senior students in the chemistry and chemical engineering courses and the graduate students in chemistry are held weekly for the purpose of reviewing the recent progress in the various fields of chemistry.

Three addresses, reviews or papers are presented, two of approximately ten minutes in length by a Senior and by a member
of the Junior staff, and a longer address by a member of the Senior staff. The latter address is of broader scope than the others and usually gives a resumé of the work done in some specialized field.

Attendance is required from the Seniors but is optional with all others.

The meetings are well attended and are marked by frequent discussions of the papers reviewed.

The Chemical Club is one of the oldest organizations of its kind upon the campus, having been organized in November, 1892, with twenty charter members. At the present time the membership includes some seventy men. The purpose of the club is to promote the welfare of chemistry, to broaden the interests of its members and to bring together in a social way the men, both students and faculty, who are interested in chemistry as a profession. In any highly specialized subject, the student becomes so thoroughly engrossed in his own field of labor that he forgets the importance of other investigations and loses the inspiration which can be received only from direct personal contact with men of his own profession. It is this personal side of the chemist that the Chemical Club endeavors to develop by bringing together men from all phases of the work. Monthly meetings are held at which prominent speakers address the club and its guests upon some topic of live interest in chemistry. It has been the custom to have one big annual get-together and in the past two years this has taken the form of a smoker, in which wide-spread interest has been evidenced by the large attendance and genial good fellowship.

Phi Lambda Upsilon, honorary chemical fraternity, was founded at the University of Illinois in 1899, being the first honorary society at the University. In 1906 it became a national organization, the first charter being granted to a chapter at the University of Wisconsin.

Members are chosen from undergraduate and graduate students of chemistry whose scholarship and ability in research is of high rank, and from other men who have gained local or national recognition in this science.

The purpose of the society is the promotion of high ideals in the advancement of chemistry through scholarship and research. In the ten years of its life as a national organization Phi Lambda Upsilon has experienced a rapid growth. There are at present
chapters in twelve leading universities and an alumni chapter at Chicago. The entire membership numbers nearly one thousand, eighty of whom are connected with Alpha Chapter, at the University of Illinois.

During 1915, the following addresses on topics of chemical interest were given under the auspices of the local chapter:

January 15—Dr. David Klein, State Chemist for the Illinois Food Commission, "Pure Food Laws and Their Enforcement."


May 21—Dr. J. U. Nef, Professor of Organic Chemistry, University of Chicago (now deceased), "The Chemistry of Enzyme Action."

November 30—Dr. E. W. Washburn, Professor of Physical Chemistry, University of Illinois, "The Theory and Practice of the Measurement of the Conductivity of Electrolytes."

The Zeta Chapter of the Alpha Chi Sigma Fraternity, a national chemical fraternity, was established at Illinois in the year 1908. The Chapter now has a total membership of twenty-four active, fourteen honorary, and one hundred and eight alumni members. The development of the Chapter has been markedly rapid the past year. One of the most important advances being the new Chapter House at 917 W. Green St., Urbana.

The purpose of the Alpha Chi Sigma Fraternity is to promote good fellowship and scholarship among the chemists and to advance the interest of chemistry as a science. The organization now consists of twenty-four collegiate and four alumni chapters, and its growth is apparent from the fact that it was founded in 1902 at the University of Wisconsin, with a membership of nine undergraduates.

Alpha Theta Chi, an honorary Chemical society for women, was founded at the University of Illinois, October 8, 1915.

The organization is purely local in character. It was founded to advance the interests of Chemistry, and of women as Chemists, and to promote good fellowship among women working in Chemistry at the University of Illinois.

The members are chosen from women, having at least Junior standing at the University, whose major interest is Chemistry, and who have maintained a high scholastic average. Women eminent in science are eligible to honorary membership.
ARRANGEMENT OF COURSES

Course in Chemistry

A student may follow the General Course in the College of Liberal Arts and Sciences with chemistry as a major subject. Such a course leads to the degree of Bachelor of Arts.

For the more specialized training of the chemist the following course, largely prescribed, has been arranged. It leads to the degree of Bachelor of Science in chemistry.

Preliminary preparation in German or French equivalent to two years of high school work or one year of university work is prescribed. The total language requirement for graduation in the chemistry course, including courses offered for entrance, must be equivalent to two years of university German and one year of university French.

Students having one year of high-school chemistry should register in Chemistry 1a. Students not having such preliminary work in high school should register in Chemistry 1 (5 hours) and arrange the other subjects in consultation with their adviser.

In the following schedule of courses, after the second year, there are offered certain prescribed subjects required of all students and in addition five group options, the last four of which are outlined for the purpose of affording systematic training along certain important lines of applied chemistry. The first option, A, is intended for those students who wish to place chief emphasis upon the fundamental branches of chemistry as a science and for those students who desire a combination of subjects not outlined in the other four groups. Students in option A must submit to their adviser at the beginning of the junior year an outline of their proposed course of study for the junior and senior years. Approval of such an outline must be secured from the adviser before registering. At least 12 hours of the electives under option A must be in chemistry and
it is recommended that they be selected as far as possible from more advanced courses in inorganic, analytical, organic, and physical chemistry. In all groups, except B, 10 hours of the electives must be taken outside of the department and must include a course in economics.

The groups provided for, with the letter used to designate each group, are as follows:

A. General.
B. Electrochemical.
C. Industrial.
D. Food and Sanitation.
E. Physiological.

### FIRST YEAR

#### FIRST SEMESTER

<table>
<thead>
<tr>
<th>Hours</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>Chem. 1 or 1a—Inorganic Chemistry—5 or</td>
<td>Chem. 3a—Inorganic Chemistry and Qualitative Analysis—6</td>
</tr>
<tr>
<td>Math. 2—College Algebra</td>
<td>Math. 6—Analytical Geometry</td>
</tr>
<tr>
<td>Math. 4—Plane Trigonometry</td>
<td>German or French</td>
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<td>German or French</td>
<td>Mil. 2b—Military Drill</td>
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<tr>
<td>Rhet. 1—Rhetoric and Themes</td>
<td>Mil. 1—Drill Regulations</td>
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<td>Mil. 2a—Military Drill</td>
<td>P. T. 2—Gymnasium</td>
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#### SECOND YEAR

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<th>Hours</th>
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<tr>
<td>Chem. 5a—Quantitative Analysis</td>
<td>Chem. 5b—Advanced Analytical Chemistry</td>
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<tr>
<td>French or German</td>
<td>French or German</td>
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<tr>
<td>Rhet. 2—Rhetoric and Themes</td>
<td>Phys. 1b and 3b—General Physics and Physical Measurements</td>
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<td>Phys. 1a and 3a—General Physics and Physical Measurements</td>
<td>History 2 or 3 or English 20</td>
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<td>Mil. 2e—Military Drill</td>
<td>Mil. 2d—Military Drill</td>
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</table>
DEPARTMENT OF CHEMISTRY

THIRD YEAR

Prescribed for all Groups
Chem. 14a—Organic Chemistry........ 4
Chem. 9a—Organic Synthesis and
Ultimate Analysis.................... 2
Chem. 92a—Journal Meeting........... 1
Math. 8a—Differential and Integral
Calculus ................................ 5
Total .................................. 12

Group Options
A.—General
Electives ............................. 5

B.—Electrochemical
Economics 1; or Economics
2 with 3 additional hours
other than Chemistry........ 5

C.—Industrial
Chem. 65—Technical Gas
and Fuel Analysis.............. 2
Elective ............................. 2— 4

D.—and E.—Food and Physiological
Bot. 5—Introductory Bacteriology........ 5

*Students electing Option B must
register in Math. 7.

FOURTH YEAR

Prescribed for all Groups
Chem. 11 —Research .................. 2
Chem. 11 —Research ................. 3
Chem. 93a—Journal Meeting .......... 1
Total .................................. 6

Prescribed for all Groups
Chem. 11 —Research .................. 7
Chem. 93b—Journal Meeting .......... 1
Chem. 6 —Chemical Technology...... 3
Total .................................. 11
Course in Chemical Engineering

The work of the technical chemist or superintendent is frequently so closely associated with mechanical and other engineering lines as to make a knowledge of these subjects essential. To meet these conditions, the following four-year course in chemistry and related engineering subjects has been arranged. The degree given is that of Bachelor of Science in chemical engineering.

Preliminary preparation in German equivalent to two years of high school or one year of university work is prescribed. It is also advised that students intending to take this course be prepared to offer mechanical drawing for entrance or arrange to take General Engineering Drawing 1 or S1.

Students having one year of high-school chemistry should register in Chemistry 1a. Students not having such preliminary work in high school should register in Chemistry 1 (5 hours) and arrange the other subjects in consultation with their adviser.
### FIRST YEAR

#### FIRST SEMESTER

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<tr>
<th>Course</th>
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<tr>
<td>Chem. 1a or 1—Inorganic Chemistry</td>
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<td>Math. 2—College Algebra</td>
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<td>Math. 4—Plane Trigonometry</td>
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<tr>
<td>German 4—Prose Reading</td>
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<td>Mil. 2a—Military Drill</td>
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#### SECOND SEMESTER

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<tr>
<td>Chem. 3a—Inorganic Chemistry and Qualitative Analysis</td>
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<tr>
<td>Math. 6—Analytical Geometry</td>
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</tr>
<tr>
<td>German 6—Scientific German</td>
<td>4</td>
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<tr>
<td>Mil. 2b—Military Drill</td>
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<td>Mil. 1—Drill Regulations</td>
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### SECOND YEAR

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<tr>
<td>Math. 8—Differential and Integral Calculus</td>
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<td>Chem. 5a—Quantitative Analysis</td>
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<tr>
<td>Phys. 1a and 3a—General Physics and Physical Measurements</td>
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<td>Mil. 2c—Military Drill</td>
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<td>Rhet. 1—Rhetoric and Themes</td>
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<td>Chem. 5b—Advanced Analytical Chemistry</td>
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<td>Rhet. 2—Rhetoric and Themes</td>
<td>3</td>
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<tr>
<td>T. and A. M. 20—Analytical Mechanics</td>
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</tr>
<tr>
<td>Phys. 1b and 3b—General Physics and Physical Measurements</td>
<td>4</td>
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<td>Mil. 2d—Military Drill</td>
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### THIRD YEAR

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<tr>
<td>Chem. 9a—Organic Synthesis and Ultimate Analysis</td>
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<td>Chem. 14a—Organic Chemistry</td>
<td>4</td>
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<td>Chem. 92a—Journal Meeting</td>
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<tr>
<td>T. and A. M. 21—Analytical Mechanics</td>
<td>2</td>
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<tr>
<td>T. and A. M. 25—Resistance of Materials</td>
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<td>M. E. 75—Forge Work</td>
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<td>M. E. 77—Foundry Work</td>
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<td>Chem. 9b—Organic Synthesis and Qualitative Organic Analysis</td>
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<td>Chem. 14b—Organic Chemistry</td>
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<td>Chem. 31—Physical Chemistry</td>
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<tr>
<td>Chem. 33—Physical Chemistry Laboratory</td>
<td>2</td>
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<tr>
<td>Chem. 92b—Journal Meeting</td>
<td>1</td>
</tr>
<tr>
<td>E. E. 8—Electric Currents and Apparatus</td>
<td>3</td>
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<tr>
<td>E. E. 68—Electrical Engineering Laboratory</td>
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<tr>
<td>Electives outside of the department</td>
<td>3</td>
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<tr>
<td>One inspection trip</td>
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<td><strong>Total</strong></td>
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**DESCRIPTION OF COURSES**

**Courses for Undergraduates***

*Major:* 20 hours, exclusive of Chemistry 1, 1a, 1b, 4 and 16, and inclusive of courses in quantitative analysis and organic chemistry.

