OFFICIAL PUBLICATIONS
OF CORNELL UNIVERSITY

VOLUME 1 NUMBER 3

COLLEGE OF ARTS AND SCIENCES

ANNOUNCEMENT OF THE DEPARTMENT OF CHEMISTRY 1910-11

OCTOBER, 1910
PUBLISHED BY CORNELL UNIVERSITY
ITHACA, NEW YORK

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Special Lecturers

Aside from the regular instruction a number of special lectures are given either under the auspices of the Department or before the Cornell Section of the American Chemical Society. The lecturers in 1909–10 were:

Brainerd Dyer, - - - - - - Cleveland, Ohio
Materials and Processes used by the National Carbon Company.

Clarence Floyd Hirshfeld, B.S., M.M.E., - - - Cornell University
Some Problems of the Gas Engineer.

James George Needham, B.S., Ph.D., - - Cornell University
Some New Developments in Limnology.

Henry Neely Ogden, C.E., - - - - - Cornell University
Disposal of Sewage.

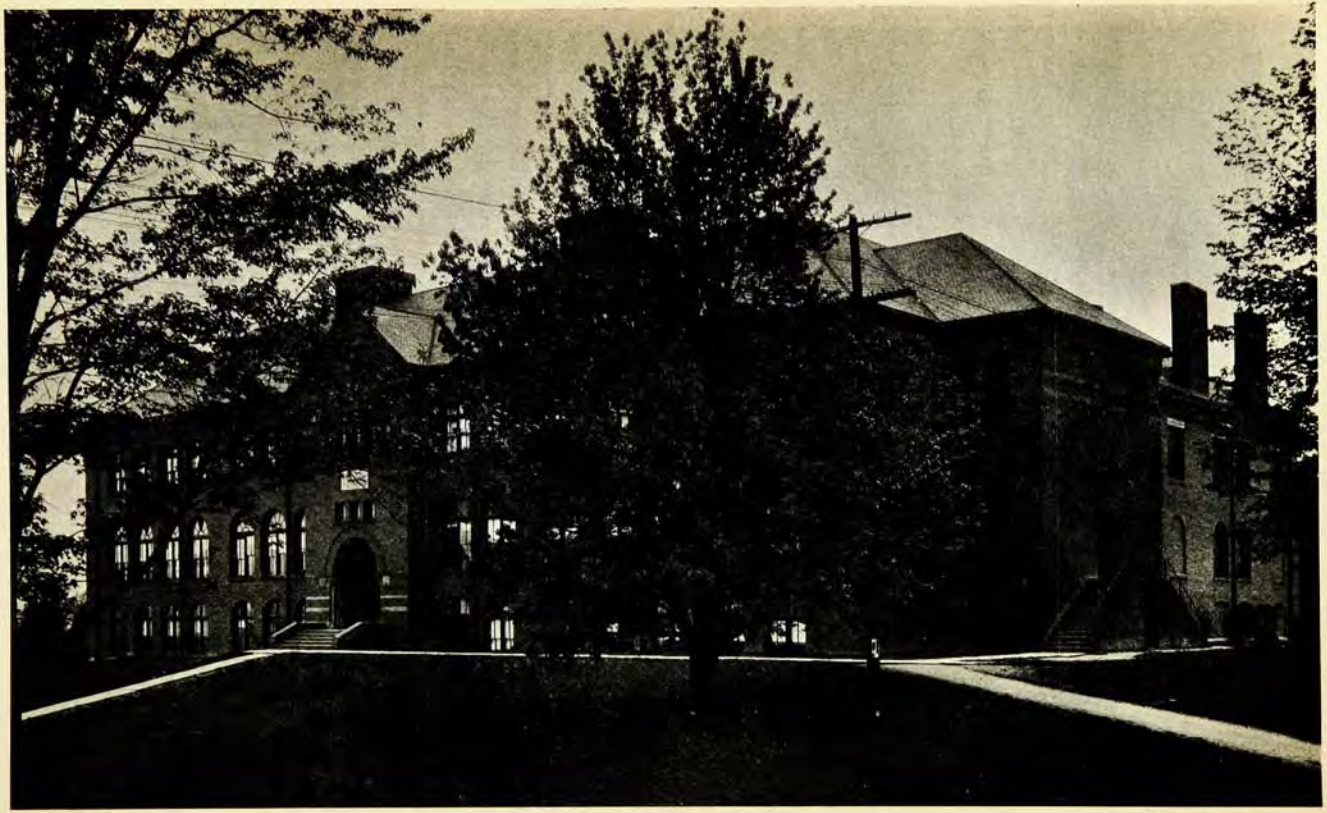
John Sandford Shearer, B.S., Ph.D., - - - Cornell University
Measurement of High Temperatures by Various Pyrometers.

John Edgar Teeple, B.S., Ph.D., - - - - - New York
Sulphuric Acid by the Lead-Chamber Process (Five Lectures).
Sulphuric Acid by the Contact Process (Two lectures).
Wood Distillation (Three lectures).
Chemical Resources of the United States.

GENERAL EQUIPMENT AND METHODS OF INSTRUCTION

The Chemical Laboratory

The laboratory, Morse Hall, consists of two buildings, with floor space of over 74,000 square feet. The buildings are connected by corridors on each floor. The laboratory contains four lecture rooms, one seating three hundred and ninety students, another eighty, and each of the others sixty-two. These rooms are furnished with all necessary appliances for the illustration of lectures by experiment and by lantern projection, and are provided with adjacent preparation rooms. For elementary work in inorganic chemistry and in qualitative and quantitative analysis, there are three large laboratories containing in the aggregate places for eight hundred and fifty students working in sections. In addition to these are two rooms for organic chemistry and a research laboratory for advanced work in that field, a special laboratory for micro-chemical analysis, two for bacteriological work in connection with the analysis of water and foods, one room for distillation in water and food analysis, three rooms for assaying, two with northern exposure for gas analysis, a fire-proof room for work with highly inflammable substances, a laboratory for organic ultimate analysis by combustion provided with powerful ventilation and with special balances, a hydrogen sulphide room connected with strong fan exhaust for work with noxious gases, an electric furnace laboratory, a large room for advanced inorganic chemistry, together with two smaller ones for research work in this field, a room for spectroscopic chemical analysis with a photographic dark room and a mercury-pump room adjoining, a large laboratory for elementary work in physical chemistry, one for electrochemistry, one for undergraduate research, one for graduate work, and a large room for advanced work in agricultural chemistry. The student laboratories contain in the aggregate places for one thousand and sixty students working in sections, or four hundred and fifty students working at once. In the sub-basement there are two constant temperature rooms, a dynamo room containing motors and a high pressure blower for air blast, a room for the storage of ores, two others for the storage of highly inflammable chemicals, and a number of stock rooms. A general supply room from which all students draw their chemicals



South Hall

MORSE HALL—THE CHEMICAL LABORATORY

North Hall

and apparatus for use in their work is situated on the main floor of the building. There are eleven private laboratories for professors and instructors. The laboratory of the Agricultural Experiment Station is also situated in Morse Hall. Distilled water is conducted in block tin pipes to all of the more important rooms on each floor from a tin-lined tank in the upper story of each building. Air blast is conducted wherever required from a high pressure blower in the basement. The buildings are supplied with an alternating current of 2200 volts and with two direct currents of 500 and 110 volts. Lighter currents for electrochemical analysis and synthesis are furnished by storage batteries. With the aid of a motor generator, low voltage direct currents up to 2000 amperes may be obtained. The buildings are lighted with gas and electricity, heated by steam and thoroughly ventilated by forced draft. All working tables are provided with gas and water and most of them with blast and with suction pumps.

The Museum

The Museum contains collections for the illustration of lectures upon inorganic, organic, sanitary, and applied chemistry. These collections include specimens of the elements, their compounds, and the ores from which they are obtained, a complete collection of the most important organic compounds, and also specimens illustrating the leading chemical industries, such as the manufacture of the various acids, alkalies and salts, pigments, glass, pottery, soap, stearine and glycerine, and the chemical processes of metallurgy, bleaching, dyeing, and photography.

The Chemical Library

The Chemical Library, which is centrally located on the first floor of South Hall, contains complete sets of all of the more important journals and is very fully supplied with works of reference and with the standard books on chemistry and allied subjects. Such additions are made to it from year to year as are necessary to keep abreast of the times. It is accessible to all students, under such restrictions only as are necessary to secure it against injury or loss.

Introductory Inorganic Chemistry

The elements of inorganic chemistry are taught by lectures, laboratory work, and recitations from a text book. The lectures deal with the fundamental theories and laws of chemistry, and with the more common elements and their compounds. They are profusely illustrated by experiments. In so far as is

MORSE HALL WITH CAYUGA LAKE IN BACKGROUND

found practicable in an introductory course reference is made to important recent advances in the science, and in its industrial applications.

The laboratory work is designed not only to familiarize the student with the principles and facts of chemistry, but also to afford a thorough preliminary training in the construction and maniulatipon of laboratory apparatus. Students who have had a thorough high school course in chemistry are permitted to substitute a series of supplementary experiments for certain parts of the regular laboratory work. This supplementary course comprises instruction and practice in the principles of simple glass blowing, together with a large number of quantitative chemical experiments.

The recitations deal with the subject matter of the lectures and with the experimental work carried on in the laboratory. They also comprise thorough drill in the solving of chemical problems.

Three courses of lectures in advanced inorganic chemistry are offered. One of these courses, extending throughout the year, comprises a general survey of the field and deals with the chemistry of both the rare and the common elements. A second course, extending throughout one term, covers selected topics in advanced inorganic chemistry, while a third is concerned with the chemistry of gases.

Advanced Inorganic Chemistry

Advanced laboratory work in inorganic chemistry is offered both for students that desire to acquaint themselves with the preparation and purification of inorganic compounds and with the extraction of the rare elements from ores and minerals, and for those who desire to pursue investigation in this branch of chemical science. The equipment for research is very complete, and excellent facilities are available for investigation in any branch of the field that the graduate student may desire to take up under the direction of the professors in charge.

Two beginning courses are given in chemical analysis. These vary in scope and length, and are designed to meet the different needs of the students of chemistry and engineering.

Qualitative and Quantitative Analysis

Qualitative analysis begins with the study of the reactions of the elements and their compounds with different reagents. This is followed by the practical application of

the knowledge thus gained to the analysis of unknown substances both in the solid form and in solution.

The work in quantitative analysis comprises gravimetric and volumetric determinations together with the study of the chemistry of the operations involved. The work in the laboratory is supplemented by lectures and recitations, the latter including practice in writing chemical equations explanatory of the actual operation of analytical work.

For students intending to devote themselves chiefly to the study of chemistry an advanced course is provided in quantitative analysis, especially designed to give as wide an acquaintance as possible with analytical manipulation. This course comprises the determination of the more important elements; the analysis of ores, minerals and alloys; electro-chemical analysis; the ultimate analysis of organic substances; the analysis of iron and steel, slags, paints and varnishes, coal and coke, and a number of other commercial products.

Advanced Quantitative Analysis

A course of lectures upon selected topics in advanced quantitative analysis is also offered.

The instruction in this subject consists of lectures and laboratory practice. The lectures comprise a complete and detailed discussion of the theory and practice of the scorification, crucible and wet assay. In the laboratory the student is given instruction in the scorification and crucible assay of silver and gold ores, mattes and bullion, and also in the wet assay of bullion and of the ores of copper, lead and zinc.

Assaying

The work in spectroscopic chemical analysis and colorimetry consists of lectures and laboratory practice. The lectures are devoted to a detailed discussion of the methods of optical analysis, especial attention being given to those methods involving the use of the spectroscope, colorimeter, polariscope, and refractometer. The laboratory work is intended to supplement the subject matter of the lectures and consists of practice in the manipulation of the above instruments in actual analyses. The spectroscopic laboratory is designed especially for optical work and the equipment includes the latest and most improved types of optical apparatus and accessories. Special opportunities are given for advanced work and research.

Spectroscopic Chemical Analysis and Colorimetry

Lecture courses and laboratory courses are given in gas analysis and the subject taken up both from a scientific and from a technical standpoint. Within certain limits the regularly outlined laboratory courses may be modified to meet the needs of the individual student. The laboratories devoted exclusively to the analysis of gases are provided with a large collection of the standard forms of gas apparatus and special apparatus, and afford exceptional opportunities for advanced work and research.

Gas Analysis

An elementary course dealing with microchemical methods and planned to meet the needs of students specializing in chemistry serves as an introduction to more advanced courses in inorganic and organic qualitative micro-analysis and the microscopy of foods and water.

Microchemistry

The course in microchemical methods deals with the application of the microscope and its accessories to the solution of problems arising in chemical practice, including micrometry and quantitative analysis by means of the microscope; methods for the preparation and examination of metallurgical materials, textiles and papers; and the handling, examination and analysis of minute amounts of material. Exceptional facilities are offered for the pursuance of advanced work and for research.

Two elementary courses are given in organic chemistry, one extending throughout the year, the other throughout the first half-year. The shorter course is intended for and required of students in medicine and is especially adapted to their needs. It may also be taken by other students who have had courses in inorganic chemistry and qualitative and quantitative analysis. The longer course is for students specializing in chemistry or for those who wish a more extended knowledge of the subject. The method of instruction is the same in both courses and consists of lectures, written reviews and laboratory work. The lectures are fully illustrated by experiments, by specimens of the compounds considered and by charts. Students are required to take careful notes on these lectures, and written reviews on the lectures and laboratory work are given every week. The laboratory work follows the lectures closely and comprises the preparation and purification of a large number of typical organic compounds and the detailed study of their properties, reactions and relations.