*Minors:* 20 hours, chosen from bacteriology, botany, geology, mathematics, philosophy, physiology, physics, and zoology.

Students taking chemistry at the University are advised to give at least one year to the subject, and this should include Chemistry 1 or 1a and 2a. Those continuing in the second year should take Chemistry 5a and 5b, 5c or 13a. In the third year Chemistry 14 or 9, 9a, and 9b, or 9c, 31, and 33 should be taken. With these, more special courses may be taken if desired, but, in general, students are not advised to take the special courses unless they have had the fundamental work represented by the selection given above. Students who desire a training for professional work in chemistry, either as teachers or in its industrial applications, will naturally take the chemical course or the course in chemical engineering.

Students who find it impossible to take more than one semester's work are requested to register for Chemistry 1 or 1a in the second semester rather than in the first.


   Professor Balke in charge.

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*Courses marked with a star may be taken by graduate students.
Note: Students who have credit for high school chemistry should register for Chemistry 1a.

1a. Inorganic Chemistry.—Lectures; recitations; laboratory. For students who have had one year of high school chemistry. I or II; (3).
   Professor Balke in charge.

Prerequisite: One year of entrance chemistry. Students whose preparation proves to be inadequate for continuing this course will be required to change their registration to Chemistry 1.

1b. Inorganic Chemistry.—Lectures; recitations; laboratory. (For students in engineering.) I or II; (4).
   Professor Balke in charge.

Note: Students who have credit for high school chemistry should register for Chemistry 1a.

2a. Inorganic Chemistry and Qualitative Analysis.—The general chemistry and qualitative analysis of the more common metals and inorganic compounds. Lectures; recitations; laboratory. I or II; (5).
   Professor Balke in charge.

Prerequisite: Chemistry 1 or 1a.

3a. Inorganic Chemistry and Qualitative Analysis.—For students in chemistry and chemical engineering. I or II; (6).
   Professor Balke in charge.

Prerequisite: Chemistry 1 or 1a.

4. Qualitative Analysis and Chemistry of the Metallic Elements.—Class and laboratory work. (For students in engineering.) I or II; (4).
   Assistant Professor Weber in charge.

Prerequisite: Chemistry 1a or 1b.

5a. Elementary Quantitative Analysis.—Gravimetric and volumetric analysis; stoichiometrical relations and the application of the fundamental laws of chemistry to quantitative analysis. Lectures; recitations; laboratory. Talbot's Quantitative Chemical Analysis. I or II; (5).
   Assistant Professor Smith in charge.

Prerequisite: Chemistry 2a or 3a.

5b. Quantitative Analysis.—Continuation of 5a. The analysis of silicates, metallic compounds, and alloys; advanced quali-

Assistant Professor Smith.

Prerequisite: Chemistry 5a.

*6†. Chemical Technology.—Technological chemistry as illustrated in those industries having a chemical basis for their principal operations and processes; trade journals. Lectures; recitations. Rogers and Aubert's Industrial Chemistry. II; (3).

Assistant Professor McFarland.

Prerequisite: Chemistry 5a and 14a-14b.

*7†. Metallurgy.—General metallurgy; metallurgy of iron and steel. Lectures; assigned reading; recitations. Fulton's Principles of Metallurgy; Stoughton's Iron and Steel. I; (3).

Assistant Professor McFarland.

Prerequisite: Chemistry 5a. (Senior students in engineering courses may be admitted to this course by special arrangement, without this prerequisite.)

*7a. Metallurgy of the Non-Ferrous Metals.—Copper, lead, zinc, gold and silver. II; (3).

Assistant Professor McFarland.

Prerequisite: Chemistry 5a or 13a.

*8. Iron and Steel Analysis.—Analyses of all the constituents by both rapid, or technical, and standard methods. II; (3).

Assistant Professor Smith.

Prerequisite: Chemistry 5b.

9. Organic Chemistry.—The characteristics of the more typical and simple organic compounds; the important classes of derivatives of carbon. (For students of the medical preparatory and household science courses and others desiring a short course.) II; (3).

Assistant Professor Derick.

*In registering for a course with variable credit hours, a student must put down on his study-list, not the possible hours, as shown here, but the number of hours for which he intends to take the course; e. g., not 2-5, but 2, or 3, or 4, or 5.

†Certain required inspection trips will be arranged in connection with courses 6 and 7. Students registered in these courses should take into consideration the expense involved, which will approximate $15 for each course.
Prerequisite: Chemistry 2a.

*9a. ORGANIC SYNTHESIS AND ULTIMATE ANALYSIS.—Ultimate organic analysis; preparation of typical organic compounds. Laboratory. I or II; (2).

Assistant Professor Smith, Dr. Johnson.

Prerequisite: Registration in Chemistry 14a-14b, or equivalent.

*9b. ORGANIC SYNTHESIS AND QUALITATIVE ORGANIC ANALYSIS.—Continuation of 9a, to accompany Chemistry 14b. I or II; (2).

Assistant Professor Derick, Dr. Johnson.

Prerequisite: Chemistry 9a; registration in Chemistry 14b, or equivalent.

9c. ORGANIC SYNTHESIS.—Typical organic compounds. Laboratory. (For students in the medical preparatory and household science courses and others desiring a brief course.) II; (2).

Assistant Professor Derick, Dr. Johnson.

Prerequisite: Chemistry 2a; registration in Chemistry 9, or equivalent.

*10a. WATER CHEMISTRY.—The history, sources, contamination, and standards of purity of potable waters and waters for industrial purposes. Lectures; practice in analytical methods. II; (3).

Professor Bartow, Mr. Langelier.

Prerequisite: Chemistry 5a.

10b. WATER CHEMISTRY.—A modification of 10a to meet the requirements of students in sanitary engineering, registered in connection with Chemistry 2a. II; (1½).

Professor Bartow, Mr. Langelier.

Prerequisite: Chemistry 2a or 4.

11a-11b. RESEARCH.—Thesis, embodying a review of the literature of the subject; account of work done in the laboratory. The subject should be determined upon and reading begun in the junior year. A minimum of five semester hours is required. (Required for seniors.) I, II; (5).

Professor Noyes in charge.

13a. ELEMENTARY QUANTITATIVE ANALYSIS.—Gravimetric and volumetric analysis, fertilizer and milk analysis. Lectures; recita-
tions; laboratory. Talbot's *Quantitative Chemical Analysis.* (For students in agriculture.) *I or II; (5).*

Assistant Professor Smith in charge.

**Prerequisite:** Chemistry 2a or 3a.

*13b. Advanced Agricultural Analysis.—The analysis of fungicides, limestone, phosphate rock, fuel, and water; determination of the alkali metals; special methods of agricultural analysis. Treadwell-Hall, *Analytical Chemistry,* Vol. II. (For students specializing in agricultural chemistry or agricultural experiments.) *II; (5).*

Dr. Beal.

**Prerequisite:** Chemistry 5a to 13a.

*14a-14b. Organic Chemistry.—Lectures; recitations. Noyes's *Organic Chemistry.* *I; (4) : II; (2).*

Professor Noyes.

**Prerequisite:** Chemistry 5a; should be accompanied by Chemistry 9a and 9b.

*15. Physiological Chemistry.—Enzymes; carbohydrates; salivary digestion; gastric digestion; fats; pancreatic-digestion; intestinal digestion; bile; putrefaction products; feces; blood; milk; epithelial and connective tissues; muscular tissue; nervous tissue; urine. Qualitative and quantitative work on gastric juice, blood, urine, and milk; the clinical aspects of these topics treated thoroughly for the prospective students of medicine. Lectures; demonstrations; conferences; practical work; assigned reading. Hammarsten's *Text Book of Physiological Chemistry;* Hawk's *Practical Physiological Chemistry.* (Open to graduates and undergraduates.) *I; *(5 or 7).*

Dr. Lewis.

**Prerequisite:** Two years' work in chemistry, including Chemistry 14a-14b and 9a or 9 and 9c.

*15a. Problems of Metabolism (especially for Medical Students).—Colloids; animal oxidations; osmosis; absorption; selective activity of cells; metabolism; activities of gastro-intestinal tract; enzymes; inorganic nutrition. Lectures; demonstrations; conferences. *II; (2).*

Dr. Lewis.

*In registering for a course with variable credit hours, a student must put down on his study-list, *not* the possible hours, as shown here, but the number of hours for which he intends to take the course; e. g., not 2-5, but 2, or 3, or 4, or 5.*
Prerequisite: Chemistry 15.

16. CHEMISTRY FOR ENGINEERS.—The proximate analysis of coal; determination of calorific power; technical analysis of furnace gases; examination of boiler waters; lubricating oils. (For mechanical engineers). II; (3). Professor Parr, Dr. Broderson.

Prerequisite: Chemistry 1.

17. TEACHERS' COURSE.—The methods of teaching elementary chemistry. I; (1). Professor Balke.

Prerequisite: One year's work in chemistry.

*21. QUALITATIVE ORGANIC ANALYSIS.—Systematic methods for identification of pure organic compounds and mixtures. I or II; (2). Assistant Professor Derick, Dr. Johnson.

Prerequisite: Chemistry 9a, 9b.

*22. ANIMAL CHEMISTRY (ANIMAL NUTRITION).—The chemical composition of animal products and feeding stuffs. Lectures; conferences; assigned reading; laboratory. I or II; (5). Professor Grindley.

Prerequisite: Two years' work in chemistry.

25. FOOD ANALYSIS.—Quantitative organic analysis, with special reference to the examination of food products: alcohols, carbohydrates, fats and oils, cereals, nitrogenous bodies, preservatives, and colors. Sherman's Organic Analysis; Sherman's Food Products; "Bulletin 107, rev., U. S. Bureau of Chemistry." II; *(3 to 5).

Dr. Beal.

Prerequisite: Chemistry 5a or 13a; 9 or 14a-14b.

*27. QUALITATIVE ANALYSIS OF THE RARE ELEMENTS.—The rare elements and their compounds; identification and separation of the elements; formation, solubilities, and chemical reaction of their salts. Assigned reading; laboratory. II; (3). Professor Balke.

Prerequisite: Two years' work in chemistry.

*31. ELEMENTARY PHYSICAL CHEMISTRY.—The more important principles of physical chemistry and electro-chemistry. Lectures; recitations; problems. II; (4). Professor Washburn.

*In registering for a course with variable credit hours, a student must put down on his study-list, not the possible hours, as shown here, but the number of hours for which he intends to take the course; e. g., not 2-5, but 2, or 3, or 4, or 5.
Prerequisite: Chemistry 2a or 3a; Physics 1a-1b or 7a-7b; Mathematics 7 or 8.