Organic Chemistry

South Hall

MORSE HALL FROM THE NORTHEAST

North Hall

The detection of different elements in organic compounds, and the recognition of various groups or radicals is also included in the laboratory work. The second year's work in organic chemistry consists of lectures on special chapters of the subject and of advanced laboratory work in the preparation and study of the more complicated compounds of carbon. Special courses of lectures are also given on the coal tar dyes and on the stereochemistry of the compounds of carbon and nitrogen. In all the advanced work constant reference is made to the original literature of the subject in the various chemical journals so as to familiarize the students with the classical investigations of the science. A course on the methods of organic analysis is also given in which the qualitative and quantitative analysis of commercial products and of mixtures of organic substances is taken up.

Physical Chemistry

An outline of the more important features of the physical aspect of chemical change is given in an introductory course of lectures in physical chemistry. This course aims to give a systematic presentation of modern chemical theory and to serve as an introduction to the other courses in physical chemistry. An advanced course of lectures is offered in which especial attention is paid to the Gibbsian phase rule and to a non-mathematical exposition of the mass law with its application to chemical equilibrium and reaction velocity. This course aims to cover the work that has not yet appeared in the text books and to give a critical survey of the field of physical chemistry in general. The first laboratory course covers the more important sub-divisions of the subject with a series of experiments that aim to illustrate the fundamental principles of the science. In the advanced laboratory courses the student may elect work on the mass law, reaction velocity, high temperature measurements, the study of alloys, or the application of physical chemical methods to organic chemistry. Opportunity is offered for investigation in the field of metallography and photography.

Electrochemistry

In electrochemistry a course of lectures is given in which emphasis is laid on the industrial aspects of the subject. Electrothermal processes, inorganic and organic synthesis by the electric current, electrochemical analysis and storage batteries are considered in this course. In an advanced course the theory of the voltaic

cell, the calculation and measurement of electromotive force, and electrochemical theories are considered in detail. Laboratory instruction in electrochemistry includes the preparation of compounds by electro-chemical and electro-thermal methods and a study of storage batteries.

Sanitary Chemistry and Toxicology

The laboratories devoted to sanitary chemistry and toxicology are exceptionally well equipped with the most modern apparatus both chemical and optical, and afford facilities for the microscopical study of preparations and materials obtained in the laboratory courses in food analysis. Provision is made also for research in water analysis, water purification and chemical bacteriology. A large collection of pure and adulterated food products supplies materials for those desiring to specialize in Board of Health work or in domestic economy.

The equipment for the study of toxicology is such as to permit of the detection and determination of the rarer as well as the common poisons of both organic and inorganic origin.

Agricultural Chemistry

An elementary course, consisting of lectures, laboratory practice and recitations, deals with the fertility of the soil, the relations of soils to plant growth, and the composition of plants and fertilizers. In the laboratory are studied the chemical and physical properties of soils and fertilizers. A series of elementary lectures is given for the winter course students. Two advanced courses are offered, one on dairy chemistry and one on the chemistry of plant and animal life.

A laboratory course in the chemical analysis of agricultural products extends throughout the year. Special attention is given to the methods of analysis recommended by the Association of Official Agricultural Chemists.

Seminary

A general seminary, attended by the members of the staff of instruction in the Department of Chemistry and by graduate students and seniors specializing in chemistry, meets every two weeks throughout the year. Members of the seminary report upon recent advances and upon selected topics in chemical science.

Research

The Department possesses unusual facilities for the prosecution of experimental research in the different branches of chemical science, and every encouragement is afforded for work of this nature.

COURSES OF INSTRUCTION OFFERED BY THE DEPARTMENT OF CHEMISTRY

INTRODUCTORY INORGANIC CHEMISTRY

1. **Introductory Inorganic Chemistry.** Lectures, recitations, and laboratory. Repeated in second term, credit six hours.

1a. Lectures. First term, T Th S, 11, Professor DENNIS and Mr. SUTHERLAND; M W F, 11, Professor BROWNE and Mr. SUTHERLAND. Second term, M W F, 11. Morse 1.

1b. Recitations (one hour a week to be arranged), and laboratory (two 2½ hour periods a week to be arranged). Professors DENNIS and BROWNE, Mr. WELSH, and Messrs. HOULEHAN, GAUB, FINK, HOLLINGSHEAD, NUNEZ, and ————.

Entrance credit in chemistry does not carry with it University credit in course 1. If a student entering the University from a preparatory school desires credit in course 1 he must pass an examination set by the department of chemistry. This examination is held both in New York City and in Ithaca on the same day in September as the entrance examination. University credit in course 1 that is obtained by passing this examination does not carry with it entrance credit in chemistry.

Examinations for those who were unavoidably absent from the term examination in course 1, and for those who have conditions to remove in this course, will be held at 2 p.m on the day before instruction begins in the fall, and also in the month of May at a date to be announced. No special examinations will be given at other times.

ANALYTICAL CHEMISTRY

6. **Qualitative and Quantitative Analysis.** Repeated in second term, credit five hours. Prerequisite course 1. Dr. LUNDELL, Mr. LEMON, and Messrs. RIEGGER, DILLON, WALKER, RHODES, UHLRICH, A. R. HITCH, and GIBBONS. Lectures, T Th, 12, Morse L. R. 1.

Laboratory sections: M W F, 2–5; T Th S, 8–11; T Th, 9–12.

Qualitative work: the properties and reactions of the common elements and acids and their detection in various liquid and solid mixtures.

Quantitative work: the preparation and use of volumetric solutions and work in elementary gravimetric analysis.

7. **Qualitative Analysis.** Second term, credit six hours. Prerequisite course 1. Dr. LUNDELL, Mr. LEMON, and Mr. ————. Lectures T Th, 9, Morse L. R. 3.

Laboratory, M F, 11–1; T Th, 2–5.

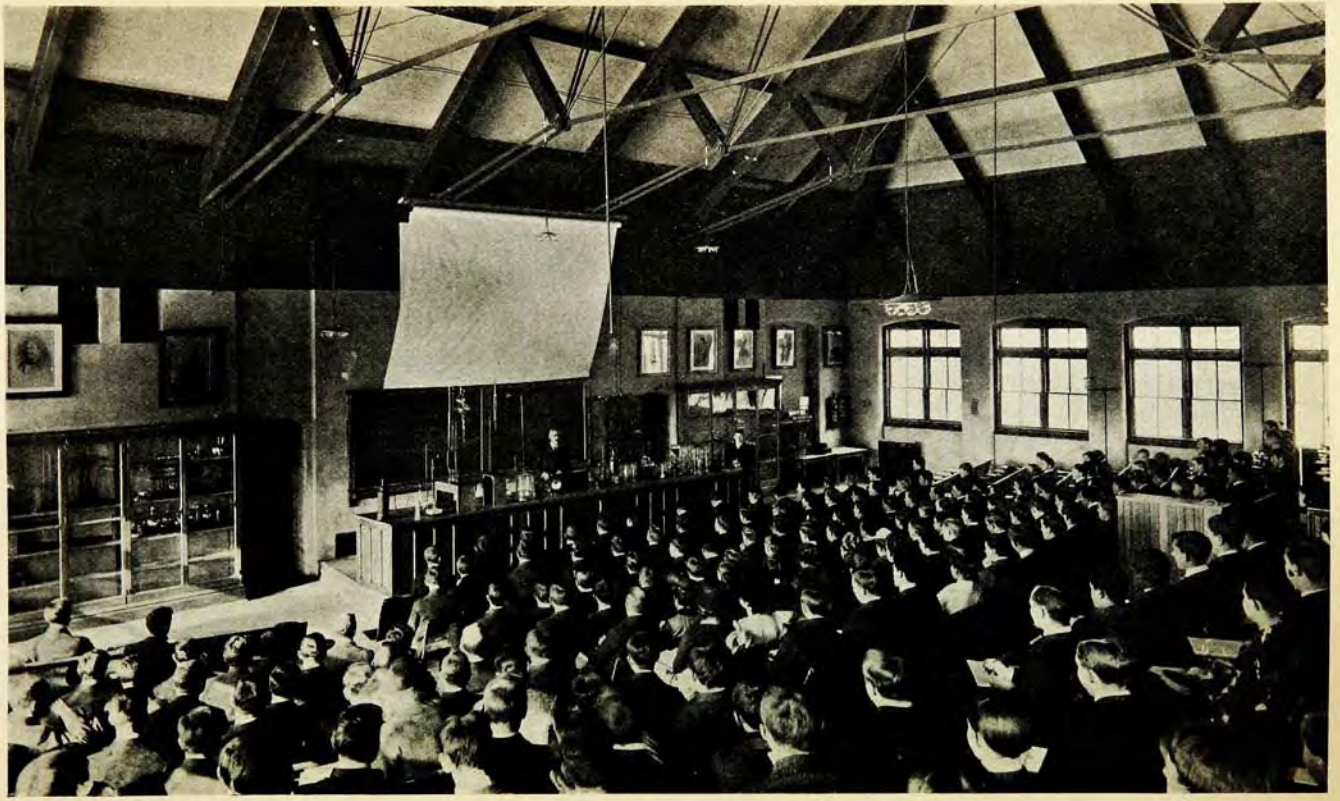
The properties and reactions of the common elements, and of the inorganic and organic acids, also the qualitative analysis of a number of solutions and solid mixtures.

Students in science are advised and those who are specializing in chemistry are required to take this course instead of course 6.

12. **Quantitative Analysis, Elementary Course.** First term, credit six hours. Prerequisite 6, or preferably 7. Dr. LUNDELL and Messrs. MARSH and KING. Lectures, T Th, 9.

Laboratory sections: T W Th, 2–5.30; W Th, 2–5.30 and S, 9–12.30.

The preparation and standardization of various volumetric solutions and their use in analyzing a variety of substances; gravimetric methods.



CLASS IN INTRODUCTORY INORGANIC CHEMISTRY

Students in science are advised and those who are specializing in chemistry are required to take this course instead of the quantitative analysis of course 6.

14. **Quantitative Analysis, Advanced Course.** Repeated in second term. Credit one to four hours. Prerequisite course 6, or 7 and 12. Dr. LUNDELL, and Messrs. MARSH and KING.

Laboratory sections: 1st term, M T W Th, 2–5.30; T S, 9–12.30; 2nd. term, M T W Th F, 2–5; T Th S, 9–12.30.

Gravimetric, volumetric, and electrolytic methods of analysis, and methods of combustion analysis; analysis of iron ores, iron and steel, slags, paints, lubricants, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

Designed for students that are specializing in chemistry, and as an elective for mechanical and civil engineering students.

15. **Quantitative Analysis, Advanced Lectures.** First term, credit two hours. Prerequisite course 6, or 7 and 12. Dr. LUNDELL. M W, 11, Morse, L. R. 3.

Selected topics in advanced quantitative analysis.

Designed for students that are specializing in chemistry.

17. **Spectroscopic Chemical Analysis and Colorimetry.** Second term, credit two hours. Prerequisite courses 6, or 7 and 12; Physics 1 and 6. Dr. SHETTERLY, and Messrs. WILSON and MILLER. Lectures, W, 11, Morse, L. R. 3.

Laboratory practice, (three actual hours) at hours to be arranged.

The lectures are devoted to a description of the instruments used in the laboratory and to a detailed discussion of spectroscopic methods.

The laboratory instruction includes the following work: the observation and mapping of emission spectra of various elements in the Bunsen flames the electric arc, and the electric spark; the qualitative analysis of mixture, and minerals by the use of the Krüss spectroscope and the direct vision spectroscope; the observation and mapping of absorption spectra; the examination and identification of rare earths and of organic dyes in solution by means of their absorption spectra; the calibration of spectroscopes; spectrum photography; and practice in the use of colorimeters, polariscopes, and refractometers of various types.

18. **Assaying.** First term, credit three hours. Prerequisite course 6, or 7 and 12, and if possible a course in mineralogy. Dr. LUNDELL and Mr. ————. Lecture, F, 10, Morse 2.

Laboratory sections: M W, 2–5; W F, 2–5; M F, 2–5.

Lectures on the theory and practice of the scorification and crucible assay, and on the metallurgy of copper, lead, zinc, silver, and gold. In the laboratory, practice is given in assay of zinc, lead, copper, gold, and silver ores, mattes, and bullion.

Designed for students that are specializing in chemistry, and as an elective for students in mechanical and civil engineering.

19. **Qualitative and Quantitative Gas Analysis.** Lectures. First term, credit one hour. Prerequisite courses 6, or 7 and 12; Physics 1 and 6. Dr. SHETTERLY. T, 9, Morse L. R. 3.

LABORATORY OF INTRODUCTORY INORGANIC CHEMISTRY

A detailed discussion of many representative types of apparatus employed by the gas analyst, and of the various methods of analysis involved in their use. Numerous simple problems are assigned which afford practice in the calculation and interpretation of the results obtained in the analysis of gases.

20. **Technical Gas Analysis.** First term, credit two hours. Prerequisite courses 6, or 7 and 12; Physics 1 and 6. Open to those who are taking course 19. Dr. SHETTERLY, and Messrs. WILSON and MILLER. Laboratory practice at hours to be arranged.

The analysis of gas mixtures with the apparatus of Honigmann, Bunte, Orsat, Lunge, and Hempel; the complete analysis of flue gas, illuminating gas, generator gas, acetylene, and air; the determination of the heating power of gaseous, liquid and solid fuels, and the analysis of various substances by gas analysis methods involving the use of the different types of gas evolution apparatus such as the nitrometers of Hempel, Lunge, and Bodländer. Within certain limits the work may be selected to suit the requirements of the individual student.

21. **Gas Analysis.** Advanced course. Repeated in second term, credit one to four hours. Prerequisite courses 1, 6 (or 7 and 12), 19, and 20; Physics 1, and 5 or 6. Professor BROWNE and Dr. SHETTERLY. Laboratory Practice at hours to be arranged, Morse.

Special topics in the field of either scientific or industrial gas chemistry. The course may be elected by seniors and graduate students in chemistry, and is open to seniors or graduates in mechanical engineering that are specializing in gas power work.

ORGANIC CHEMISTRY

30. **Organic Chemistry.** Throughout the year, credit six hours a term. Prerequisite courses 7 and 12. Professor ORNDORFF, Mr. NICHOLS, and Messrs. E. F. HITCH and CONKLIN. Lectures and written reviews, M W F, 9, Morse, L. R. 3.

Laboratory sections: M T, 1–5.30; F, 1–5.30 and S, 8–1. Morse 9.

The lectures and written reviews serve as an introduction to the general subject of the chemistry of the compounds of carbon. In the laboratory the student prepares a large number of typical compounds of carbon and familiarizes himself with their properties, reactions, and relations. The detection of inorganic elements in organic compounds and the recognition of various groups or radicals is included in the laboratory work.

31. **Organic Chemistry.** Throughout the year, credit three hours a term. Prerequisite courses 7 and 12. Professor ORNDORFF and Mr. E. F. HITCH. M W F, 9, Morse L. R. 3.

This course consists of the lectures and written reviews of course 30.

32. **Elementary Organic Chemistry.** First term, credit four hours. Prerequisite courses 1, 7, and 12, or the equivalent. Mr. NICHOLS and Mr. CONKLIN. Lectures, and oral and written reviews, M W F, 12, Morse L. R. 3. Laboratory Th, 2–5, Morse 10.

33. **Special Chapters in Organic Chemistry.** Throughout the year, credit two hours a term. Prerequisite course 30. Professor ORNDORFF. T Th, 9, Morse L. R. 2.

Especial attention is given to certain important chapters of organic chemistry. Frequent references are made to the original literature, and an attempt is made to acquaint the student with the classical researches in organic chemistry.

34. **Advanced Organic Chemistry.** Laboratory practice. Throughout the year. Open to those who have had 30 and are taking 33. Professor ORNDORFF and Mr. NICHOLS. Hours to be arranged. The laboratory is open daily, Morse 10.

The course in the preparation of organic compounds is here continued, the preparations, however, being more difficult and requiring more experience and skill on the part of the student. The original literature is consulted, and, before taking up original work in this field, the student is finally required to repeat some extended and important piece of work, and to compare his results with those published.

35. **The Coal Tar Dyestuffs.** First term, credit one hour. Open to those who have had 30 and have had or are taking 33. Professor ORNDORFF. Th, 12, Morse L. R. 3.

The coal tar dyestuffs have become so important, both theoretically and practically, as to justify their consideration in a separate course of lectures. The methods of making the dyestuffs, their properties, constitution and relations to each other are discussed, the treatment being scientific rather than technical.

36. **Stereochemistry.** Second term, credit one hour. Prerequisite course 30 or 31. Professor ORNDORFF. Th, 12, Morse L. R. 3.

The stereochemistry of the compounds of carbon and nitrogen. The necessity of considering the space relations of the atoms in certain classes of physical isomers is shown and the close agreement of the facts and theory is brought out.

37. **Methods of Organic Analysis.** Throughout the year. Prerequisite course 30. Professor ORNDORFF and Mr. NICHOLS. Hours to be arranged. The laboratory is open daily, Morse 10.

Designed for students that desire practice in the qualitative and quantitative analysis of commercial organic products such as alcohols, ethers, organic acids, glycerin, formalin, acetates, coal tar distillates, petroleum products, soaps, acetanilid, etc.

INORGANIC CHEMISTRY

[46. **Inorganic Chemistry.** Advanced course. Throughout the year, credit two hours a term. Prerequisite course 30 and open to those who have completed or are taking course 50 and 51. Professor DENNIS.

The chemical elements are discussed in the order in which they occur in the Periodic Law of Mendeleéff, and special attention is paid to the group properties of the elements and to the relations of the groups to one another. The rare elements and the rare earths are treated in as great detail as are the more common elements.] Not given in 1910–11.

47. **Advanced Inorganic Chemistry.** Laboratory practice. Throughout the year. Prerequisite course 30. Professors DENNIS and BROWNE and Mr. ANDERSON. Morse 68.

The preparation and purification of inorganic compounds and the extraction of the rarer elements from ores and minerals.

Course 47 is designed to accompany course 46, but either course may be taken separately.

48. **Selected Topics in Advanced Inorganic Chemistry.** First term, credit one hour. Prerequisite course 30. Courses 50 and 51 should either precede or accompany 48. Professor BROWNE. Th, 11, Morse L. R. 3.

Experimental lectures, dealing chiefly in 1910–11 with the hydronitrogens and their derivatives.

Open only to seniors and graduate students in chemistry.

49. **Chemistry of Gases.** First term, credit one hour. Prerequisite course, 6, or 7 and 12, and should be preceded or accompanied by 19 and 20. Professor BROWNE. T, 11, Morse L. R. 3.

The preparation, properties, and reactions of a large number of gases are discussed, and in many cases are illustrated by experiments. The various generalizations concerning gases are considered, not only in the light of their scientific value, but also to some extent from the point of view of their application to the practical problems of the gas chemist and of the gas engineer. The course may be elected by juniors, seniors, and graduate students in chemistry, and is open to seniors in mechanical engineering who intend to specialize in gas power work.

PHYSICAL CHEMISTRY

50. **Introductory Physical Chemistry.** Throughout the year, credit three hours a term. Prerequisite courses 30 and Physics 14. Dr. WHITE. M W F, 9, Morse L. R. 4.

A systematic presentation of modern chemical theory. Especial attention is paid to the theory of solution, reaction velocity, catalysis, chemical equilibrium, and to the application of the principles of physical chemistry to chemical practice.

51. **Physical Chemistry Laboratory.** Throughout the year, credit three hours a term. Open only to those who have taken or are taking course 50. Dr. WHITE and Mr. BRIGGS. Two laboratory periods a week: M T, 2–5; F, 2–5, S, 9–12. Morse 77.

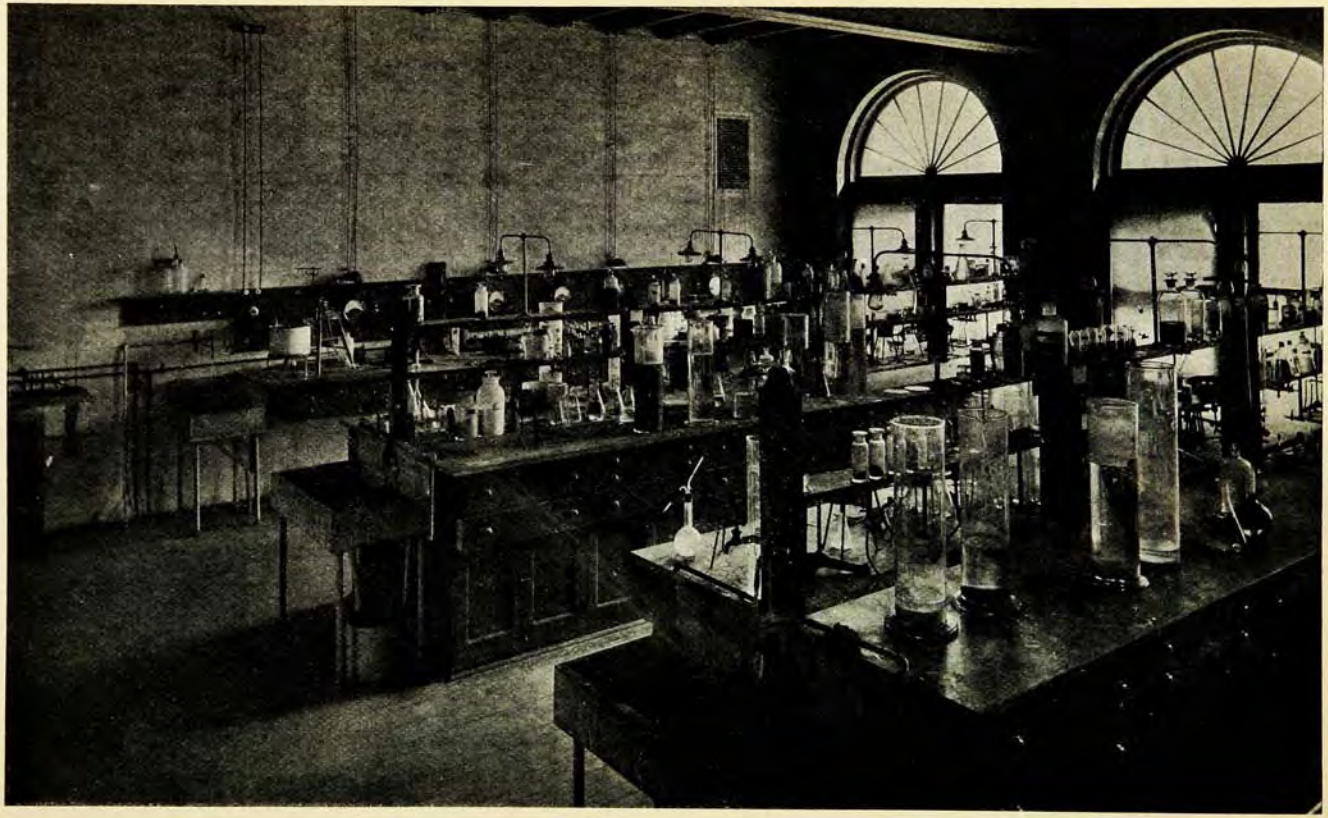
With the data obtained in the laboratory as a basis, detailed reports covering each sub-division are written. The subject matter includes: the calibration of pipettes, burettes, and measuring flasks; molecular weight determination by vapor density, freezing point and boiling point methods; vapor pressure; viscosity; colloids; diffusion; absorption; thermochemistry; reaction velocity; catalysis; dissociation; solubility; formation, separation and identification of phases; study of photo-chemical effects.

[52. **Advanced Physical Chemistry.** Lectures throughout the year, credit three hours a term. Prerequisite course 50. Professor BANCROFT.

An exposition of the law of mass action in its application to chemical equilibrium and reaction velocities.] Not given in 1910–11.

53. **Colloid Chemistry and Photochemistry.** Lectures. Second term, credit three hours. Professor BANCROFT. M W F, 12, Morse L. R. 4.

The theories of colloid chemistry and of photochemistry, with special reference to photography. For advanced students in chemistry or physics.



LABORATORY OF ADVANCED INORGANIC CHEMISTRY

55. **Theoretical Electrochemistry.** Lectures. Throughout the year, credit three hours a term. Professor BANCROFT. M W F, 10, Morse L. R. 4.

The historical development of the subject with special reference to the theory of the voltaic cell. For advanced students in chemistry or physics.

56a. **Applied Electrochemistry.** Lectures. First term, credit three hours. Prerequisite courses, 6 or 7 and 12. Professor BANCROFT and Messrs. BENNETT and KOERNER. M W F, 12, Morse L. R. 4.

The preparation of compounds in the electric furnace; electrolytic extraction and refining of metals; theory of plating; electrolytic manufacture of inorganic and organic compounds; theory and practice of storage cells. Students that take this course are advised to supplement the lectures by laboratory practice, course 56b or 56c; this is, however, not obligatory.

56b. **Applied Electrochemistry.** Second term, credit two hours. Prerequisite courses 56a; Physics 10 or 14. Messrs. BENNETT and KOERNER. Laboratory practice, one morning or one afternoon 8–1 or 1.30–5.30, Morse 79.

Determination of current and energy efficiencies in electrolytic and electrothermal work; preparation and tests of storage batteries. Open to engineering students. Students that are specializing in chemistry are expected to elect course 56c instead of course 56b.

56c. **Applied Electrochemistry.** First term, credit four hours. Open to those who have had 50 and 51, and have taken or are taking 56a. Laboratory practice.

W, 2–5, Th, 8–1; F, 2–5, S, 8–1. Morse 79. Professor BANCROFT, and Messrs. BENNETT and KOERNER.

Preparation of electrical standards and measurements of electrical constants; qualitative study of conditions affecting electrolytic reactions; determination of current and energy efficiencies in electrolytic and electrothermal work; preparation and tests of storage batteries; electrolytic preparation of inorganic and organic compounds. For students that are specializing in chemistry.

57. **Advanced Laboratory Practice.** Either term or throughout the year. Credit, one to six hours a term. Prerequisite courses determined in each case by the professor in charge. Professor BANCROFT, Dr. WHITE, and Messrs. BENNETT and KOERNER. Hours and work to be arranged. Morse.

Students may elect work in mass law, reaction velocity, or efficiency measurements with special reference to course 52; in photochemistry or photography with special reference to course 53; in conductivity or electrometric determinations with special reference to course 55; in electrolytic or electric furnace products with special reference to course 56; in metallography; in the application of physical chemical methods to organic chemistry.

MICROCHEMISTRY AND MICROCHEMICAL ANALYSIS

65. **Microchemical Methods.** Second term, credit two hours. Prerequisite courses 6, or 7 and 12. Professor CHAMOT and Dr. RATHJEN. Laboratory practice at hours to be arranged.

The use of the microscope and its accessories, and microchemical methods and apparatus as applied to chemical investigations.

LABORATORY OF QUALITATIVE ANALYSIS

66. **Microchemical Analysis.** First term, credit three hours. Prerequisite course 65. Professor CHAMOT and Dr. RATHJEN. Laboratory practice at hours to be arranged, Morse.