*33. ELEMENTARY PHYSICAL CHEMISTRY.—Molecular weight in gases and in solutions; chemical equilibrium; the electrical conductivity of solutions and the attendant phenomena within the solution; thermochemistry. (Laboratory to accompany course 31.) II; (2).
Dr. MacInnes.

Prerequisite: Chemistry 5a; Physics 8a-8b or 3a-3b.

*35. ELECTROCHEMISTRY.—(A continuation of Chemistry 31. See also Chemistry 102b.) Theory and application. Lectures, recitations, laboratory. Allmand’s Applied Electrochemistry. I; (3).
Dr. MacInnes.

Prerequisite: Chemistry 31, 33.

36. THE PHASE RULE AND ITS APPLICATIONS.—A study of equilibria in heterogeneous systems. Lectures and seminar. II; (2).
Dr. Hecker.

Prerequisite: Chemistry 31, 33; Mathematics 8 or 7 and 9.

*37. EXPERIMENTAL PROBLEMS IN PHYSICAL AND ELECTROCHEMISTRY.—Laboratory and conferences. I; (4).
Professor Washburn, Dr. MacInnes.

Prerequisite: Chemistry 35 or 102b.

*61. INDUSTRIAL CHEMICAL LABORATORY.—The preparation and purification of chemical products from raw materials on a scale sufficient to afford data for determining the economy of the processes employed. Typical forms of chemical machinery such as filter presses, vacuum pan, centrifugal separators, steam jacketed kettles, etc.; reports and estimates upon apparatus and plant for the production of some particular product on a commercial scale. (Should be accompanied by either Chemistry 6 or 109.) II; (3).
Assistant Professor McFarland.

Prerequisite: Chemistry 5a and 14a-14b.

65. TECHNICAL GAS AND FUEL ANALYSIS.—Examination of gases, gas mixtures, flue gases and fuels; determination of calorific values; calculation of efficiencies. I; (2).
Dr. Broderston.

*In registering for a course with variable credit hours, a student must put down on his study-list, not the possible hours, as shown here, but the number of hours for which he intends to take the course e. g., not 2.5, but 2, or 3, or 4, or 5.
Prerequisite: Chemistry 5a.

*66. TECHNOLOGY OF GASES.—The manufacture, constituents, and uses of the various forms of gaseous fuel; calorimetry; photometry; the more exact methods of analysis. Lectures; reading; reports; laboratory. II; (1). Professor Parr, Dr. Broderson.

Prerequisite: Chemistry 65.

*69. METALLURGICAL LABORATORY AND ASSAYING.—The fire assay of gold, silver, lead, and copper ores, mattes, and bullion; special experiments illustrating the underlying metallurgical principles; fluxes, slags, and charge calculations; practise in the use of coal, oil, and gas furnaces, and in the measurement of high temperatures. Fulton's Manual of Fire Assaying. I; (2). Assistant Professor McFarland.

Prerequisite: Chemistry 5a; Geology 5.

*70. ADVANCED ASSAYING AND ORE TESTING.—The assay of ores of platinum, tin, copper; bullion assay; free milling, amalgamation, and cyaniding tests. (A continuation of Chemistry 69.) II; (2). Assistant Professor McFarland.

Prerequisite: Chemistry 69.

*71. ADVANCED METHODS OF METALLURGICAL ANALYSIS.—Comparison of methods for analyses of ores, alloys, and metallurgical products. Laboratory. I; (2). Assistant Professor McFarland.

Prerequisite: Chemistry 5b.

*72. PAINTS, OILS, TURPENTINES, VARNISHES, AND PROTECTIVE COVERINGS FOR WOOD AND METALS.—Lectures and laboratory. I; (2). Professor Parr and Dr. Broderson.

Prerequisite: Chemistry 5a and 14a-14b.

73. ASPHALT, TAR, PETROLEUM RESIDUES AND CREOSOTE OILS.—Source, characteristics, composition, examination; materials used in road construction and wood preservation. (For students in highway engineering.) II; (2). Professor Parr and Dr. Broderson.

Prerequisite: Chemistry 2a or 4.

*76. CALORIMETRY OF FUELS.—Methods for determining the heat values of solid, liquid, and gaseous fuels. (An advanced course.) II; (2). Professor Parr.

*In registering for a course with variable credit hours, a student must put down on his study-list, not the possible hours, as shown here, but the number of hours for which he intends to take the course; e.g., not 2-5, but 2, or 3, or 4, or 5.
Prerequisite: Chemistry 65.

*77. Composition and Classification of Coal.—Classification, changes in composition, weathering, spontaneous combustion, formation of mine gases. Lectures; assigned reading. II; (1).
Prerequisite: Chemistry 65. Professor Parr.

*78. Metallography.—Constitution and microstructure of metals and alloys and the relations between their properties, chemical and mechanical treatment, and structure. Lectures; reading and laboratory. II; (2). Assistant Professor McFarland.

80. The Elements of Glass Blowing.—A laboratory course in the construction and repair of glass apparatus. II; (1).
Mr. Anders.

86. The Chemistry of the Higher Order Compounds.—Complex compounds from the standpoint of the Valence Theory as developed by Werner. I; (2). Assistant Professor Smith.

Prerequisite: Chemistry 9a, 9b, 14a-14b.

*92a-92b, 93a-93b. Journal Meeting.—(For juniors, seniors, and graduates.) I, II; (1). All members of the teaching staff in the chemical department.
Assistant Professors McFarland and Derick in charge.

*95. History of Chemistry.—Lectures and assigned reading.
I; (2). Assistant Professor Smith.

Prerequisite: Chemistry 14a-14b and 31.

Courses for Graduates

Graduate students whose major subject is in some department other than chemistry, before taking graduate work for credit in this department, must have had the equivalent of 15 university credits in chemistry, and the work covered must have included satisfactory work in general chemistry and in qualitative and quantitative analysis. Such students are advised to take Chemistry 31, 31 (or 102, 102a), 5b, 5c, 14a-14b, 9a and 9b. Courses of a more special nature will not, as a rule, be accepted for graduate work unless preceded by one of the above courses.

*In registering for a course with variable credit hours, a student must put down on his study-list, not the possible hours, as shown here, but the number of hours for which he intends to take the course; e.g., not 2-5, but 2, or 3, or 4, or 5.
For students in agriculture, Chemistry 5a and 13a will not be accepted for graduate credit.

Graduate students who are candidates for an advanced degree in chemistry must have had the equivalent of 30 university credits in chemistry, properly distributed.

For students in chemistry, 5a, 13a, 9, and 9c will not be accepted for graduate credit and 9a, 9b, 14a-14b, 31 and 33 will be accepted only from students entering the Graduate School with the equivalent of 30 university credits in chemistry.

102. ADVANCED PHYSICAL CHEMISTRY.—This course with 102a, covers a period of two years. The subject is treated from the standpoint of molecular kinetics and thermodynamics. The primary purpose is to develop power to handle successfully a physico-chemical problem rather than merely to impart a knowledge of the phenomena and the principles involved. Lectures and seminar. Nernst's Theoretische Chemie, 7th edition. Twice a week; I, II; (3/4 unit).

Professor Washburn.

Prerequisite: Chemistry 2a or 3a; Physics 1a-1b, 3a-3b; Mathematics 8a or 7 and 9. An elementary knowledge of organic and physical chemistry is desirable.

[102a. ADVANCED PHYSICAL CHEMISTRY.—Chemical equilibrium; the Phase Rule; certain portions of thermochemistry; photochemistry. (A continuation of 102, with which it alternates.) Nernst's Theoretische Chemie. Twice a week; I, II; (3/4 unit). Not given in 1916-17.

Professor Washburn.

Prerequisite: The same as course 102.]

102b. ADVANCED ELECTROCHEMISTRY.—The modern theories of solution and the principles of thermodynamics in their application to the problems of electrochemistry; electro-motive force and the energy principles underlying the transformation of chemical and electrical energy. Two times a week; II; (3/4 unit). Dr. MacInnes.

Prerequisite: Chemistry 102; Mathematics 8a or 7 and 9.

102c. ADVANCED PHYSICAL AND ELECTROCHEMISTRY.—The applications of physico-chemical methods to special problems. Laboratory. Twice a week; I; (1/2 to 1 unit). Professor Washburn.

Prerequisite: Chemistry 31, 33; registration in Chemistry 102b, or completion of Chemistry 102, 102a, or 102b; Mathematics 8a or 7 and 9.

102d. ELECTROCHEMISTRY.—Theoretical and applied electro-
chemistry, with emphasis on the technical side of the subject. (For students in electrical engineering.) *Once a week; 1; (½ unit).*

Dr. MacInnes.

102e. **Special Topics in Physical Chemistry.**—Subject for 1916-17: Radiochemistry. Soddy, *The Chemistry of the Radio Elements.* *Once a week; 1; (½ unit).*

Professor Washburn.

**Prerequisite:** Chemistry 102 or 102a.

102f. **The Chemistry and Physics of Colloids.**—The classification of disperse systems, adsorption, ultramicroscopy. Electrical, chemical, optical, and catalytic properties of colloids. Seminar and laboratory. (Given in 1916-17, alternating with 102b.) *Two times a week; 1; (¾ unit).*

Dr. MacInnes.

**Prerequisite:** Chemistry 31, 33, 35.

103. **Advanced Inorganic Chemistry.**—Descriptive inorganic chemistry; the rarer elements; the periodic system. Lectures, with or without laboratory. *Two to five times a week; I, II; (½ to 1¾ units).*

Professor Balke.

103a. **Advanced Analytical Chemistry.**—Special topics. Lectures, with or without laboratory. *One to five times a week; II; (½ to 1¾ units).*

Assistant Professor Smith.

**Prerequisite:** Chemistry 5b, 9a, 9b, 14a-14b, 31, 33.

103b. **Special Topics in Inorganic Chemistry.**—Subject for 1915-16: The Chemistry of the Higher Order Compounds. Werner, *Neuere Anschauungen auf dem Gebiete der Anorganischen Chemie;* assigned reading from later publications. Lectures and seminar. *Twice a week; 1; (¾ unit).*

Assistant Professor Smith.

**Prerequisite:** Chemistry 9a, 9b, 14a-14b.

103c. **Special Topics in Inorganic Chemistry.**—Seminar. Subject for 1916-17: The Determination of Atomic Weights. *Twice a week; II; (¾ unit).*

Professor Balke.

103d. **Advanced Qualitative Analysis.**—Methods of separation; qualitative reagents; reactions of some of the less common elements. Designed especially for those intending to teach qualitative chemistry. Lectures, with or without laboratory. *One to three times a week; I; (½ to 1 unit).*

Assistant Professor Weber.

104. **Advanced Organic Chemistry.**—Seminar. The open chain compounds of carbon, hydrogen, and oxygen atoms from the
DEPARTMENT OF CHEMISTRY

standpoint of the atomic linking theory; tautomerism, stereochemistry; and the carbohydrates. Lectures; discussions; laboratory. \textit{Three times a week; I, II; (3/4 unit)}. Assistant Professor DERICK.