Practice in the examination and analysis of inorganic substances containing the more common elements with reference to rapid qualitative methods and the analysis of minute amounts of materials.

67. **Microchemical Analysis.** First term, credit two or more hours. Prerequisite course 66. Professor CHAMOT. Laboratory practice, Morse.

This course may be arranged so as to comprise the analysis of inorganic substances containing the rarer elements or of organic compounds.

SANITARY CHEMISTRY

[70. **Foods, Beverages, and Food Accessories.** First term, credit two hours. Prerequisite course 6, or 7 and 12. Professor CHAMOT.

The source, preparation for use, and the chemistry of foods, beverages, and food accessories; the individual and relative assimilability, digestibility, and nutritive value of food products; the relation of pure and adulterated foods to the public health; the adulteration, sterilization, and preservation of foods; dietary standards, and the methods for carrying on nutrition investigation.] Not given in 1910–11.

[71. **Food Analysis.** First term. Prerequisite course 6, or 7 and 12. Professor CHAMOT and Mr. REDFIELD.

The examination of foods by chemical and optical methods, with reference to adulteration, imitation, and alteration; the examination of foods for artificial coloring matters, preservatives, and poisonous substances; a study of milk, comestible fats and oils, cereal products and starchy foods, canned goods, jellies, etc. This course may be extended so as to include the analysis of alcoholic beverages]. Not given in 1910–11.

72. **Microscopical Examination of Foods.** First term, credit two hours. Prerequisite course 66. Professor CHAMOT and Dr. RATHJEN. Hours to be assigned.

The use of the microscope in the examination of foods and condiments for the purpose of detecting adulterations and admixtures.

75. **Potable Water.** Second term, credit two hours. Prerequisite courses 6, or 7 and 12. Professor CHAMOT. T Th, 11, Morse L. R. 2.

Sources of potable water; how polluted; agencies at work leading to the natural or self purification of streams, etc., and what they accomplish; the data necessary for a decision as to the fitness of a water for household use, and for use in steam generators; the interpretation of the results of water analysis, chemical, microscopical, and bacteriological. Modern methods of water purification.

76. **Water Analysis.** Second term, credit three hours. Prerequisite course 6, or 7 and 12. Professor CHAMOT and Mr. REDFIELD. Hours to be arranged, Morse.

The methods employed for the examination of waters with reference to their fitness for household purposes, steam boilers, etc; the testing of filters and water purifying devices for efficiency.

80. **Toxicology.** First term, credit two hours. Prerequisite course 30. Professor CHAMOT. W F, 12, Morse L. R. 2.

A review of the present methods for the separation and identification of the common poisons, together with a brief review of the classification, cause of action, and method of elimination of poisonous substances.

81. **Toxicology.** First term, credit two hours. Prerequisite course 30, and open only to those who are taking 80. Professor CHAMOT. M W F, 2–5, Morse.

AGRICULTURAL CHEMISTRY

85. **Agricultural Chemistry.** Second term, credit four hours. Prerequisite course Chemistry 1. Professor CAVANAUGH and Messrs. HEDGES, CROSS, and RICE. Lectures T Th S, 11. One recitation a week M, 8 or 9; W, 8 or 9; F, 8 or 9. Morse L. R. 1.

A general course treating of the relation of chemistry to agriculture and dealing with the composition and chemical properties of plants, soils, fertilizers, feed-stuffs, insecticides, and fungicides.

85a. **Agricultural Chemistry, Laboratory Course.** Repeated in second term, credit two hours. Prerequisite courses 1, 6, 85. Professor CAVANAUGH and Messrs. HEDGES and RICE. T Th, 2–4.30, W F, 8–10.30, Morse, Quantitative Laboratory. Designed to accompany course 85.

[86. **Agricultural Chemistry, Advanced Course.** Credit two hours. Prerequisite course 87 or 88, or may be taken at same time with 87 or 88. Professor CAVANAUGH. T Th 9, Morse L. R. 4.] Not given in 1910-11.

87. **Agricultural Analysis.** First term, credit three hours. Prerequisite courses 1, 6, 85a, 86, or may be taken with 86. Professor CAVANAUGH and Mr. CROSS. T Th, 2–5, S, 9–12, Morse 57. The methods of the A.O.A.C. are studied, in the analysis of fertilizers, soils, and insecticides.

88. **Agricultural Analysis.** Second term, credit three hours. Prerequisites, 87, 89. Professor CAVANAUGH and Mr. CROSS. T Th, 2–5, S, 9–12, Morse 57. Methods of examining foods, feed-stuffs, and dairy products.

89. **Dairy Chemistry.** First term, credit two hours. Prerequisite courses 85, 85a. Professor CAVANAUGH. T Th, 9, Morse L. R. 4.

90. **Advanced Agricultural Analysis.** Repeated in second term. Prerequisite courses 86 or 89, 87, 88. Professor CAVANAUGH. Credit and hours by appointment, Morse 57. Designed to meet the needs of those who are doing research in agricultural chemistry.

SEMINARY

95. **Seminary.** Throughout the year. Morse L. R. 3.

One hour every other week throughout the year.

This is a general seminary in which graduate students with major subjects in chemistry, and seniors that are specializing in chemistry are expected to take part.

RESEARCH

96. **Research for Undergraduate Students.** Throughout the year. Morse.

Seniors that are specializing in chemistry are expected to elect at least four hours a term in research under the direction of some member of the staff of instruction.

SPECIAL COURSE IN CHEMISTRY

The four year course in chemistry and allied subjects that is outlined below is offered for students that plan to follow chemistry as a profession, and serves to prepare them either for teaching or for commercial work. The course affords a broad and thorough training in each of the great subdivisions of chemical science, and also comprises instruction in the allied sciences of mathematics, physics, mineralogy, and economic geology. Courses in mechanical drawing, in mechanics of engineering and in the mechanical and electrical engineering laboratories are included in order that the student may gain some acquaintance with the principles of construction, design, and power transmission.

Objects

This special course is open to all students registered in the College of Arts and Sciences, but those intending to pursue it are strongly advised to defer the study of chemistry until after they have entered the University, and to take before entrance, solid geometry, advanced algebra, plane and spherical trigonometry, three years of preparatory German, three years of preparatory French and four years of preparatory English instead of three. Failure to comply with this recommendation will necessitate the completion of the unfinished work after the student has entered the University, and may result in the prolongation of his course beyond the usual four years, unless the deficiencies be made up during the Summer Session at Cornell or at some other University.

Requirements for Admission

Students registered in the special course in chemistry will be excused from the requirement mentioned in paragraph 12, page ii, of the Announcement of the College of Arts and Sciences for 1910–1911, but they will be certified by the Department as having met the requirements for the degree of Bachelor of Arts only upon the completion of the special four year course outlined below. Under no circumstances will deviation from this course be allowed without the approval of Professor Dennis.

Requirements for Graduation

OUTLINE OF COURSES

First Year.	No. Course	First Term	Second Term
Introductory Inorganic Chemistry	1	6	–
Qualitative Analysis	7	–	6
Mathematics: Analytic Geometry, Differential Calculus, Integral Calculus	3	5	5
Physics	1	4	–
Physics	6	–	4
Physics	10	–	2
Drawing (Sibley College)	D3	3	–
Second Year.			
Organic Chemistry	30	6	6
Quantitative Analysis	12	6	–
Spectroscopic Chemical Analysis	17	–	2
Mechanics of Engineering (Civil Engineering)	20	5	5
Physics	14	1	3
Third Year.			
Introductory Physical Chemistry	50	3	3
Physical Chemistry Laboratory	51	3	3
Microchemical Methods	65	–	2
Gas Analysis	19–20	3	–
Mineralogy	11	3	3
Advanced Quantitative Analysis	14	–	4
Quantitative Analysis—Lectures	15	2	–
Assaying	18	3	–
Mechanical Laboratory (Sibley College)	X11	–	3
Fourth Year.			
Electrochemistry	56a	3	–
Electrochemistry	56c	4	–
General Economic Geology	32	3	3
Electrical Engineering Laboratory (Sibley College)	E13	1	3
Mechanical Laboratory (Sibley College)	X20	3	–
Potable Water	75	–	2
Water Analysis	76	–	3
Research	96	4	4
Seminary, once every other week throughout the year.			

In filling out the remainder of his time the student may elect advanced courses either in chemistry, or in other departments of the College or Arts and Sciences, or, under the regular restrictions, in Sibley College.

REQUIRED COURSES TAKEN OUTSIDE OF THE DEPARTMENT BY STUDENTS IN THE SPECIAL COURSE IN CHEMISTRY

MATHEMATICS

3. **Analytic Geometry and Calculus.** Throughout the year, credit, five hours a term.

3a. **Analytic Geometry.** Credit, four hours first term.

3b. **Differential Calculus.** Credit, one hour first term, two hours second term.

3c. **Integral Calculus.** Credit, three hours second term.

Sec. 1. Daily except S., 10, White 24. Professor TANNER.

Sec. 2. Daily except S., 8, White 6. Professor SNYDER.

PHYSICS

1. **Introductory Experimental Physics.** Repeated in second term, credit four hours. Lectures. Professors NICHOLS, MERRITT, and SHEARER. M T W Th, first term 9 or 12, second term 12, Rockefeller A.

Entrance physics is not accepted as an equivalent for this course.

6. **Introductory Physics.** Class room work. Repeated in second term, credit four hours. Messrs. GIBBS, SOMERVILLE, MURDOCK, and FORMAN. M T W Th, Rockefeller, as assigned.

Examinations for those who were unavoidably absent from either term examination in courses 1, 5, or 6, and for those who have conditions to make up, will be held on registration day, September 29, 1910, at 2 p.m.

10. **Introductory Physical Experiments.** Either term or throughout the year, credit one to four hours a term. Especially for students taking 1 and 6, but open to those who are taking or have completed 1, 1 and 5, 6, or the equivalent. Assistant Professor BLAKER and Messrs. DORSEY, RODGERS, and MAYER. M W S, 8–10.30, M T W Th F, 2–4.30. Rockefeller 220–232.

A shorter course of two hours covering properties of matter, heat, light, sound, magnetism, and electricity may be taken for one term, the student electing two laboratory periods a week or the course may be extended over a year, one period a week being taken. A longer course of three or four hours may be elected covering the same ground as the two hour course but more in detail, the work being done in one term or distributed over two terms.

14. **Physical Experiments.** Either term or throughout the year, credit one to eight hours a term. Prerequisite courses 1 and 6, or 1 and the two hour course in 10, or the equivalent. May be taken by students that are taking courses 8 and 9. Assistant Professor BLAKER and Messrs. RICHTMYER, FISHER, DORSEY, GALAJIKIAN, MOLBY, RODGERS, TAYLOR, GOLDBERG, HARRINGTON and WING. M T Th, 9–12, W S, 8–11, M T W Th F, 2–5. Rockefeller 250–257.

Physical measurements, properties of matter, mechanics, heat, light, sound, magnetism, and electricity; the adjustment and use of instruments of precision. Results and errors are carefully discussed. Students that are specializing in chemistry are required to take four hours. Other students may elect the desired number of hours.

LABORATORY OF QUANTITATIVE ANALYSIS

GEOLOGY

11. **Mineralogy.** Throughout the year, credit three hours a term. Prerequisite at least the equivalent of Chemistry 1; more chemistry and some physics desirable. Professor GILL and Mr. GALPIN. Lectures, T Th, 8. Laboratory sections to be arranged. McGraw Geological Lecture Room.

For beginners who desire a general knowledge of the commoner minerals and their uses, or who intend to pursue advanced work in mineralogy or petrography. Elementary crystallography is a part of the course.

32. **General Economic Geology.** Throughout the year, three hours a term. Prerequisite, sufficient preparation in geology and mineralogy. Professor RIES, Mr. STEWART, and ———. Lectures M W, 10; laboratory T, 2, F, 9, or Th, 2, McGraw.

The origin, nature, distribution, and uses of the non-metallic, and metallic products of the earth's crust. First term, the non-metallics, including coal, oil, gas, clays, salt, fertilizers, etc. Second term, the metallic products, including the ores of iron, copper, lead, zinc, gold, silver, etc. Students may take lectures without laboratory only by special permission. A portion of the laboratory work may be replaced by field trips.

DRAWING (SIBLEY COLLEGE)

D. 3. First term, credit, three hours. Nine hours a week. Mechanical drawing; working drawings, including conventions, standards, etc., following the best practice of commercial drafting rooms. Messrs. WILLIAMS and ———.

MECHANICAL LABORATORY (SIBLEY COLLEGE)

X. 11. **Mechanical Laboratory:—Introductory Experimental Engineering.** Junior year. Second term, credit, three hours. Requires M. 5 and M. 6, or C.E. 20, Chem. 6, and Physics 1 and 5. One laboratory period per week as assigned, one written report per week. Calibration of indicator springs, steam gauges, thermometers and dynamometers; practice and tests of various computing machines; viscosity and friction tests of lubricants on various testing machines; tests of heating values of coals; steam quality tests, with various forms of calorimeter; measurement of water; efficiency tests of steam engines and pumps, steam heaters and condensers. Reports are required which must include all data and results of the various tests, together with the conclusions. The preparation of the report is considered an important part of the laboratory course.

Text-book: Carpenter's "Experimental Engineering." Professor DIEDERICHS, Assistant Professor UPTON, Messrs. PUTNAM, HOOK, WIGLEY and WING.

X. 20. **Mechanical Laboratory:—General Experimental Engineering** Senior year. First term, credit, three hours. Requires X. 10, 11, P. 10. One laboratory period per week. Efficiency tests of Corliss compound engine, steam injector, centrifugal blowing fan, Ericsson hot air engine, Rider hot air engine, gas engine with city gas, gas engine with gasoline and oil engine; tests on hydraulic machinery; pyrometers of various types; and valve setting on automatic and Corliss engines.

Reports are required to be full and complete, to include data and results of each test under consideration and all information necessary to understand completely the machine tested and the methods used. Carpenter's Experimental Engineering is used as text-book. Professor DIEDERICHS, Messrs. GAGE, BIERMA, TORRANCE, WILSON, CURRENT.

ELECTRICAL ENGINEERING LABORATORY (SIBLEY COLLEGE)

E. 13. **Electrical Engineering for Chemists.** Required of senior chemists. One hour credit, first term. Three hours credit, second term. The purpose of this course is three-fold: (1) To review and emphasize the fundamental physical principles applied to electrical engineering; (2) to familiarize the student with the phraseology of current electrical engineering literature; (3) to enable the student to choose the proper type of apparatus for any particular service demanded in ordinary elementary practice. The course consists of one lecture each week during the first term and one recitation and one laboratory experiment with report each week during the second term. Assistant Professor MACOMBER, Messrs. KROGER, PETTITT, TAPPAN, and HOLCOMB.

MECHANICS OF ENGINEERING (COLLEGE OF CIVIL ENGINEERING)

20. **Mechanics of Engineering.** For sophomores in Civil Engineering and for students specializing in chemistry. Credit, five hours for each term. Preparation required: mathematics, course 1. A study of the principles, and applications to engineering, of the mechanics of solids; as relating to the mutual action, motions, pressures, strength, stiffness, and resilience of the members of structures of machines. Original problems form a prominent feature. Statics of a material point and of rigid bodies. Centers of gravity. Chains and cords. Dynamics, (Kinetics) of a material point. Impact. Virtual velocities. Centrifugal and centripetal forces. Pendulums. Moments of inertia of plane figures and of rigid bodies. Dynamics (kinetics) of rigid bodies. Work. Power. Energy. Fly-wheels. Friction. Graphical statics of mechanism. Dynamometers. General theorem of work and energy applied to machines. Stresses and strains. Tension. Shearing. Compression. Torsion. Flexure. Elastic curves. Safe loads. Columns. Text-books: Church's Mechanics of Engineering, and Notes and Examples in Mechanics, supplemented by other printed notes and problems. Lectures and recitations, daily except S, throughout the year. Professor CHURCH, Assistant Professors GEORGE, RETTGER, and SEERY. Eight sections.

COURSES IN CHEMISTRY OF GENERAL INTEREST TO STUDENTS NOT REGISTERED IN THE SPECIAL COURSE IN CHEMISTRY

The following partial list of courses, which are described in detail elsewhere in this pamphlet (pages 19-25), are required of, or are in general elected by, students in the various colleges as indicated below. For more specific and more extended information concerning the conditions under which these or other courses in chemistry may be elected, the student should refer to the announcement of the college in which he is registered.

Chemistry 1. Introductory Inorganic Chemistry. Required of freshmen in Sibley College, in the College of Agriculture, in the College of Civil Engineering, and in the College of Veterinary Medicine. Frequently elected by students in the College of Arts and Sciences and fulfills the six-hour requirement in the science group (see paragraph 12, p. ii, Announcement of the College of Arts and Sciences, 1910–11).

Chemistry 6. Qualitative and Quantitative Analysis. Required of freshmen in the College of Agriculture as a prerequisite to course 85a, and of sophomores in Sibley College and in the College of Civil Engineering.

Chemistry 32. Elementary Organic Chemistry. Required of first year students in the Medical College, and suggested as an elective for students in the College of Agriculture who are specializing in Home Economics.

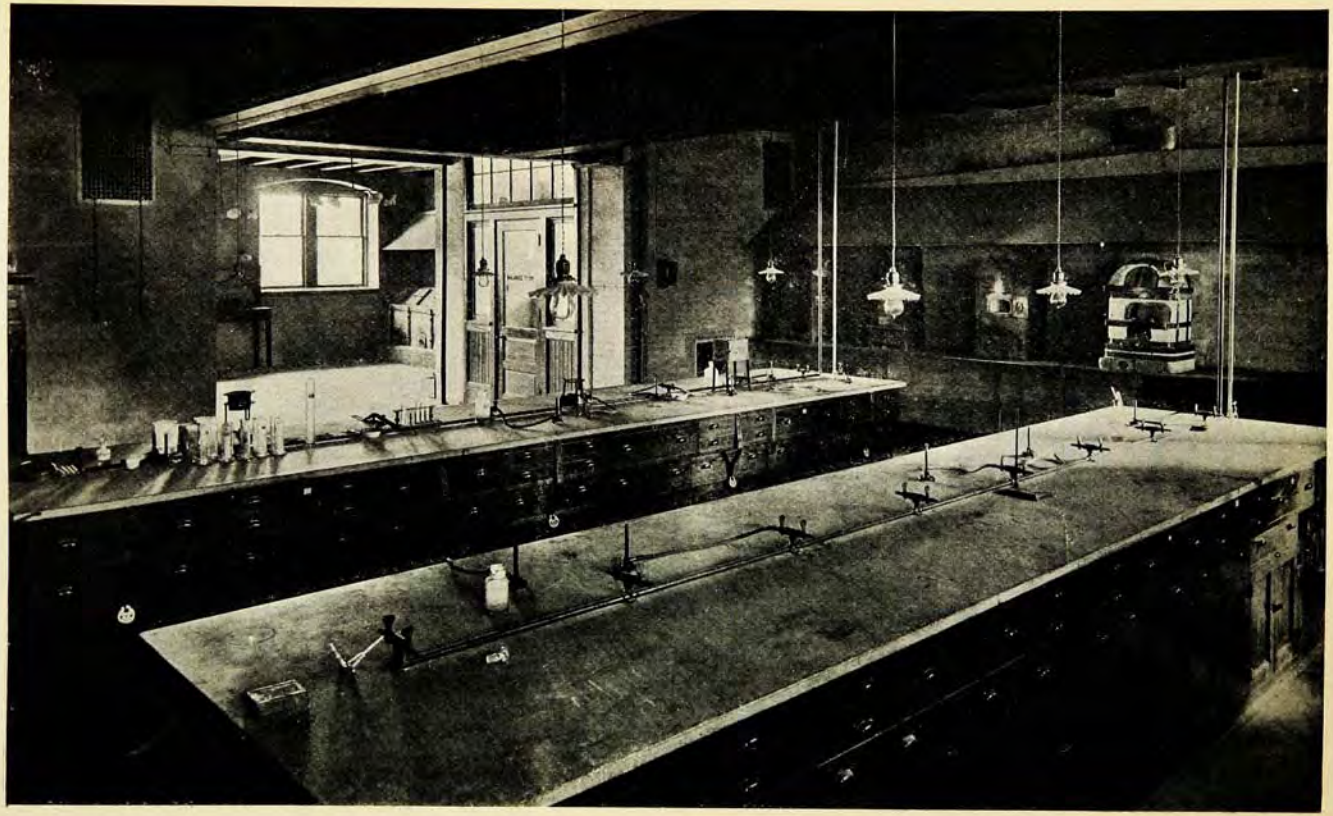
Chemistry 14, 15, 19, 20, 21, 49, and 56 b. Suggested as electives for Sibley students who have had the necessary preparation in chemistry.

Chemistry 75 and 76. Suggested as electives for suitably prepared students in the College of Civil Engineering and in the Medical College.

Chemistry 85. Required of freshmen in the College of Agriculture.

Chemistry 85a, 86, 87, 88, 89, and 90. Suggested as electives for students in the College of Agriculture who have taken the prerequisite courses.

Juniors and seniors in the College of Arts and Sciences who have chosen chemistry as their group in fulfillment of the requirement mentioned in paragraph 13, p. ii, Announcement of the College of Arts and Sciences, 1910–11, usually choose their electives in chemistry in the order prescribed for students in the special course.



ASSAY LABORATORY

COURSES IN CHEMISTRY OFFERED DURING THE SUMMER SESSION 1910

The courses briefly listed below correspond as follows with regular University courses given during the year:

A with Course 1; C and E with 6; C and D with 7; E (with part of F) with 12; F with 14; G with 17; H with 19; I with 20; J partly with 30; K partly with 31; L with 37; R with 65; S with 66; T with 70; U with 71; V with 75; W with 76.

The recitation and laboratory work will be arranged, within reasonable limits, to meet the individual requirements of teachers and of industrial chemists registered in the respective courses. For students wishing to obtain University credit the requirements for admission to the courses will be the same as during the regular University sessions. For teachers or industrial chemists not intending to have their work apply toward a Cornell degree these requirements will not be rigidly enforced.

Further information concerning summer work in general, or concerning the courses in chemistry may be obtained by consulting the Announcement of the Summer Session, or by corresponding with the Director of the Summer Session, Professor G. P. Bristol, Ithaca, N. Y.

A. **Introductory Inorganic Chemistry.** Credit, six hours. a. Lectures, daily except Sat., 12, Ch. L. R. 1. Professor BROWNE and Mr. SUTHERLAND. b. Laboratory work. M W F, 8–12, and T Th, 9–12. Mr. WELSH and Mr. HOULEHAN. c. Recitations, T Th, 8, Ch. L. R. 4. Mr. WELSH.

C. **Qualitative Analysis.** Elementary. Credit, six hours. Lectures, M W F, 11, Ch. L. R. 4. Mr. LEMON. Laboratory. Daily except Sat., 1.30–4.30. Mr. LEMON and Mr. HOULEHAN.

D. **Qualitative Analysis.** Credit, one, two, or three hours. Lectures and recitations, T Th, 8, Ch. L. R. 2. Dr. LUNDELL. Laboratory as arranged. Mr. LEMON.

E. **Quantitative Analysis. Elementary Course.** Credit, two hours. Lectures, T Th, 11, Ch. L. R. 4. Laboratory, M W F, 8–11. Dr. LUNDELL and Mr. HOLLINGSHEAD.

F. **Quantitative Analysis. Advanced Course.** Credit, one, two, three, or four hours. Laboratory as arranged. Dr. LUNDELL.

G. **Spectroscopic Chemical Analysis and Colorimetry.** Credit, two hours. Lectures, M W F, 12, Ch. L. R. 3. Laboratory as arranged. Dr. SHETTERLY.

H. **Qualitative and Quantitative Gas Analysis.** Credit, one hour. Lectures, M W F, 10. Ch. L. R. 3. Dr. SHETTERLY.

I. **Technical Gas Analysis.** Credit, two hours. Laboratory as arranged. Dr. SHETTERLY and Mr. ANDERSON.

J. **Organic Chemistry.** Credit, four, five, or six hours. Lectures and recitations. Except Sat., 8, Ch. L. R. 3. Laboratory as arranged. Mr. NICHOLS and Mr. E. F. HITCH.

K. **Organic Chemistry.** Credit, two hours. Lectures and recitations. Except Sat., 8, Ch. L. R. 3. Mr. NICHOLS.

L. **Methods of Organic Analysis.** Credit, two or more hours. Laboratory practice with occasional lectures. Mr. NICHOLS.

R. **Microchemical Methods.** Credit, two hours. Laboratory as arranged. Dr. RATHJEN.

S. **Microchemical Analysis.** Credit, three hours. Laboratory as arranged. Dr. RATHJEN.

(T. **Foods, Beverages and Food Accessories.** Credit, two hours. Lectures. Mr. REDFIELD. Not given during the summer of 1910.)

(U. **Food Analysis.** Credit, three hours. Laboratory as arranged. Mr. REDFIELD. Not given during the summer of 1910.)

V. **Potable Water.** Credit, two hours. Lectures. Except Sat., 12, Ch. L. R. 2. Mr. REDFIELD.

W. **Water Analysis.** Credit, three hours. Laboratory as arranged. Mr. REDFIELD.

GRADUATE WORK IN CHEMISTRY

For information concerning the requirements for admission to the Graduate School, concerning the Sage Fellowship and the University Graduate Scholarship in Chemistry, or concerning graduate work in departments of instruction other than chemistry, reference should be made to the Announcement of the Graduate School, which may be obtained from the Registrar.

A graduate student who desires to take either a major or a minor subject in chemistry may select any one of the following six branches: inorganic chemistry, analytical chemistry, organic chemistry, physical chemistry, sanitary chemistry, agricultural chemistry. Under the present procedure both the major subject and the one minor subject required for the degree of Master of Arts or the major subject and the two minor subjects required for the degree of Doctor of Philosophy may be selected from the six divisions mentioned above, but it is desirable that candidates for the degree of Doctor of Philosophy select at least one minor subject outside of the Department of Chemistry.

A graduate student who desires to take a minor subject in chemistry with the major subject in some department other than that of chemistry will be required to offer introductory inorganic chemistry and elementary qualitative and quantitative analysis as preliminary to his graduate work in chemistry. The work upon his minor subject in chemistry may be taken in any branch of the subject that he is qualified to pursue. Candidates for the degree of Master of Arts or for that of Doctor of Philosophy with the major subject in chemistry will be expected to have a reading knowledge of French and German and will be required to offer as preliminary to their graduate work in chemistry the following subjects; introductory inorganic chemistry, elementary qualitative and quantitative analysis, advanced quantitative analysis, spectroscopic chemical analysis, gas analysis, elementary organic chemistry, microchemical methods, and elementary physical chemistry. Courses in these subjects, if taken in another university should be substantially equivalent to the courses offered in this Department. Graduate students entering from other universities may take during their residence for the advanced degree such of the above courses as they have not already pursued. If a graduate student lacks at entrance several of these preliminary courses, longer residence may be necessary.