[104a. \textbf{ADVANCED ORGANIC CHEMISTRY}.—(Continuation of 104, with which it alternates.) The closed chain compounds of the carbon, hydrogen, and oxygen atoms and of the organic compounds of nitrogen; the ureids, alkaloids. Lectures; discussion; laboratory. \textit{Three times a week; I, II; (3/4 unit.)} Not given in 1916-17.]

Assistant Professor DERICK.

104b. \textbf{ADVANCED QUANTITATIVE ORGANIC ANALYSIS}.—Proteins, alkaloids, glucosides, volatile oils, and other constituents of animal and vegetable tissues. Plant analysis. Toxicological analysis. The general methods, chemical and physical, or organic analysis. Lectures and seminar. May be accompanied by laboratory work on a selected group of compounds. \textit{Twice a week; I, II; (3/4 unit}).

Dr. BEAL.

104c. \textbf{SPECIAL TOPICS IN ORGANIC CHEMISTRY}.—Seminar. \textit{Once a week; II; (1/4 unit)}. Assistant Professor DERICK.

105. \textbf{ADVANCED PHYSIOLOGICAL CHEMISTRY}.—A more detailed study of the structure and distribution of the proteins. The chemistry of intermediary metabolism and of the glands of internal secretion. Lectures, demonstrations, assigned readings, with discussions. \textit{Twice a week; II; (3/4 unit)}. Dr. LEWIS.

105a. \textbf{ADVANCED PHYSIOLOGICAL CHEMISTRY}.—Laboratory work involving the more difficult biochemical preparations and the use of the newer analytical methods. \textit{One to five times a week; I, II; (3/4 unit)}. Dr. LEWIS.

105b. \textbf{ADVANCED PHYSIOLOGICAL CHEMISTRY}.—Seminar. A consideration of some phases of the recent development of physiological chemistry. \textit{Two hours a week; I, II; (3/4 unit)}. Dr. LEWIS.

106. \textbf{ANIMAL CHEMISTRY (ANIMAL NUTRITION)}.—The recent advances in the chemistry of nutrition of the lower animals; the chemistry of the functional products; the flesh, fat, milk, and wool of the more common domesticated animals. Lectures; conferences; assigned reading; laboratory. \textit{Five times a week; I, II; (1 to 11/2 units)}. Professor GRINDLEY.
Prerequisite: Two years' work in chemistry.

107. Special Problems in Technology of Fuels.—I; (1 unit).
Professor Parr.

Prerequisite: Chemistry 77.

107a. Gas Manufacture.—Carbonization processes, ovens and by-products. Once a week; II; (½ unit).
Professor Parr.

108. Advanced Metallography.—Constitution and microstructure of metals and alloys; the relations between their properties, chemical and mechanical treatment, and structure. Assigned reading and laboratory. Twice a week; I; (¾ unit).
Assistant Professor McFarland.

Prerequisite: Chemistry 7 and 78 or equivalent.

109. Advanced Industrial Chemistry.—Seminar. Some of the more important chemical industries; the development and chemical control of processes. Twice a week; I, II; (¾ unit).
Assistant Professor McFarland.

Prerequisite: Chemistry 6, 9, 14a-14b, 21 or equivalent.

110. Water Supplies.—The sources of contamination of water supplies and the purification of water for potable or technical use. One to five times a week; I, II; (½ to ⅔ units).
Professor Bartow.

111. Research.—A thesis is usually required of students taking the Master's degree and is always required of students taking the degree of Doctor of Philosophy. (For a description of undergraduate work leading to a thesis, see Chemistry 11.) Work may be taken in the following subjects:

Physical and Electrochemistry. Professor Washburn, Dr. MacInnes.

Inorganic Chemistry. Professor Balke, Assistant Professors Smith, Weber.

Analytical Chemistry. Assistant Professor Smith.

Food Chemistry. Dr. Beal.

Organic Chemistry. Professor Noyes, Assistant Professor Derick.

Water Chemistry. Professor Bartow.

Animal Chemistry (Animal Nutrition). Professor Grindley.

Physiological Chemistry. Dr. Lewis.

Industrial Chemistry. Professor Parr, Assistant Professor McFarland.
Note: All the courses in Chemistry offered in the Summer Session are equivalent to the courses of the same numbers given during the academic year. For full description see preceding pages.

Graduate Work. The courses which are starred (*) below are accepted for graduate credit in accordance with the introductory paragraphs of the Graduate School Circular under the head of Chemistry.

S1. Elementary Chemistry.
   Dr. Hopkins, Dr. Hecker, Dr. Engle, Mr. Rowland.

S1a. Inorganic Chemistry.—For students who have had one year of high school chemistry.
   Dr. Hopkins, Dr. Hecker, Dr. Engle.

S1b. Elementary Chemistry.—For Engineering students.
   Dr. Hopkins, Dr. Hecker, Dr. Engle.

S2a. Inorganic Chemistry and Qualitative Analysis.
   Dr. Hecker, Mr. Rowland.

S3a. Inorganic Chemistry and Qualitative Analysis.—For students in Chemistry and Chemical Engineering. Dr. Hecker.

*S5a. Elementary Quantitative Analysis.
   Dr. Beal, Dr. Sears.

*S5c. Food Analysis.
   Dr. Beal, Dr. Sears.

*S9a. Organic Synthesis.
   Assistant Professor Derick, Dr. Johnson.

*S9b. Organic Synthesis.
   Assistant Professor Derick, Dr. Johnson.

*S14. Organic Chemistry (First Semester).
   Assistant Professor Derick, Dr. Johnson.

   Assistant Professor Derick, Dr. Johnson.

*S11 and *S111. Research.
   Professor Balke, Assistant Professor Derick, Dr. Beal, Dr. Lewis.
   (Subject to the approval of the Graduate School Faculty.)

*S13a. Agricultural Analysis.
   Dr. Beal, Dr. Sears.

*S15. Physiological Chemistry.
   Dr. Lewis.

S17. Teachers' Course.
   Dr. Hopkins.
*S92. History of Chemistry.—Periods, theories, leaders; use of literature. Lectures, reports, reference work. Two periods a week; one hour credit.  
Assistant Professor Derick.

THEESIS SUBJECTS
1915-16
CANDIDATES FOR THE DEGREE PH.D.

"Equilibria Between Aqueous and Metallic Solutions."
(Smith) Theodore Rolly Ball

"The Scale of Influence of Substituents in Paraffin Mono-basic Acids. The Divalent Oxygen Atom."
(Derick) St. Elmo Brady

"The Influence of Viscosity Upon Ionic Mobilities."
(Washburn) Karl Adolph Clark

"The Scale of Influence of Substituents in Paraffin Mono-basic Acids. The Phenyl Radical."
(Derick) Paul Marshall Dean

"Observations on the Rare Earths."
(Balke) Edgar Wallace Engle

"A Study of Liquid Manure."
(Beal) Duane Taylor Ennis

"Studies in the Alterations of Peat."
(Parr) Ross Earlby Gilmore

"The Scale of Influence of Substituents in Paraffin Mono-basic Acids. The Divalent Oxygen Atom."
(Derick) Raymond Washington Hess

"The Coking of Coal at Low Temperatures."
(Parr) Thomas Ernest Layng

"Studies on the Quantitative Estimation of Alkaloids by Means of Immiscible Solvents."
(Beal) Harry Fletcher Lewis

"Purification of Sewage by Aeration in the Presence of Activated Sludge."
(Bartow) Floyd William Mohlman

"The Scale of Influence of Substituents in Paraffin Mono-basic Acids. The Phenyl Radical."
(Derick) Loran Ogdan Potterf.

* Died January 3, 1916.
DEPARTMENT OF CHEMISTRY

(Grindley) John Carl Ross

"Radio-Activity of Well Waters in Illinois."
(Bartow) Clarence Scholl

CANDIDATES FOR THE DEGREE M. S.

"A Study of Trimethylene Oxide."
(Derick) Don Warren Bissell

"Decomposition Problems of Sewage Disposal."
(Bartow) Frederick North Crawford

"Determination of Moisture and Calorific Value of American Woods."
(Parr) Carl Nathan Davidson

"The Toxic Limits of Certain Drugs."
(MacArthur) Edward Adelbert Duys

"Alkali Halide Concentration Cells."
(MacInnes) Frank F. Foutz

"Nickel-Chromium Eutectic Alloys."
(McFarland) Jay Thomas Furl

"The Value of Activated Sludge as a Fertilizer."
(Bartow) William Durnell Hatfield

"Observations on the Rare Earths."
(Balke) John Frederick Gross Hicks

"Studies on the Formation and Distribution of Uric Acid and Urea in Vertebrates."
(Lewis) Walter Gerald Karr

"The Effect of Aging on the Constants of Chinese Wood Oil."
(McFarland) Henry Rhodes Lee

"Catalytic Hydrogenation of Unsaturated Compounds."
(Derick) Harold Alvin Levey

"Correlation of Ionization and Structure in Unsaturated Acids."
(Derick) Harry Bruce McClugage

Without thesis.
(Balke) Albert Waffle Owens

"The Biological Studies of Sewage Purification by Aeration."
(Bartow) Robbins Russell

"A Study of the Amino Acids of Barley."
(Grindley) Albert Durand Shepard

"A Study of the Possible Sources of Industrial Alcohol in China."
(Olin) Nun Chi Shum
"Copper-Chromium Alloys and Emulsions."
   (McFarland) Terrence Onas Westhafer

CANDIDATES FOR THE DEGREE A. M.

"The Scale of Influence of the Trivalent Nitrogen Atom in Paraffin Monobasic Acids."
   (Derick) Herbert Ephraim French
"Water Softening Problems."
   (Bartow) Edman Greenfield
"Derivatives of Dimethylcyclopentenone."
   (Noyes) Carl Shipp Marvel
"A Study of Trimethylene Oxide."
   (Derick) Ernest Henry Vollweiler

CANDIDATES FOR THE DEGREE B. S.