The following courses, which are described in detail in this pamphlet, may be taken in partial fulfillment of the requirements for an advanced degree: Analytical chemistry, course 14; organic chemistry, courses 33, 34, 35, 36, and 37; inorganic chemistry, courses 46, 47, 48, and 49; physical chemistry, courses 52, 53, 55, 56, and 57; microchemistry, courses 66 and 67; sanitary chemistry, courses 70, 71, 72, 75, 76, 80, and 81; agricultural chemistry, courses 86, 87, 88, 89, and 90.

HOLDERS OF THE SAGE FELLOWSHIP IN CHEMISTRY SINCE 1903

William Chauncey Geer, A.B.,	1903–04
James Munsie Bell, B.A. (University of Toronto),	1904–05
Helen Isham, A.B.,	1905–06
Frank Curry Mathers, A.B. (Indiana University), A.M. (same),	1906–07
Carl George Schluederberg, M.E.,	1907–08
Ellen S. McCarthy, A.B.,	1908–09
David Shepard Pratt, A.B.,	1909–10
David Shepard Pratt, A.B.,	1910–11

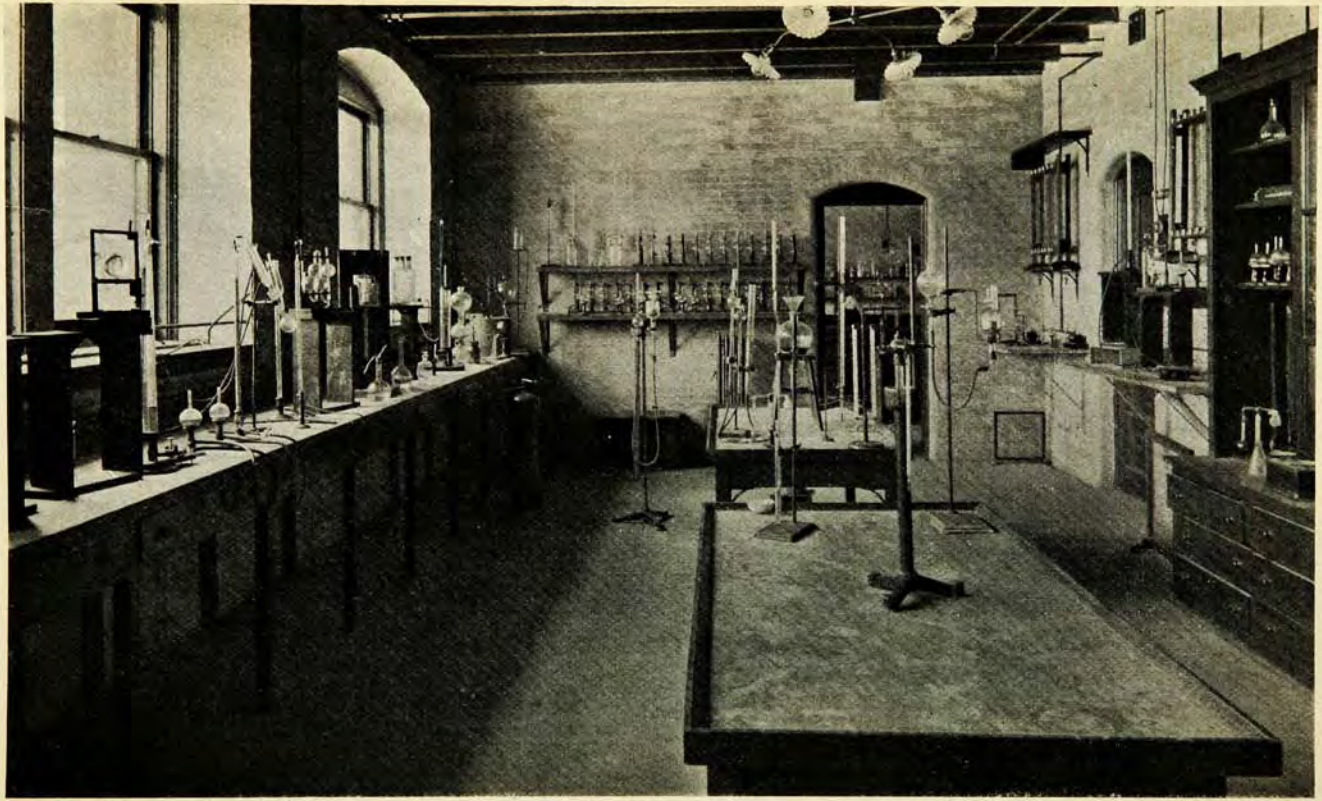
LABORATORY OF SPECTROSCOPIC CHEMICAL ANALYSIS

HOLDERS OF THE UNIVERSITY SCHOLARSHIP IN CHEMISTRY SINCE 1903

James Munsie Bell, B. A.(University of Toronto), - - 1903–04
Helen Isham, A.B., - - - - - - 1904–05
Frank Curry Mathers, A.B. (Indiana University), A.M. (same), 1905–06
Carl George Schluederberg, M.E., - - - - 1906–07
Ellen S. McCarthy, A.B., - - - - - - 1907–08
Clarence Frederick Hale, B.S. (Wesleyan University), M.S. (same), 1908–09
James Kemp Plummer, B.S. (North Carolina A. & M. College), M.S., (same), - - - - - - - 1909–10
Louisa Stone Stevenson, A.B. (Vassar), - - - 1910–11

ADVANCED DEGREES AWARDED SINCE 1903 TO STUDENTS TAKING THEIR MAJOR SUBJECT IN CHEMISTRY.

James Munsie Bell, B.A. (Univ. of Toronto), 1902.
Dineric Equilibria (Ph.D., 1905)
James Adrian Bizzell, B.S. (North Carolina Coll. of Ag. and Mech. Arts), 1895; M.S. (same), 1900.
Behavior of Phosphoric Acid in the Soil (Ph.D., 1903)
John Alexander Black, A.B. (Univ. of Chicago), 1903.
Tetra-chlor-phenolphthalein and some of its Derivatives (A.M., 1908)
Arthur Wesley Browne, B.S. (Wesleyan Univ.), 1900: M.S. (same), 1901.
Contribution to the Chemistry of Hydronitric Acid and the Trinitrides (Ph.D., 1903)
Hari Singh Chima, B.S. (Oregon Agr. Coll.), 1907.
The Microchemical Detection of Nitric Acid (A.M., 1909)
Thomas G. Delbridge, A.B. (Union Coll.), 1903.
Tetrachlorgallein and some of its Derivatives (Ph.D., 1907)
William Chauncey Geer, A.B., 1902.
Contributions to the Chemistry of Indium (Ph.D., 1905)
Horace Wadsworth Gillett, A.B., 1906.
The Carborundum Furnace (Ph.D., 1910)
Clarence Frederick Hale, B.S. (Wesleyan Univ.), 1903; M.S. (same), 1907.
Contributions to the Chemistry of Hydrazine (Ph.D., 1909)
Lee Fred Hawley, A.B., 1903.
Some New Compounds of Thallium (A.M., 1905)
Contributions to the Chemistry of Thallium. II. (Ph.D., 1907)
Major Edward Holmes, B.S. (Valpariso Univ.), 1904; A.B. (Indiana Univ.), 1908.
On the Electrolysis of Certain Liquid Ammonia Solutions (A.M., 1910)
Helen Isham, A.B., 1903.
A Contribution to the Chemistry of Hydronitric Acid (Ph.D., 1906)
Jacob Goodale Lipman, B.S. (Rutgers Coll.), 1898; A.M. (Cornell Univ.), 1900.
Nitrogen-Fixing Bacteria (Ph.D., 1903)
Gustav Ernst Frederick Lundell, A.B., 1903.
Anhydrous Hydronitric Acid (Ph.D., 1909)



LABORATORY OF GAS ANALYSIS

Ellen S. McCarthy, A.B., 1907.
The Determination of Benzene in Illuminating Gas (Ph.D., 1909)
John Peter Magnussen, B.A. (Gustav Adolphus Coll.), 1908; M.A. (Univ. of Minn.), 1902.
Equilibrium between Hydrogen Sulphide and Ammonia (Ph.D., 1907)
Frank Curry Mathers, A.B. (Indiana Univ.), 1903; A.M. (same), 1905.
A Study of the Atomic Weight of Indium (Ph.D., 1907)
Arthur Renwick Middleton, A.B. (Univ. of Rochester), 1891.
The Determination of Acetylene (Ph.D., 1904)
George Arthur Perley, B.S. (New Hampshire Coll.), 1908.
Experiments on Solarization (A.M., 1910)
Edwin Frederick Rathjen, A.B. (Univ. of Wisconsin), 1905; A.M. (same), 1906.
Picrates of the Rare Earths (Ph.D., 1910)
Burton Justice Ray, A.B. (Wake Forest Coll.), 1904.
Some Trisazo-Compounds of Resorcin (Ph.D., 1909)
Carl George Schluederberg, M.E., 1902.
Actinic Electrolysis (Ph.D., 1908)
Fred Floyd Shetterly, A.B. (Indiana Univ.), 1906.
On the Oxidation of Hydrazine (Ph.D., 1910)
Ralph Cuthbert Snowdon, A.B., 1904.
The Electrolytic Deposition of Metals (A.M., 1906)
The Electrolytic Reduction of Nitrobenzene (Ph.D., 1909)
John Edgar Teeple, B.S., 1899.
On Bilirubin, the Red Coloring Matter of the Bile (Ph.D., 1903)
John William Turrentine, Ph.B. (Univ. of North Carolina), 1901; M.S. (same), 1902.
Contributions to the Chemistry of Hydrazine (Ph.D., 1908)
Gorrell Robert White, A.B., 1905.
The Electrolytic Corrosion of Some Metals (Ph.D., 1910)
John Anderson Wilkinson, B.Sc. (Ohio State Univ.), 1903.
The Phosphorescence of Some Inorganic Salts (Ph.D., 1909)

GRADUATE STUDENTS TAKING MAJOR OR MINOR SUBJECTS IN CHEMISTRY 1909–10.

(*In Summer Session. †Not Candidates for degrees.)

Allen, Herman Camp, Ithaca
A.B. (McPherson College) 1904; A.M. (University of Kansas) 1905,
Physical Chemistry, Organic Chemistry, Analytical Chemistry.
Committee: Bancroft, Orndorff, Chamot. (Ph.D.)

Anderson, Ross Peter, Ithaca
A.B. (Cornell) 1908,
Inorganic Chemistry, Sanitary Chemistry, Agricultural Chemistry.
Committee: Dennis, Chamot, Cavanaugh. (Ph.D.)

*Behnken, Henry Emile, Brooklyn
A.B. (Cornell) 1904,
Physics, Analytical Chemistry.
Committee: Shearer, Chamot. (A.M.)

Bennett, Charles William, Hartford, Ky.
B.S. (Vanderbilt University) 1908; M.A. (same) 1909,
Physical Chemistry, Inorganic Chemistry, Organic Chemistry.
Committee: Bancroft, Dennis, Orndorff. (Ph.D.)

Bouyoucos, George John, Tripoltsa, Greece
B.S. (University of Illinois) 1908,
Soil Technology, Agricultural Chemistry, Plant Breeding.
Committee: Lyon, Cavanaugh, Gilbert. (Ph.D.)

Briggs, Thomas Roland, Flushing
A.B. (Cornell) 1909,
Physical Chemistry, Organic Chemistry.
Committee: Bancroft, Orndorff. (A.M.)

Conn, Harold Joel, Middletown, Conn.
Ph.B. (Wesleyan University) 1908,
Soil Technology, Plant Pathology, Sanitary Chemistry.
Committee: Lyon, Whetzel, Chamot. (Ph.D.)

Cothran, John Cleveland, Lockport
A.B. (Cornell) 1908,
Inorganic Chemistry, Sanitary Chemistry, Agricultural Chemistry.
Committee: Dennis, Chamot, Cavanaugh. (Ph.D.)

†Crawford, Frederick North, Middletown, Conn.
B.S. (Wesleyan University) 1908,
Chemistry, Inorganic Chemistry.
Committee: Dennis, Browne.

Cross, Lewis Josephus, Ithaca
A.B. (Cornell) 1909,
Agricultural Chemistry, Sanitary Chemistry, Bacteriology.
Committee: Cavanaugh, Chamot, Moore. (Ph.D.)

Dillon, Sidney Ogier, Tipton, Ind.
A.B. (Indiana University) 1907,
Inorganic Chemistry, Physical Chemistry, Analytical Chemistry.
Committee: Dennis, Bancroft, Lundell. (Ph.D.)

Doyle, Clarence Morton, Ithaca
A.B. (Cornell) 1902,
Physics, Chemistry.
Committee: Blaker, Dennis. (A.M.)

Elliott, Fred Leslie, Gueydan, La.
B.S. (Louisiana State University) 1909,
Sanitary Chemistry, Agricultural Chemistry, Organic Chemistry.
Committee: Chamot, Cavanaugh, Orndorff. (Ph.D.)

Fink, Gail J., Crawfordsville, Ind.
A.B. (Wabash College) 1909,
Inorganic Chemistry, Sanitary Chemistry, Organic Chemistry.
Committee: Dennis, Chamot, Orndorff. (Ph.D.)

Frank, Joseph Julius New York City
A.B. (Columbia University) 1905,
Physical Chemistry, Analytical Chemistry.
Committee: Bancroft, Chamot. (A.M.)

Frear, Henry North, Ithaca
A.B. (Cornell) 1908,
Inorganic Chemistry, Physical Chemistry, Agricultural Chemistry.
Committee: Dennis, Bancroft, Cavanaugh. (Ph.D.)

French, George Talbot, Geneva
B.Sc. (Massachusetts Agricultural College) 1906,
Plant Pathology, Plant Physiology, Agricultural Chemistry.
Committee: Whetzel, Duggar, Cavanaugh. (Ph.D.)

Gaub, John, New Brunswick, N. J.
B.Sc. (Rutgers College) 1905,
Agricultural Chemistry, Sanitary Chemistry, Bacteriology.
Committee: Cavanaugh, Chamot, Stocking. (Ph.D.)

Gillett, Horace Wadsworth, Penn Yan
A.B. (Cornell) 1906,
Physical Chemistry, Organic Chemistry, Analytical Chemistry.
Committee: Bancroft, Orndorff, Chamot. (Ph.D.)

†Graham, Samuel Herbert, Ithaca
A.B. (Cornell) 1909,
Chemistry, Geology, Mechanics.
Committee: Dennis, Ries, Diederichs.

Guthrie, Edward Sewell, Ithaca
B.S.A. (Iowa State College) 1908,
Agricultural Chemistry, Dairy Bacteriology.
Committee: Cavanaugh, Stocking. (M.S. in Agr.)

Harding, Harry Alexis, Geneva
B.S. (University of Wisconsin) 1896, M.S. (same) 1898,
Plant Physiology, Agricultural Chemistry, Pathological Bacteriology.
Committee: Duggar, Cavanaugh, Moore. (Ph.D.)

Harris, Franklin Stewart, Logan, Utah
B.S. (Brigham Young University) 1907,
Soil Technology, Plant Physiology, Physical Chemistry.
Committee: Lyon, Duggar, Bancroft. (Ph.D.)

Hedges, Charles Cleveland, Ithaca
B.S. (Kentucky State University) 1906; A.B. (Cornell) 1908,
Agricultural Chemistry, Sanitary Chemistry, Bacteriology.
Committee: Cavanaugh, Chamot, Moore. (Ph.D.)

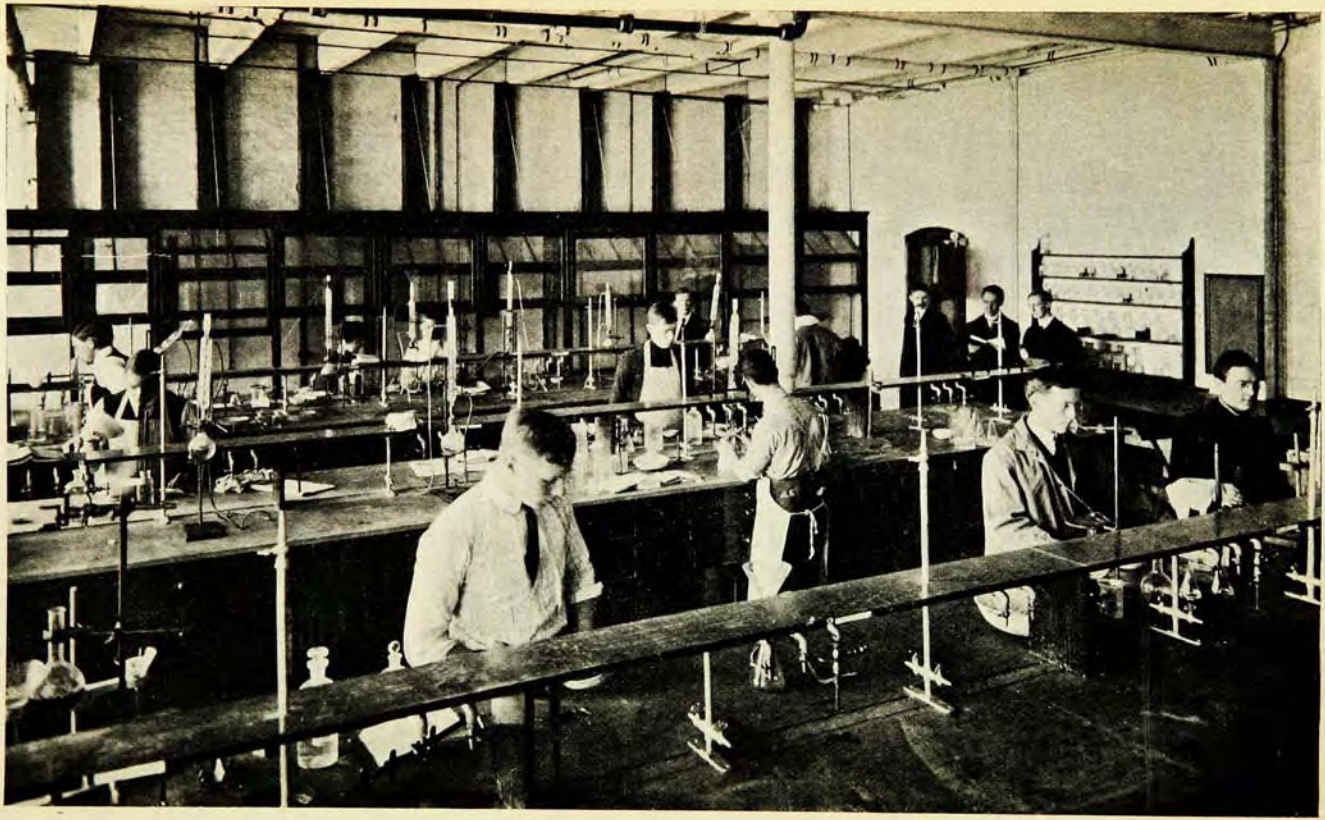
Hill, George Richard, Jr., Springville, Utah
B.S. (Utah Agricultural College) 1908,
Plant Physiology, Horticulture, Organic Chemistry.
Committee: Duggar, Craig, Orndorff. (Ph.D.)

Hitch, Emmet Francis, Seaford, Delaware
A.B. (Washington College) 1904; A.M. (same) 1907,
Organic Chemistry, Inorganic Chemistry, Sanitary Chemistry.
Committee: Orndorff, Dennis, Chamot. (Ph.D.)

Hollingshead, Robert Sullivan, Augusta, Georgia
A.B. (Cornell) 1910,
Sanitary Chemistry, Analytical Chemistry, Agricultural Chemistry.
Committee: Chamot, Lundell, Cavanaugh. (Ph.D.)

Holmes, Major Edward, Kempton, Ind.
B.S. (Valparaiso University) 1904; A.B. (Indiana University) 1908,
Inorganic Chemistry, Physical Chemistry.
Committee: Browne, Bancroft. (A.M.)

Houlehan, Arthur Earl, Crawfordsville, Ind.
A.B. (Wabash College) 1908,
Inorganic Chemistry, Organic Chemistry, Sanitary Chemistry.
Committee: Dennis, Orndorff, Chamot. (Ph.D.)



LABORATORY OF ORGANIC CHEMISTRY

*†Keitt, Thomas Ellison, Clemson College, S. C.
B.Sc. (Clemson College) 1906,
Organic Chemistry.
Committee: Orndorff.

Knudson, Lewis, Milwaukee, Wis.
B.S. in Agr. (University of Missouri) 1907,
Plant Physiology, Botany (Histology), Physical Chemistry.
Committee: Duggar, Rowlee, Bancroft. (Ph.D.)

Lemon, Burton Judson, Ithaca
A.B. (Cornell) 1908,
Inorganic Chemistry, Physical Chemistry, Agricultural Chemistry.
Committee: Dennis, Bancroft, Cavanaugh. (Ph.D.)

†Lohr, James Martin, Clear Spring, Md.
A.B. (Franklin and Marshall) 1905.
Chemistry, Physics, Mechanics.
Committee: Dennis, Blaker, Church.

deLorenzi, Joseph Higgins, Mishawaka, Indiana
A.B. (Wabash College) 1909,
Organic Chemistry, Analytical Chemistry, Physical Chemistry.
Committee: Orndorff, Chamot, Bancroft. (Ph.D.)

Marsh, William Judson, Corning
A.B. (Amherst) 1908,
Inorganic Chemistry, Physical Chemistry, Analytical Chemistry.
Committee: Dennis, Bancroft, Chamot. (Ph.D.)

Martin, John Gordon, LaPort, Indiana
A.B. (Cornell) 1910,
Physical Chemistry, Analytical Chemistry.
Committee: Bancroft, Chamot. (A.M.)

Miller, Carleton Friend, Wallingford, Conn.
B.S. (Wesleyan University) 1909,
Physical Chemistry, Sanitary Chemistry, Agricultural Chemistry.
Committee: Bancroft, Chamot, Cavanaugh. (Ph.D.)

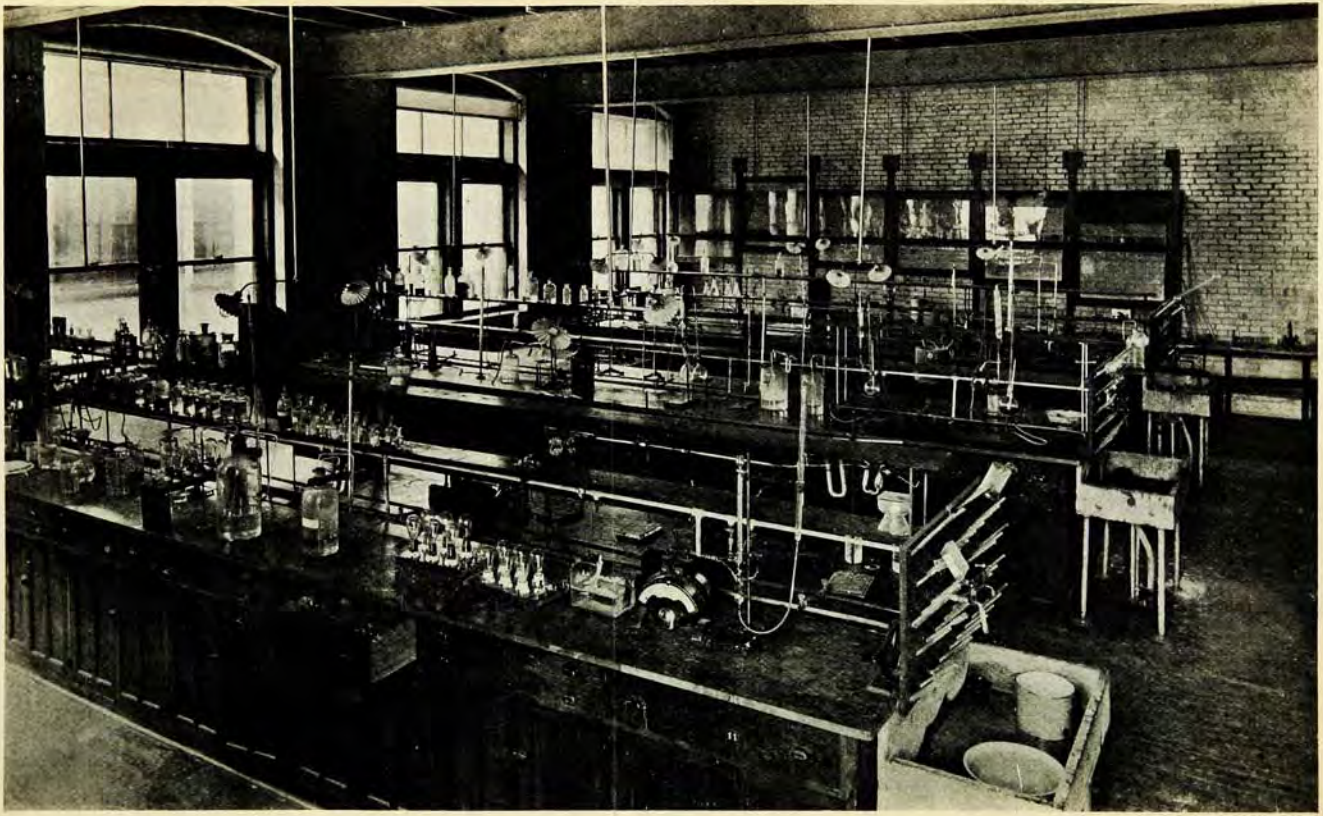
Nichols, Edson Hoyt, Camden, N. J.
A.B. (Cornell) 1908,
Organic Chemistry, Sanitary Chemistry, Inorganic Chemistry.
Committee: Orndorff, Chamot, Browne. (Ph.D.)

Peck, Melville Canby, Enid, Okla.
A.B. (Colgate) 1908,
Organic Chemistry, Analytical Chemistry, Economic Geology.
Committee: Orndorff, Chamot, Ries. (Ph.D.)

Perley, George Arthur, Goffstown, N. H.
B.S. (New Hampshire College) 1908,
Physical Chemistry, Analytical Chemistry.
Committee: Bancroft, Chamot. (A.M.)

Petry, Edward Jacob, Seventeen, Ohio
B.Sc. (Agr.) (Ohio State University) 1907,
Botany (Mycology), Plant Physiology, Organic Chemistry.
Committee: Atkinson, Duggar, Orndorff. (Ph.D.)

Plummer, James Kemp, Middleburg, N. C.
B.S. (N. C. A. & M. College) 1907; M.S. (same) 1909,
Agricultural Chemistry, Organic Chemistry, Analytical Chemistry.
Committee: Cavanaugh, Orndorff, Chamot. (Ph.D.)



LABORATORY OF PHYSICAL CHEMISTRY

Pratt, David Shepard, Towanda, Pa.
A.B. (Cornell) 1908,
Sanitary Chemistry, Analytical Chemistry, Organic Chemistry.
Committee: Chamot, Dennis, Orndorff. (Ph.D.)