"Proper Heat Treatment of Steel for Line Shafting."
   (McFarland) O. A. Barnes
"Catalysis in Chlorination Reactions."
   (Hecker) J. Breedis
"Determination of Type Compounds in Low Temperature Tars."
   (Broderson) R. J. Goodrich
"The Rearrangement of Alkyl Aniline."
   (Derick) Fred C. Hahn
"Studies in Dust Preventives and Road Materials."
   (Broderson) R. M. Kamm
"Studies in Qualitative Organic Analysis."
   (Kamm) O. S. Keener
"Studies in Qualitative Organic Analysis."
   (Derick) S. D. Kirkpatrick
"Effect of Gas House Waste on the Bio-Chemical Oxidation of Sewage."
   (Bartow) C. W. Lenzing
"Specifications for Sulphuric Acid Containers for Railway Shipment."
   (McFarland) J. H. McCormack
"The System, Benzene-Silver Perchlorate."
   (Washburn) R. W. Miller
"The Electrolytic Deposition of Lead."
   (MacInnes) R. W. Morgan
"The Amino-Acid Contents of Low and High Protein Corn."
   (Grindley) Harry L. Mueller
"Studies in Qualitative Organic Analysis."
   (Derick) A. H. Polakow
"Some Quantitative Results on the Determination of the Monamino Acids of Casein." (Grindley) Horace A. Shonle

"Synthesis of Ethylisopropylhydroxylamine." (Hecker) Julian F. Smith

"The Reduction of Iron Oxides with Hydrogen; a Study of Equilibria." (Olin) Verner Starner

"A Rapid Method for the Analysis of the R₄O₅ Precipitate Obtained from Silicate Rocks." (Smith) J. H. Tilton

"Reduction of Unsaturated Compounds." (Derick) G. A. Wrisley

"The Zimmermann-Reinhart Method for the Determination of Iron, as Applied to the Analysis of Materials Containing Titanium, Vanadium, Tungsten, etc." (Smith) C. A. Zelle

GENERAL SCIENCE

"The Decomposition of Sewage by Bacteria." (Bartow) Wilbur Fred Kamm

PUBLICATIONS DURING 1915


STUDENTS IN CHEMISTRY

FIRST SEMESTER, 1915-16

Graduate Students

Ball, Theodore Rolly .... 806 S. Third St., C. .... Same
Beattie, Harry James... 807 Armory Ave., C.... 909 S. Clarkson St., Denver, Colo.
Bennett, Arthur Norton... 307 Armory Ave., C....
Bissell, Don Warren.... 917 W. Green St., U.... 284 Water St., Keene, N. H.
Brady, St. Elmo.......... 1202 W. Main St., U.... 824 W. Magazine St., Louisville, Ky.
Braham, Joseph Marvin. 805 W. Oregon St., U.... 1918 E. Gordon Ave., Spokane, Wash.
Braley, Silas Alonzo.... 806 S. Third St., C. .... Same
Brown, John B nis... 704 S. Third St., C.... Rock Falls, Ill.
Bruce, William R....... 704 S. Third St., C.... Appleton, Wis.
Buell, Mary Van Rensselaer .... 806 S. Fifth St., C.... 115 Ely Place, Madison, Wis.
Bull, Sleeter............ 806 W. Michigan Ave., U.... Same
Chandler, EdwinMarionA. 1202 W. Main St., U.... Port Tampa City, Fla.
Charlton, Ernest Edw.... 907 S. Sixth St., C.... Cherokee, Iowa
Cook, Willard Oliver... 507 S. Goodwin Ave., U.... New Salem, Ind.
Crawford, F. N......... 805 W. Illinois St., U....
Davidson, Carl Nathan... 917 W. Green St., U....
Eckstein, Henry C..... 1003 W. Illinois St., U....
Engle, Edgar Wallace... 201 W. Green St., U.... Same
Englis, Duane T....... 907 S. Sixth St., C.... Eureka, Ill.
Foord, Jay Thomas..... 104 E. Green St., C.... St. Johns, Mich.
French, Herbert Ephraim .... 907 S. Sixth St., C.... Pendleton, Ind.
Gilmore, Ross Earley.... 704 S. Third St., C.... Sioux City, Iowa
Greenfield, Edman.... 410 W. High St., U.... Toronto, Canada
Hamon, Robert J...... 102 E. Daniel St., C.... Sabetha, Kan.
Hatfield, Wm. Durrell... 917 W. Green St., U.... Jacksonville, Ill.
Heinzelmann, Alf. Martin .... 917 W. Green St., C.... Aurora, Ill.
Hess, Ray Washington... 704 S. Third St., C.... Plover, Iowa
Hicks, J. Frederick Gross .... 907 W. High St., U....
Howell, Lloyd B....... 516 W. Michigan, U.... St. Louis, Mo.
Hufford, Ralph W....... 506 W. Oregon St., U.... Montello, Wis.
Hull, Sidney Marion... 917 W. Green Ct., U....
Hultgren, H. R......... 1303 W. Univ. Ave., U....
Jordan, Louis......... 1006 W. Calif. Ave., U.... Portland, Me.
Karr, Walter Gerald... 407 W. Healey St., U.... Almond, N. Y.
Knight, Henry G...... Harvard Apts., C.... Laramie, Wyo.
Kremers, Harry Cleveland .... 1102 W. Springfield Ave., U....

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<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>City</th>
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<tbody>
<tr>
<td>Langlier, W. F.</td>
<td>601 Oregon St., U.</td>
<td>Same</td>
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<td>Lee, Emmett Chambers</td>
<td>912 W. Illinois St., U.</td>
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<td>Lee, Henry Rhodes</td>
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<td>Levey, Harold Alvin</td>
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<td>Lewis, Harry Fletcher</td>
<td>601 W. Oregon St., U.</td>
<td>Pottsville, Pa.</td>
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<td>McClugage, Harry B.</td>
<td>1008 W. Illinois St., U.</td>
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<td>Manuel William Asbury</td>
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<td>Marvel, Carl Shipp</td>
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<td>Okey, Ruth E.</td>
<td>301 S. Wright St., C.</td>
<td>Kirkwood, Ill.</td>
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<td>Olewine, James Harris</td>
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<td>Owens, Albert Waffle</td>
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<td>Portz, Harry Glenn</td>
<td>1212 W. Main St., U.</td>
<td>Fresno, Ohio</td>
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<td>*Potterf, Loran O.</td>
<td>907 S. Sixth St., C.</td>
<td>Eaton, Ohio</td>
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<td>Powell, Alfred Richard</td>
<td>917 W. Green St., U.</td>
<td>Ottawa, Kan.</td>
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<td>Reed, James Keel</td>
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<td>Indianapolis, Ind.</td>
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<td>Rees, Edwin Arthur</td>
<td>307 Armory Ave., C.</td>
<td>Garfield, Utah</td>
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<td>1117 S. Third St., C.</td>
<td>Dawson, Minn.</td>
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<td>Rowland, Floyd Elba</td>
<td>1300 W. Stoughton St., U.</td>
<td>Corvallis, Ore.</td>
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<td>404 E. Healey, C.</td>
<td>Watseka, Ill.</td>
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<td>Smith, Irene Fern</td>
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<td>Appleton, Wis.</td>
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<td>Updegraff, Helen</td>
<td>1008 W. Calif. Ave., U.</td>
<td>Vallejo, Cal.</td>
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<td>Vollweiler, Ernest Henry</td>
<td>917 W. Green St., U.</td>
<td>Shandon, Ohio</td>
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<td>Welland, Henry Joseph</td>
<td>601 W. Oregon St., U.</td>
<td>Pittsford, N. Y.</td>
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<td>Wells, Lansing Sadler</td>
<td>403 S. Wright St., C.</td>
<td>Helena, Mont.</td>
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<td>Westhafer, Terrence O.</td>
<td>407 W. Healey St., C.</td>
<td>Braman, Okla.</td>
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<td>Winkelmann, Herbert August</td>
<td>917 W. Green St., U.</td>
<td>Appleton, Minn.</td>
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* Died January 3, 1916.
## COURSE IN CHEMISTRY 1915-1916

### SENIORS.

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<tr>
<th>Local</th>
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<tbody>
<tr>
<td>1307 W. Main St.</td>
<td>Goldingen, Russia</td>
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<td>410 Green St.</td>
<td>Oberlin, Ohio</td>
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### JUNIORS.

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<td>511 E. Green St.</td>
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### SOPHOMORES.

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<td>Struever, Carl C.</td>
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<td>Hartmann, Wm. Monroe</td>
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<td>Segur, John Bartlett</td>
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<td>Sparks, Keith</td>
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## COURSE IN CHEMICAL ENGINEERING 1915-16

### SENIORS.

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<td>Kirkpatrick, Sidney Dale.</td>
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<td>Krug, Louis Gustave...</td>
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<td>Hyman ..................</td>
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<td>Wrisley, George Alfred.</td>
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### JUNIORS.

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<td>Adler, Leon............</td>
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### SOPHOMORES.

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### FRESHMEN.

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DEPARTMENT OF CHEMISTRY

Dixam, Ralph Scott........  612 S. Coler Ave., U...... Vincennes, Ind.
Cantert, C. F............. 1011 W. Oregon St., U......
Ginnings, Paul............. 603 E. Spfd. Ave., C...... Macomb, Ill.
Heaton, Henry Herman...... 506 E. John St., C...... Rosedale, Ind.
Heinicke, Herbert.......... 207 E. John S., C...... St. Louis, Mo.
Hyde, Harry Woolsey........ Assoc. Bldg. ........
Knop, Oscar................. Y. M. C. A. ........
Koupol, Walter G.........  1006½ W. Green St., U... Crown Point, Ind.
Lenton, Robert Edgar...... 901 W. Green St., U...... Gloucester, N. J.
McElbeney, Fred..........  511 E. Green St., C...... Vandalia, Ill.
Marshall, Elsmere John...  602 E. White St., C...... Washington, D. C.
Mohamed, Alamullah........ 302 E. Stoughton St......
Petesch, Germer........... 411 E. Healey St., C...... McHenry, Ill.
Pferson, Raymond H........ 503 S. Race St., U...... Chicago, Ill.
Pprolis, Otto............... 1112 W. Main St., U......
Schlader, Henry M.........  1001 W. Illinois St., U... Oak Park, Ill.
Spelce, John Edward...... 411 E. Green St., C...... Sycamore, Ill.
Stalins, Eugene M........  612 E. Univ. Ave., C...... Danville, Ill.
Thal, Adolph Frederick.... 507 S. 6th St., C...... Effingham, Ill.
Tucker, William H........  509 E. Green St., C...... Morrison, Ill.
Westerberg, Glenn L........ 608 E. Spfd. Ave., C...... Moline, Ill.

GENERAL SCIENCE, WITH CHEMISTRY AS MAJOR

SNIORS.

Fager, Eugene Philip......  Y. M. C. A. ........ Murphysboro, Ill.
Felger, Walter Blaine...... 708 W. Green St., U...... Cheadle, Alberta.
Holmes, Charles Vernon...  506 E. Green St., C...... Manteno, Ill.
Kamm, Wilbur Fred........  512 E. Spfd. Ave., C...... Highland, Ill.
Pinkney, Fred Theodore.... 1005 S. 4th St., C...... Chicago, Ill.
Primm, James Kelly........ 909 S. 6th St., C...... Champaign, Ill.

JUNIORS.

Anderson, Charles
Wesley .................. 1014 S. 6th St., C...... Dixon, Ill.
Newlin, Harold Vance.....  212 E. Daniel St., C...... Robinson, Ill.
Terry, Robert Byron......  311 E. Green St., C...... Girard, Ill.
ALUMNI OF THE DEPARTMENT OF CHEMISTRY

CLASS OF 1872

Davis, John Jefferson, B.S., Physician, 119 College Ave., Racine, Wis.

CLASS OF 1874


CLASS OF 1875

Barnes, Arthur Ellis, B.S., Mining, Goldfield, Nevada.
Scovill, Melville Amasa, B.S. M.S. '78, Ph.D. '06, Dean and Director Ky. Agr. Exp. Sta., Died August 15, 1912, at Lexington, Ky.

CLASS OF 1877

Gibson, Charles Brockway, B.S., Assayer, Chemist, Metallurgist, Mining Engineer, Retired, 1505 Morse Ave., Chicago, Illinois.
Sim, Coler Lindley, B.S., Banker, 1303 N. Lawrence Ave., Wichita, Kansas.