Rathjen, Edwin Frederick, Ithaca
A.B. (University of Wisconsin) 1905; A.M. (same) 1906,
Inorganic Chemistry, Physical Chemistry, Analytical Chemistry.
Committee: Dennis, Bancroft, Chamot. (Ph.D.)

Redfield, Harry Westfall, Ithaca
B.S. (Cornell) 1900,
Sanitary Chemistry, Inorganic Chemistry, Agricultural Chemistry.
Committee: Chamot, Browne, Cavanaugh. (Ph.D.)

Rhodes, Frederick Hoffmann, Rochester, Ind.
A.B. (Wabash College) 1910,
Inorganic Chemistry, Physical Chemistry, Organic Chemistry.
Committee: Dennis, Bancroft, Orndorff. (Ph.D.)

Rice, Frank Elmore, Spencer, Ind.
A.B. (Indiana University) 1909,
Physical Chemistry, Sanitary Chemistry, Agricultural Chemistry.
Committee: Bancroft, Chamot, Cavanaugh. (Ph.D.)

Sargent, George Jackman, Concord, N. H.
B.S. (New Hampshire State College) 1909,
Physical Chemistry, Agricultural Chemistry, Analytical Chemistry.
Committee: Bancroft, Cavanaugh, Chamot. (Ph.D.)

Shetterly, Fred Floyd, Ithaca
A.B. (Indiana University) 1906,
Inorganic Chemistry, Physical Chemistry, Analytical Chemistry.
Committee: Browne, Bancroft, Chamot. (Ph.D.)

Smith, Raymond Templeton, Pittsburgh, Pa.
A.B. (Cornell) 1910,
Sanitary Chemistry, Political Science.
Committee: Chamot, Jenks.

Stevenson, Louisa Stone, Lowell, Mass.
A.B. (Vassar) 1901,
Physical Chemistry, Organic Chemistry, Physics.
Committee: Bancroft, Orndorff, Nichols. (Ph.D.)

Sutherland, Leslie Thompson, Yonkers
A.B. (Cornell) 1909,
Inorganic Chemistry, Sanitary Chemistry, Agricultural Chemistry.
Committee: Browne, Chamot, Cavanaugh. (Ph.D.)

Talbot, Hugh Ward, Edmeston
B.S. (Colgate University) 1908,
Chemistry.
Committee: Dennis. (A.M.)

Ulrich, Lawrence J., Kokono, Indiana
A.B. (Wabash College) 1908,
Inorganic Chemistry, Analytical Chemistry, Sanitary Chemistry.
Committee: Browne, Lundell, Chamot. (Ph.D.)

Walker, Lester Vincent, Babylon
A.B. (Cornell) 1908,
Physical Chemistry, Sanitary Chemistry, Analytical Chemistry.
Committee: Bancroft, Chamot, Dennis. (Ph.D.)

†Weed, Randolph Woodruff, Jr., Brooklyn
M.E. (Cornell) 1909,
Gas Engineering Designs, Physics, Assaying.
Committee: Hirshfeld, Bedell, Lundell.

Welsh, Thomas Whitney Benson, Ithaca
A.B. (Cornell) 1908,
Inorganic Chemistry, Analytical Chemistry, Economic Geology.
Committee: Browne, Chamot, Ries. (Ph.D.)

White, Gorrell Robert, Auburn
A.B. (Cornell) 1905,
Physical Chemistry, Inorganic Chemistry, Mineralogy.
Committee: Bancroft, Dennis, Gill. (Ph.D.)

Wilson, Arthur John, Knoxville, Ill.
B.S. (N. C. A. and M. Coll.) 1907; M.S. (same) 1908,
Agricultural Chemistry, Analytical Chemistry, Sanitary Chemistry.
Committee: Cavanaugh, Dennis, Chamot. (Ph.D.)

UNDERGRADUATES REGISTERED IN THE SPECIAL COURSE IN CHEMISTRY.

1909–10.

(The figures 1, 2, 3, 4, directly following the name, indicate freshman, sophomore, junior, and senior year, respectively.)

Andrews, Joseph Church, (4) ..... New Britain, Conn.
Beagle, Nathan Robert, (2) ..... Sidney, N. Y.
Beakes, Henry Lewis, (3) ..... Middletown, N. Y.
Bennett, Harold Selden, (2) ..... Ithaca, N. Y.
Boies, Orlow William, (4) ..... Woodhaven, N. Y.
Boulter, Lewis Henry, (1) ..... Auburn, N. Y.
Bryce, James Richard, (2) ..... Schenectady, N. Y.
Bunce, Earl Hamlin, (1) ..... Lyndonville, N. Y.
Conklin, Alfred Wilkinson, (4) ..... Marquette, Michigan.
Conlin, Henry Joseph, (1) ..... Glens Falls, N. Y.
Cooper, Ellis Bush, (1) ..... Ithaca, N. Y.
Crown, Harry Abraham, (4) ..... Brooklyn, N. Y.
Crumrine, Ralph Milton, (4) ..... Akron, Ohio.
Currie, Robert Henry, (1) ..... Little Falls, N. Y.
Davies, Earl Lee, (2) ..... Knoxville, Pa.
Davis, Richard Foster, (3) ..... Franklin, Pa.
Deutsch, Armand Samuel, (1) ..... Chicago, Ill.
Eastwood, Harry, (3) ..... Auburn, N. Y.
Elsenbast, Arthur Simon, (2) ..... New York City.
Engelder, Carl John, (1) ..... Wellsville, N. Y.
Evans, Durand Randall, (4) ..... Norwich, N. Y.
Finch, Leon, (1) ..... Alpine, N. Y.
Flumerfelt, Olin France, (2) ..... Newark Valley, N. Y.
Flynn, William Francis, (1) ..... Johnstown, N. Y.
Fry, John Martin, (3) ..... Ephrata, Pa.
Georger, Edwin Louis, (1) ..... Buffalo, N. Y.

Gibson, Jr., Richard, (1) ..... Medford, Mass.
Glück, Harry James, (4) ..... Brooklyn, N. Y.
Goldberg, Harry, (2) ..... Riverhead, L. I.
Gordon, Marcus Acheson, (2) ..... Brookville, Pa.
Grant, George Edwin, (2) ..... New York City.
Gundlach, Henry Ralph, (3) ..... Baltimore, Md.
Hart, Arthur Marshall, (2) ..... Baldwinsville, N. Y.
Henry, Frank, (1) ..... Water Valley, N. Y.
Herrera, Carlos Manuel, (2) ..... Gautemala City, C. A.
Hooey, William Charles, (2) ..... Corning, N. Y.
Hopp, George Sol, (2) ..... New York City.
Hovey, Edward A., (3) ..... Glens Falls, N. Y.
Huckle, Clarence, (1) ..... Clyde, N. Y.
Isett, Robert Tussey, (2) ..... Philadelphia, Pa.
Joachim, Samuel, (1) ..... Newark, N. J.
Joachim, William, (2) ..... Newark, N. J.
Kennedy, John Joseph, (1) ..... Poughkeepsie, N. Y.
Kennedy, Robert Phelps, (2) ..... Buffalo, N. Y.
Kenny, Herman Carlyle, (1) ..... Wakefield, Mass.
King, Jr., James Stevens, (4) ..... Montclair, N. J.
Kneeland, Malcolm Chase, (1) ..... Pittsburgh, Pa.
Koerner, Walter Ernest, (4) ..... Troy, N. Y.
Koller, Joseph, (2) ..... Johnstown, N. Y.
Kratz, George Davenport, (3) ..... Akron, Ohio
LaTourette, Harry, (3) ..... Monticello, N. Y.
Little, William Thorburn, (2) ..... Little Falls, N. Y.
Lowary, Ralph Cornelius, (3) ..... Wellsville, Ohio.
Lyman, George Stuart, (1) ..... Davenport, Iowa.
McCoy, Harold Glidden, (2) ..... Watertown, N. Y.
Maider, Joseph Plaisted, (3) ..... Clay, N. Y.
Mason, Archie Osborn, (2) ..... Highland Park, Ill.
van der Meulen, Peter Andrew, (1) ..... Dunkirk, N. Y.
Montgomery, John Henry, (2) ..... Buffalo, N. Y.
Mowry, Leland Bertley, (3) ..... N. Adams, Mass.
Newman, Floyd Roy, (2) ..... Churchville, N. Y.
Newman, Henry Otis, (1) ..... Ithaca, N. Y.
Norton, Allen Bullard, (1) ..... Salamanca, N. Y.
Norton, Frederick Errol, (1) ..... Syracuse, N. Y.
Nunez, Vasco Emilio, (4) ..... Felts Mills, N. Y.
O'Brien, William James, (3) ..... Kingston, N. Y.
Osborne, Harold Hollenbeck, (1) ..... Luzerne, Pa.
Osborne, John Leslie, (1) ..... Oneida, N. Y.
Patterson, Romney Clayton, (3) ..... Glens Falls, N. Y.
Pawel, George Washington, (3) ..... Sandy Hill, N. Y.
Peterkin, Albert Gordon, Jr., (Special) ..... Bloomfield, N. J.
Popoff, Stephen J., (2) ..... Fredonia, N. Y.
Pratt, William Henry, (3) ..... Hackensack, N. J.
Ralph, William McMillan, (1) ..... Buffalo, N. Y.

LABORATORY OF ELECTROCHEMISTRY

Rankin, Everett Horace, (2) ..... Ithaca, N. Y.
Rekate, Edward Albert, (3) ..... Lancaster, N. Y.
Riegger, Harold Eaton, (4) ..... New York City.
Ritter, Horace Sheldon, (3) ..... Oneonta, N. Y.
Rose, Clifford Contant, (2) ..... Kingston, N. Y.
Rosenberg, Arthur David, (1) ..... New York City.
Rosenwald, Lessing Julius, (2) ..... Chicago, Ill.
Rossbach, Walter Lemon, (1) ..... New York City.
St. John, Henry Mark, (4) ..... Canajoharie, N. Y.
Schagrin, Harry, (2) ..... Yonkers, N. Y.
Scharschu, Charles Alton, (3) ..... Kingston, N. Y.
Schwartzmann, Julius, (2) ..... Brooklyn, N. Y.
Sidebottom, Herbert Graff, (1) ..... Philadeiphia, Pa.
Silver, Charles, (3) ..... Odenton, Maryland.
Staley, Vinton Logan, (4) ..... New York City.
Story, Austin Putnam, (1) ..... Chillicothe, Ohio.
Stuart, Mary, (3) ..... Batavia, N. Y.
Underwood, Elbert Victor, (1) ..... Buffalo, N. Y.
Walker, Harold Wehle, (3) ..... New York City.
Warner, Richard James, (1) ..... Candor, N. Y.
Wilbur, David Truxton, (4) ..... Binghamton, N. Y.
Wilson, Thomas Joseph, (3) ..... Amsterdam, N. Y.

TABLE SHOWING THE NUMBER OF STUDENTS REGISTERED IN THE DEPARTMENT OF CHEMISTRY SINCE 1903

YEAR	TERM	SIBLEY COLLEGE		COLLEGE OF ARTS AND SCIENCES		COLLEGE OF AGRICULTURE		COLLEGE OF CIVIL ENGINEERING		COLLEGE OF MEDICINE		VETERINARY COLLEGE		GRADUATES		TOTAL	
		Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students	Registration by Courses	Individual Students
1903–04..	1	338	321	264	126	37	27	61	61	64	62	35	35	76	23	875	655
	2	292	276	266	128	43	35	59	59	152	53	30	30	73	20	915	601
1904–05..	1	288	278	257	168	45	33	36	36	53	53	38	38	90	33	807	639
	2	312	270	298	148	65	48	78	57	198	76	35	35	83	25	1069	659
1905–06..	1	295	272	302	152	84	66	61	61	62	34	15	14	90	24	909	623
	2	301	296	285	131	82	76	78	78	110	39	6	2	86	26	948	648
1906–07..	1	236	225	302	195	107	98	69	69	101	70	27	27	91	54	933	738
	2	304	277	305	145	133	113	64	64	86	38	0	0	120	39	1012	676
1907–08..	1	334	306	353	205	136	134	35	35	79	50	27	27	107	38	1071	795
	2	343	326	356	190	113	100	150	148	74	34	4	4	84	45	1124	847
1908–09..	1	385	344	392	199	241	209	145	145	20	9	49	43	99	48	1331	997
	2	399	360	331	202	173	146	148	140	4	4	5	5	195	57	1255	914
1909–10..	1	391	320	463	256	270	180	132	105	12	12	34	34	290	67	1592	968
	2	348	335	391	216	373	304	179	168	22	14	9	8	191	89	1513	1134
Total registration by Courses		4566		4565		1902		1295		1037		314		1675			
Total individual students			4206		2461		1569		1226		548		302		588		

Total Registration by Courses from all Colleges, 1903–10 15354

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OFFICIAL PUBLICATIONS OF CORNELL UNIVERSITY

Issued at Ithaca, N. Y., monthly from July to November inclusive, and semi-monthly from December to June inclusive.

(Application for entry as second class matter at the post office at Ithaca, N. Y., pending.)

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Courses of Instruction in the College of Arts and Sciences,
Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts,
Announcement of the College of Civil Engineering,
Announcement of the College of Law,
Announcement of the College of Architecture,
Announcement of the Medical College,
Announcement of the New York State College of Agriculture,
Announcement of the Winter Courses in the College of Agriculture,
Announcement of the New York State Veterinary College,
Announcement of the Graduate School,
Announcement of the Summer Session,
The President's Annual Report,
Pamphlet on prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Correspondence concerning the publications of the University should be addressed to
The Registrar of Cornell University,
Ithaca, N. Y