CLASS OF 1878

Rudy, William Dole Owen, B.S., Chemist, Died July, 1899, at Washington, D.C.

CLASS OF 1879

DEPARTMENT OF CHEMISTRY

CLASS OF 1880

Cook, Charles F., B.S., Farmer, Edwardsville, Ill.

CLASS OF 1881

Bellamy, Albert, Cert. Real Estate and Loan, Girard, Ill.
Birney, Frank Lansing, Cert. Physician, 1524 Gaylord St., Denver, Colo.
Pearman, James Ora, B.S., Physician, Mahomet, Ill.
Ross, Sprague Dwight, B.S., Financier, 615 W. First St., Grand Island, Neb.
Schwartz, Joseph, Cert. Druggist, Salem, Ill.
Slade, Byron A., B.S., Druggist, 1027 Spafford Ave., Rockford, Ill.

CLASS OF 1882

Bailey, Samuel Gordon, Jr., B.S., Chemist, Died May 13, 1901, at Chicago, Ill.
Carmen, William Burges, B.S., Physician, 32 Upton Park, Rochester, N. Y.
Slauson, Howard Brinkerhoff, B.S., Horticulturist, 5416 Morgan St., Seattle, Wash.

CLASS OF 1883

Hewes, George Cavender, B.S., Evangelist, Pithoragarh Kumaun, India.
Kenower, John Thomas, B.S., Editor Breckenridge Bulletin, Breckenridge, Mo.
Little, Henry Pearson, B.S., Teacher, died Sept., 1903, at Hoboken, N. J.


CLASS OF 1884

Eberlein, Frederick Walter, B.S., Physician and Surgeon, Lacon, Ill.

Kimball, Edwin Raymond, B.S., Newspaper Work, died about June 5, 1908, at Chicago, Ill.

Lilly, Charles Hervey, B.S., Grain Merchant and Seedman, 1106 5th Ave., West, Seattle, Washington.


Parr, Samuel Wilson, B.S. (M.S. Cornell, '85; Berlin and Zürick), Professor of Applied Chemistry, Univ. of Illinois. 919 W. Green St., Urbana, Ill.

Speidel, Ernest, B.S., died Oct. 19, 1892, at Ravenswood, Ill.


CLASS OF 1885

Dunlap, Robert Livingston, Cert. Carpenter, 703 W. Washington St., Urbana, Ill.


Manns, Albert George, B.S., Chief Chemist Albert Frostel & Sons Co., Milwaukee, Wis., 606 Woodland Ave., Oconomowoc, Wis.

Miller, John Albert, B.S., M.S., '88, Associate Professor in Chemistry, Univ. of Buffalo, 176 Norwood Ave., Buffalo, N. Y.

CLASS OF 1886

Barrett, Dwight Harrison, B.S., died Dec. 30, 1888, at Baltimore, Md.

Garvin, John Brewer, B.S., Educator, 4545 Grove St., Denver, Colo.
CLASS OF 1887

Clark, Percival Lemon, address unknown.
Powers, Mark, B.S., died Feb. 28, 1895, at Evanston, Ill.
Tatarian, Bedros, B.S., Chemist, care Ag. Coll. of Arizona, Tucson, Ariz.

CLASS OF 1888

Bing, Benjamin, B.S., Merchant, Urbana, Ill.
Greaves, George, Cert. Supt., Carr Wheel Works, 310 Hall St., W., Savannah, Ga.
McHugh, George Burt, B.S., Postal Railway Clerk, 122 Cortland St., Houston, Tex.

CLASS OF 1890

Cornelison, Robert Wilson, B.S., Technical Chemist and Manufacturer, West Summit St., Somerville, N. J.
Shamel, Charles H., B.S., M.S., '91 (LL.B. Univ. of Michigan, '93; A.M. Columbia, '05; Ph.D. '07), Lawyer and University Lecturer on Mining Law, Univ. of Washington, 536 New York Block, Seattle, Wash.
Steves, Fred Worthley, B.S., Fruit Grower, San Martin, Calif.

CLASS OF 1891

Barclay, Thomas Henry, B.S., Chemist, Casilla 447, Santiago, Chile, S. A.
CHESTER, DICK HUBERT, B.S., Chemist, 1405 Farmer's Bank Bldg., Pittsburgh, Pa.
SMOLT, FRANK OSCAR, B.S., Chemist, Dearborn Drug & Chemical Wks., Manila, P. I.

CLASS OF 1892


CLASS OF 1893

COFFEEN, FRED GOLDSMITH, B.S., Foundry Expert, 104 E. John St., Champaign, Ill.
HUNT, EDWARD EVERETT, B.S., Chemist for Piper, Johnson & Case, New York Life Arcade, Minneapolis, Minn.
McCARTNEY, WILLIAM PRIESTLY, B.S., M.S., '00, Lawyer, Lyons, Kansas.
METCALF, JAMES DAVID, B.S., Bank Cashier, Shipman, Ill.
MILLAR, CLENDON VAN METER, B.S., M.S., '94, Chemist and Assayer, 617½ Joplin St., Joplin, Mo.

CLASS OF 1894

EAKLE, SILAS JACKSON, B.S., Principal of School, Danforth, Ill.
ENGBERG, MARTIN JONAS, B.S., Publisher, 2304 Cleveland Ave., Chicago, or 901 Belmont Ave., Chicago.
Kerchner, Fred William, B.S., Physician, Glen Carbon, Ill.
DEPARTMENT OF CHEMISTRY

STRAUSS, WILLIAM, B.S., in Business, Pittsfield, Ill.
SY, ALBERT PHILIP, B.S., M.S., '99 (Ph.D. Univ. of Buffalo, '08), Professor of Chemistry, Univ. of Buffalo, 219 Crescent Ave., Buffalo, N. Y.
TOWER, WILLIS EUGENE, B.S., M.S., '08, Teacher, 344 Normal Parkway, Chicago, Ill.

CLASS OF 1895

CLINTON, JOHN DEWITT, B.S., died Oct. 18, 1905 at Polo, Ill.
HARMS, ARMIN, B.S., care Cia Metalurgica, Torreon, Coah, Mexico via El Paso, Tex.
ROWE, HERBERT BRUNSKILL, B.S., Pharmacist, 201 N. Central Ave Paris, Ill.
STANISLAUS, I. V. S., ex '95, Pharmacist, 1715 Cherry St., Philadelphia, Pa.
STARK, ROBERT WATT, B.S., Graduate Student, 809 W. Nevada St. Urbana, Ill.

CLASS OF 1896

BENNETT, GEORGIANA E., B.S., Teacher, 1375 E. 57th St., Chicago, Ill.
BRENEKE, WILLIAM CHARLES, B.S., M.S., '98 (Ph.D. Harvard, '07), Associate Professor of Mathematics, Univ. of Nebraska, 1250 S. 21st St., Lincoln, Nebr.
CLARKE, FLORENCE BESANCON (Michalek), B.S., 13 E. 16th St., Chicago Heights, Ill.
GAZZOLO, FRANK HENRY, B.S., Chemist, 1357 Astor St., Chicago, Ill.
MAXWELL, CHARLES JACOB, B.S., Chemist, Darling & Co., Chicago Union Stock Yards, Chicago, Ill.
SAUNDERS, HARRY J., B.S., M.D., '05, Physician, 1014 Broadway, Kansas City, Mo.

CLASS OF 1897

BEADLE, THOMAS BEATTY, B.S., Architect, Jarbridge, Nev., via Three Creeks, Id.

MURPHY, FRANCIS JOSEPH, B.S., Supt. and Metallurgist, Great Cobar Mining Co., Cobar, New South Wales, Australia.


RAYBURN, CHARLES CLYDE, B.S., Physician, died April, 1912, at Stratton Park, Colo.

SAMMIS, JOHN LANGLEY, B.S., M.S., '99 (Ph.D. Univ. of Wisconsin, '06), Asst. Professor of Animal Husbandry, Univ. of Wisconsin, Madison, Wis.

SMITH, LOUIE HENRIE, B.S., M.S., '99 (Ph.D. Halle, '07), Professor of Plant Breeding, Univ. of Illinois, 804 W. Illinois, Urbana, Ill.

CLASS OF 1898


WOLCOTT, JAMES THOMPSON, B.S., Chemist, died Feb. 9, 1904, at Fort Worth, Tex.

CLASS OF 1899

HASELTINE, WARREN E., ex. '99, Chemist, Aurora, Ill.

KOCII, FRED CONRAD, B.S., M.S., '00 (Ph.D. Univ. of Chicago, '12), Asst. Professor of Physiological Chemistry, University of Chicago, 5743 Jackson Ave., Chicago, Ill.

McCORMACK, HARRY, M.S. (B.S. Drake Univ., '96), Professor of Chemistry, Armour Inst., 5329 Ingleside Ave., Chicago, Ill.

CLASS OF 1900

BUSH, JOHN KENYON, A.B., A.M., '03, Cashier in Bank, 5036 21st St. N. E., Seattle, Wash.
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MERRILL, STILLWELL FREDERICK, B.S., Chief Chemist, Western Branches, Natl. Lead Co., 1005 Clark Ave., St. Louis, Mo.
SAFFORD, EDWARD BRIGHAM, B.S., Farmer, R. F. D. No. 3, Sycamore, Ill.

CLASS OF 1901

FREES, HERMAN E., Ex. '01, 355 Dearborn St., Chicago, Ill.
GRABER, HOWARD TYLER, B.S., Chief Chemist, Rey Chemical Co., 636 Trumbull Ave., Detroit, Mich.
HARTFORD, GUY RUSSELL, B.S. (Ph.C. Northwestern Sch. Pharm., '02), Real Estate & Insurance, Urbana, Ill.
KREKENBAUM, ADOLPH, B.S., Pres. and Mgr., Kreik Varnish Co., 5130 Sheridan Road, Chicago, Ill.
LYMAN, FRANK LEWIS, B.S., Real Estate Business, 207 Ferguson St., Springfield, Ill.
MILES, RUTHERFORD THOMAS, B.S., Merchant, Fisher, Ill.
WAIT, ERNEST LUDDEN, B.S., Chemist, Fertilizer Works, Chicago.

CLASS OF 1902

BADER, WILL JOHN, A.B., Chemist, Quincy, Ill.
BREITSTADT, JOHN HENRY, A.B., Master Brewer, Dick & Bros., Quincy Brewing Co., 325 S. Ninth St., Quincy, Ill.
DONOGHUE, WILLIAM JOSEPH, B.S., Chemist, Winona Zinc Wks., La Salle, Ill.
DRAPER, EDWIN LYON, A.B. (M.D. Harvard, '07), Physician, 289 State St., Albany, N. Y.
HAGEDORN, CARL FREDERICK, A.B., charge of Mfg., Armour Fertilizer Wks., Hyde Park Hotel, Chicago, Ill.
HIGGINS, FRANCIS WHITSON, A.B., Wks. Mgr., Deutsche Carborundum Werke, Düsseldorf-Reisgolz, Germany.
WILLIAMS, ELRICK, A.B., A.M., '03, Teacher, Ventura, Calif.

CLASS OF 1903


HIGGINS, CHARLES HUNTINGTON, B.S., Chemist, Gulick-Henderson Co., 6325 Kenwood Ave., Chicago, Ill.

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Jarman, HENRY PHELPS, B.S., Farmer, Elmwood, Ill.


Steinwedell, CARL, B.S., Supt. Artificial Dept., Columbus Gas & Fuel Co., Columbus, Ohio.

ZANGERLE, NORMAN ARTHUR, B.S., Manufacturer, died.

CLASS OF 1904

Barker, PERRY, A.B., A.M., '07, Fuel Engineer, Oliver Bldg., 141 Milk St., Boston, Mass.

Braun, WALTER CHARLES EMIL, A.B., Chemist, died July 7, 1905, at Chicago, Ill.


Ogihara, Tokiyo, A.B., Tokoyo, Japan.

Powell, Jesse Roy, A.B., Chief Chemist, Armour Soap & Glue Wks., 212 E. 56th St., Chicago, Ill.

Wilcox, Burton B., A.B., Chemist, U.S. Food Inspection Lab., Appraisers Store, New York City, N. Y.

CLASS OF 1905

Bailey, Thomas Stanley, B.S., Mgr. Good Morning Mining Co. and Storm King Mining Co., Wallstreet, Colo.

Dickey, Cromwell Bartlett, B.S., Chemist, 677 Murray Ave., Milwaukee, Wis.
HARNEY, JOHN MATTHEW, B.S., Chief Chemist, Frank Tea & Spice Co., 307 Broadway, Cincinnati, Ohio.
McGrath, Sylvester Joseph, A.B., Chemist, care O'Breen Varnish Co., South Bend, Ind.

CLASS OF 1906

Barnhart, Jesse Melangthon, B.S., M.S., '12, Dairyman, R. R. 41, Mahomet, III.
Gill, Frederic Williams, B.S., M.S., '10, Chemist, General Electric Co., 322 Beech St., Arlington, N. J.
Miller, Donald S., B.S., M.S., '07, Supt. of Schools, Stanley, Wis.
Snow, Louis Frederick, B.S., Salesman, American Oil Furnace Co., 3344 H. St., San Diego, Calif.
Trowbridge, Perry Fox, Ph.D. (B.Pd. Mich. Nor. Coll., '92; Ph.B. Univ. of Michigan, '92; A.M. ibid, '05), Professor of Agr. Chemistry and Chemist to Exp. Sta., Univ. of Missouri, 1305 Keiser Ave., Columbia, Mo.
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CLASS OF 1907

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Heuse, Edward Otto, M.S., Ph.D., '14 (B.S. Hanover Coll., '00), Professor of Chemistry, Monmouth Coll., Monmouth, Ill.
Koch, Alfred Richard, B.S. (A.M. Univ. of Wisconsin, '08), Chemist, American Steel Foundries, Granite City, 4539A Clayton Ave., St. Louis, Mo.
Moulton, Charles Robert, B.S. (M.S. Univ. of Missouri, '09; Ph.D. ibid, '11), Asst. Professor in Agr., Univ. of Missouri, Rosemary Lane, Columbia, Mo.
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CLASS OF 1908

Bartells, George Case, B.S., Metallurgist, Gould & Ash, 2020½ Delaware St., Berkeley, Calif.
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Dieter, Charles Foster, B.S., Chemist, Western Electric Co., 3200 Harvard St., Chicago, Ill.
HANZLIK, PAUL JOHN, A.B., A.M., '11 (Ph.C. Univ. of Iowa, '07; M.D. Western Reserve Univ., '12), Demonstrator and Instructor, Western Reserve Univ., 7904 Central Ave., Cleveland, Ohio.

HOMBERGER, ALFRED WILHELM, A.M., Ph.D., '10 (A.B. Univ. of Wisconsin, '05), Professor of Chemistry, Ill. Wesleyan Univ., Bloomington, Ill.

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NIEDERMAN, GERTRUDE (SCOTT), B.S., M.S., '14, Syracuse, N. Y.


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CLASS OF 1909


BENNETT, HARVEY CHILDS, B.S., Chemist, care Allan Jemison, Birmingham, Ala.

BIRDSALL, LEWIS ISAAC, A.M. (A.B. Williams Coll., '07), Supt. of Filtration, Water Department, Minneapolis, Minn.

BLISS, FRANK WALKER, M.S. (B.S. Univ. of Michigan, '08), Professor of Chemistry, Univ. of Minnesota, Minneapolis, Minn.

CLARK, SAMUEL CHAPIN, A.M. (B.S. Univ. of Chicago, '00), Asst. in Nutrition Laboratory, U. S. Dept. of Agr., Washington, D. C.

DAVIS, GRANT TRAIN, M.S. (A.B. Univ. of Mich., '03), Farmer, Clinton, Mich.

DERICK, CLARENCE GEORGE, M.S., Ph.D., '10 (B.S. Worcester Poly. Inst., '06), Asst. Professor of Chemistry, Univ. of Illinois, 619 Indiana Ave., Urbana, Ill.
DOWNEY, Elzy Franklin, A.B., M.S., '10, Teacher, 2635 59th Ave., Cicero, Ill.


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MARTI, William Christoph, B.S., Chemist, Missouri Geological Survey, Rolla, Mo.


MITCHELL, Harold Hanson, A.B., M.S., '13, Ph.D., '15, Associate in Animal Nutrition, Univ. of Ill., 907 W. Main St., Urbana, Ill.

NICKELL, Lloyd Francis, A.B., A.M., '11, Ph.D., '13, Assistant Professor of Chemistry, Washington Univ., St. Louis, Mo.

NUTTALL, John Tilden, M.S. (B.S. Northwestern Univ., '05), Teacher, Chemistry and Physics, 926 Ella St., Birmingham, Ala.


ROSS, Verne Ralph, A.M., (A.B. James Millikin Univ., '08), Teacher, Covina, Calif.

WHEELER, WILFRED FORREST, A.M. (B.S. Univ. of Kansas, '06), died Nov. 17, 1909, at Urbana, Ill.

WILLIAMS, WARREN STEPHEN, B.S., Ceramic Chemist, American Encaustic Tiling Co., 703 Fountain Square, Zanesville, Ohio.


WUSSOW, AUGUST FRANK DANIEL, B.S., M.S., '11, Assistant, Dept. of Nutrition, Ohio Agr. Exp. Sta., Wooster, Ohio.

CLASS OF 1910

BACHMANN, FRANK, B.S., Chemist, California State Board of Health, 1638 Grove St., Berkeley, Calif.

BEEMER, ALEXANDER WILLIAM, B.S., Chemist, Port Neches, Tex.

BORNMAANN, JOHN HENRY, JR., B.S., M.S., '12, Chemist, Bureau of Chemistry, Washington, D. C.

COSS, JAMES AUSTIN, M.S. (B.S. Ill. Wesleyan Univ., '03), Professor of Chemistry, Morningside Coll., 2502 Morningside Ave., Sioux City, Iowa.

EGAN, JAMES EVERETT, A.M. Ph.D. '12 (A.B. De Pauw Univ. '08), Asst. Professor of Chemistry, Miami Univ., Oxford, O.

GORDON, HUGH BYRON, M.S. Ph.D. '12 (A.B. Miami Univ. '08), Asst. Professor of Chemistry, Tex. A. & M. Coll., College Station, Tex.

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INGRAM, HAROLD STUART, B.S., Chemical Engr., Holabert & Roach, 4536 N. Lincoln St., Chicago.

JACOBSON, ANDREW, M.S. (B.S. St. Olaf Coll. '06), Chemist, Metropolitan Water, District of Omaha, Florence, Nebr.
JORDAN, ARTHUR IRVINING, B.S., Farmer, Shanawan, Man., Canada.
KOSTALEK, JOHN ANTON, Ph.D. (A.B. Univ. of Wisconsin '07, A.M. ibid '08), Instructor in Chemistry, Univ. of Idaho, Moscow, Idaho.
MCAILLISTER, HERBERT THOMPSON, B.S., Chemist, Milwaukee Electric Railway & Light Co., 187 12th St., Milwaukee, Wis.
MATTILL, HENRY ALBRIGHT, Ph.D. (A.B. Western Reserve Univ. '06, A.M. ibid '07), Instructor in Chemistry, Univ. of Calif., 2752 Piedmont Ave., Berkeley, Calif.
MOJONNIER, OLIVER WILLIAM, B.S., Manager, Waverly plant, Mohawk Condensed Milk Co., Waverly, IA.
SCHULZKE, OTTO FREDERICK, B.S., Chief Chemist, St. Louis Portland Cement Wks., St. Louis, Mo., 8849 N. Broadway, St. Louis, Mo.
STRACHAN, EARLE KENNETH, M.S. Ph.D. '12 (B.S. Worcester Poly. Inst. '08), Instructor in Chemistry, Univ. of Minn., Minneapolis, Minn.
THOMPSON, THOMAS EUGENE, B.S., Business, 1419 Central Ave., Wilmette, Ill.
WAGNER, CLAUDE LEVERN, B.S., Chief Chemist, Superior Portland Cement Co., Concrete, Washington.
WARNOCK, DAVID WALLACE, B.S., Chemist, Bettendorf Steel Car Co., 910 12th Ave., Moline, Ill.
WILLS, FRANK, B.S., Gen'l Superintendent, Emporia Gas Co., 422 Exchange St., Emporia, Kansas.

CLASS OF 1911

BAKER, CLARENCE JAMES, M.S. (A.B. Univ. of Denver '07), Taylorville, Ill.
BURGESS, PAUL STEERE, M.S. (A.B. Rhode Island State Coll. '10), Chemist and Bacteriologist, Hawaiian Sugar Planters Assn., Honolulu.
BURKE, CHARLES ELDRID, Ph.D. (A.B. McMaster Univ. '07, A.M. ibid '09), Instructor in Chemistry, Univ. of Calif. Add.: Y. M. C. A., Berkeley, Calif.

BURTON, LAWRENCE VREELAND, B.S. M.S. '14, Traveling Fellowship in Chemistry and Bacteriology, Yale Univ., New Haven, Conn.

ELM, EMANUEL EVAR, B.S., Asst. Chemist, Armour & Co., 2515 Flournoy St., Chicago, Ill.

FAIRHALL, LAWRENCE TURNER, B.S. M.S. '12, Head Assistant, Inorganic Chemistry, Harvard Univ., 82 Ellery St., Cambridge, Mass.

FRITZE, LUCIUS AUGUSTUS, B.S., Chemist and Supt. Water Purification, Moline, Ill.


KAMM, OLIVER, B.S. M.S. '13, Ph.D. '15, Instructor in Chemistry, Univ. of Michigan, Ann Arbor, Mich.


LAUTER, CARL JOHN, B.S., Chemist, Quincy, Ill.

MAUTNER, LEO A., B.S., Chemist, Eisendrath Tanning Co., Racine, Wis. Add.: Racine, Wis.

MURDOCK, WALTER THOMPSOHN, M.S. (B.S. Purdue Univ. '07), Instructor in Chemistry, Mount Union-Scio Coll., Alliance, O.

OLIN, HUBERT LEONARD, M.S. Ph.D. '14 (A.B. Univ. of Iowa '08), Instructor in Chemistry, Univ. of Ill., 1107 W. Oregon St., Urbana, Ill.

PETERSON, JOHN BERNARD, B.S., Chemist & Analyst, 153 N. Cuyler Ave., Oak Park, Ill.


SEARS, GEORGE WALLACE, M.S. Ph.D. '14 (B.S. Drury Coll. '08), Instructor in Chemistry, Univ. of Ill., 704 W. High St., Urbana, Ill.

WHITTUM, FRED HORACE, B.S., Asst. Chemist, Division of Applied Chemistry, Univ. of Ill., 1107 W. Oregon St., Urbana, Ill.
DEPARTMENT OF CHEMISTRY

CLASS OF 1912

BATES, STUART JEFFERY, Ph.D. (A.B. McMaster Univ. '07, A.M. ibid '09), Professor of Inorganic and Physical Chemistry, Throop College of Technology, Pasadena, Calif.


DECHMAN, ARTHUR, B.S., Chemist, Permutit Co., 30 E. 42nd St., New York City.

GATES, RALPH PILSBURY, B.S., Chemist, Armour & Co., 4540 N. Lincoln St., Chicago, Ill.

HADLEY, HARRY FIELDING, A.M. Ph.D. '14 (A.B. James Millikin Univ. '11), State Food & Drug Lab., Vermilion, S. D.

HEWES, CHARLES KAY, B.S. M.S. '14, Chemist, Huasteca Petroleum Co., 1040 Richmond St., Los Angeles, Calif.

HOLLMAN, EDWARD EMIL, B.S., Asst. Chemist, St. Louis Water Department, 1412 Wright St., St. Louis, Mo.


JOHNSTON, PAUL EVANGEL, B.S., Chemist, 3124 Market Ave., E. St. Louis, Mo.

LEO, HERBERT THAL, B.S., Chemist, Moscow, Idaho.

LITTLETON, LEONIDAS ROSSER, Ph.D. (A.B. Southern Univ. '07, A.M. Tulane Univ. '10), Professor of Chemistry, Emory & Henry Coll., Emory, Va.

MACGREGOR, HALBERT P., B.S., Metallurgist, 970 Ventura St., Berkeley, Calif.

MANDEL, ELIAS, B.S., Chemist, 1825 S. Troy St., Chicago, Ill.

MITCHELL, JOHN HARRIS, M.S. (B.S. Ala. Poly. Inst. '03, M.S. ibid '04), Hotel Ave., Clemson Coll., S. C.

MOJONNIER, JULIUS JOHN, B.S., Inventive Chemist, 603 East Ave.,
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America, 120 Maryland Ave. N. E., Washington, D. C.
ROSS, ELLISON LLOYD, Ph.D. (B.S. Iowa State Coll. '04), Instructor
SHEWADE, VINAYAK YESHAWANT, B.S., Chemist, Gary Products
Coke Plant, Gary, Ind.
SPaulding, charles Herbert, B.S., Chemist, Isthmian Canal Com.,
Cristobal, Panama Canal Zone.
TINEN, JOHN VICTOR, B.S., Tuscola, Ill.
WILSON, DAVID WRIGHT, M.S. (B.S. Grinnell Coll. '10), Grad. Student,
Johns Hopkins Univ., Baltimore, Md.
ZUCKER, THEODORE FREDERICK, M.S. (B.S. Concordia Coll. '07),
Student, Harvard Medical Coll., Boston, Mass.

CLASS OF 1913

BELL, JAMES EDGAR, Ph.D. (B.S. Univ. of Chicago '05), Instructor,
Univ. of Washington, Seattle, Wash.
CHEN, KING YAOU, B.S., Grad. Student, Mass. Inst. Tech., Boston,
Mass.
COCHRAN, HARRY RUSLING, B.S., Foundry Foreman, Root & Vander-
COLE, ROBERT McFARLAND, B.S., Consulting Chemist, Block Labora-
tories, Chicago. Glenview, Ill.
CROCE, MICHELE FRANCESCO, B.S., Chemist, Armour & Co., 633 Oak-
wood Blvd., Chicago, Ill.
CROLL, PAUL REVERE, B.S., Chemist, New Jersey Zinc Co., Palmer-
ton, Pa.
DARRAH, JUANITA ELIZABETH, A.B. M.S. '15, Grad. Student and
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City.
DAVIS, LLOYD HAYES, A.M. (A.B. Wabash Coll. '11), Chemist,
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DAY, PHILLMER WYMOND, B.S., Chemist, Illinois Glass Wks., Y. M.
C. A. Bldg., Alton, Ill.
GLENZ, EDWARD ANTON, B.S., Chemist, Swift & Co., 2113 Coblentz St., Chicago, Ill.

HOWARD, JOSEPH WHITNEY, A.M. Ph.D. '15 (A.B. Shurtleff Coll. '12), Instr. in Chemistry, Univ. of Montana, Missoula, Mont.

HUENINK, HENRY LAWRENCE, M.S. (A.B. Carroll Coll. '11), Dutch Canning Co., Cedar Grove, Wis.


KRAEGER, JOHN FRANKLIN, B.S., Pharm. Chemist, Eli Lilly Co., Indianapolis, Ind.

LESLIE, EUGENE HENDRICKS, B.S., Asst. Columbia Univ., 49 Claremont Ave., New York City, N. Y.

MILLER, ROLAND NORTON, M.S. (A.B. Lawrence Coll. '11), Asst. Chemist, Insecticide and Fungicide Board, Dept. of Agr., Washington, D. C.

MUNCIE, FRED WEAVER, M.S. Ph.D. '15 (A.B. Wabash Coll. '10), Associate in Flor. Chemistry, Univ. of Ill., 805 W. Illinois St., Urbana, Ill.

MUNROE, COURTLAND LEROY, B.S., Chemist, Miner Laboratories, 9 S. Clinton St., Chicago.


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SIMPSON, GEORGE ERIC, B.S. (M.S. Western Reserve Univ. '15), Instructor in Chemistry, Western Reserve Medical School, Cleveland, Ohio.


TAYLOR, SCOTT CHAMPLIN, B.S. M.S. '15, Grad. Student & Asst. in Chemistry, Univ. of Ill., 304 E. Daniel St., Champaign, Ill.
WILLIAMS, Guy Yandall, Ph.D. (A.B. Univ. of Oklahoma '06, A.M. ibid '10, M.S. Univ. of Chicago '11), Acting Director of Chemistry, Univ. of Oklahoma, 426 College Ave., Norman, Okla.

CLASS OF 1914

ALLEN, Chester Harmon, A.M. (A.B. Lawrence College '12), Research Chemist Rockefeller Institute, 66th St., and Ave. A., New York City.
Baker, Robert Earl, A.M. (A.B. Univ. of Oklahoma '12, Chem. Eng. Univ. of Wis. '15), Instructor in Chemical Engineering, University of Cincinnati, Cincinnati, Ohio.
Ball, Theodore Rolly, M.S. (B.S. Drake Univ. '08), Fellow in Chemistry, University of Illinois, 806 S. Third St., Champaign, Ill.
Barbre, Clarence, B.S., Asst. in Medical School, University of So. California, Los Angeles, Calif.
Brady, St. Elmo, A.M. (A.B. Fisk Univ. '08), Fellow in Chemistry, University of Illinois, 1202 West Main St., Urbana, Ill.
Dass, Baneshvar, B.S., 1149 Washington Blvd., Chicago, Ill.
Doisy, Edward Adelbert, A.B., Graduate Student Physiological Chemistry Harvard Medical School, 96 Calumet St., Boston, Mass.
Engle, Edgar Wallace, M.S. (B.S. Drury College '12), Fellow in Chemistry, University of Illinois, 201 W. Green St., Urbana, Ill.
Ennis, Duane Taylor, A.M. (A.B. Eureka College '12), Assistant in Flor. Chem., University of Illinois, 907 S. Sixth St., Champaign, Ill.
Foster, Laurence Fleming, MS. (A.B. Albion Col. '10), Teacher in High School, Y. M. C. A., Pasadena, Calif.
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DEPARTMENT OF CHEMISTRY

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Hinds, Milford Everett, M.S. (B.S. Northwestern Univ. '12), Chemist in State Food Commission, Nashville, Tenn.

Hjort, Axel Magnus, A.B. M.S. '15, Graduate Student, Yale University, New Haven, Conn.

McGregor, Harold Hossack, Ph.D. (A.B. McMaster Univ. '10, M.S. Univ. of Louisville '12), Instructor in Chemistry, Western Reserve Univ., Cleveland, Ohio. Died Sept. 13, 1915.

Millard, Earl Bowman, Ph.D. (A.B. Univ. of Col. '10, A.M. Univ. of Wis. '11), Instructor in Chemistry, Mass. Institute of Technology, Boston, Mass.

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CLASS OF 1915


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### SUMMARY

- **Alumni of the Department of Chemistry**: 397
- **Graduate Students**: 75
- **Chemical Engineering**
  - Seniors: 11
  - Juniors: 23
  - Sophomores: 34
  - Freshmen: 32
- **Chemistry**
  - Seniors: 13
  - Juniors: 15
  - Sophomores: 18
  - Freshmen: 13
- **General Science with chemistry as major**: 10
- **Other students taking chemistry**: 1,901

**Total for First Semester, 1915-16**: 2,145
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SPRING MEETING
OF THE
AMERICAN CHEMICAL SOCIETY
AT THE
UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS
APRIL 17-21, 1916

MONDAY, APRIL 17
6:00 P. M.— Council Dinner.
7:30 P. M.— Council Meeting.

TUESDAY, APRIL 18
10:00 A. M.— General Session.
12:30 P. M.— Luncheon.
1:00-4:30 P. M.— Excursion, Floral Display, Plant Breeding Green Houses, Stock Exhibit.
4:30 P. M.— Review of the University Brigade.
7:30 P. M.— Concert by the University Band.
9:00 P. M.— Smoker.

WEDNESDAY, APRIL 19
9:00 A. M.-12:30 P. M.— Sectional Meetings.
12:30 P. M.— Luncheon.
2:00 P. M.- 4:00 P. M.— Dedication Exercises.
4:00 P. M.- 5:00 P. M.— Inspection of Chemistry Building.
6:30 P. M.— Subscription Dinner.

THURSDAY, APRIL 20
9:00 A. M.-12:00 M.— Sectional Meetings.
12:00 M. - 1:00 P. M.— Luncheon.
1:00 P. M.- 2:00 P. M.— Excursion (University Campus).
2:30 P. M.- 4:30 P. M.— Sectional Meetings.
8:00 P. M.— Lecture: Charles L. Parsons, Production of Radium; Curtis F. Burnam, Use of Radium in Cure of Cancer.

FRIDAY, APRIL 21
Excursion to Danville.
Hegeler Brothers Zinc Smelter and Sulfuric Acid Plant.
Western Brick Company, Plant and Strip Coal Mine.

Beardsley Hotel, Champaign (Headquarters); Inman Hotel, Champaign; Columbian Hotel, Urbana.
Rooms are also available in the University District. Address C. W. Balke. Make reservations early.