Catalogue of the University of Wisconsin for 1897-98. 1898

Madison, Wis.| (Milwaukee): The University| (Swain & Tate Co.), [s.d.]

CATALOGUE

OF THE

University of Wisconsin

FOR

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1898.

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1898.

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CALENDAR.

ACADEMIC YEAR, 1897-98.

First Semester, September 29—February 11.

Second Semester—February 14—June 23.

Theses must be handed in, College of Letters and Science, College of Mechanics and Engineering, College of Law, School of Pharmacy, May 15.

Legal Holiday, Monday, May 30.

Examination of Candidates for Admission, Thursday and Friday, June 16, 17.

Baccalaureate Address, Sunday, June 19.

Class Day, Monday, June 20.

Address to Law Class, Tuesday, June 21.

Alumni Day, Wednesday, June 22.

Commencement, Thursday, June 23, 9 A. M.

Summer Vacation, June 24—September 27.

Summer School opens July 5, closes August 12, six weeks.

ACADEMIC YEAR, 1898-99.

First Semester opens September 28, closes February 10.

Examinations for Admission, Tuesday and Wednesday, September 27 and 28.

Registration Days, September 26—28.

First Recitations, Thursday Morning, September 29.

Legal Holiday, Thanksgiving, November 24.

Christmas Recess, Saturday, December 24—Monday, January 2. inclusive.

Examination Week, First Semester, February 6—10.

First Semester closes, Saturday, February 11.

Second Semester opens Monday, February 13, closes June 22.

Registration Day, Second Semester, Monday, February 14.

Examination Days for Second Semester, Thursday and Friday, February 9, 10.

Legal Holiday, Wednesday, February 22.

Easter Recess, Thursday, March 30—Monday, April 3, inclusive.

Legal Holiday, Tuesday, May 30.

Examination Week, Second Semester, June 12—16.

Commencement, Thursday, June 22.

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ORGANIZATION.

The University embraces:

The Department of Graduate Study.
The Undergraduate Departments.

Both Graduate and Undergraduate courses are included in the following colleges and schools of the University.

I. The College of Letters and Science.
   The School of Economics, Political Science, and History.
   The School of Education.
   The Washburn Observatory.
II. The College of Mechanics and Engineering.
III. The College of Agricuture.
IV. The College of Law.
V. The School of Pharmacy.
VI. The School of Music.

The College of Letters and Science embraces:

A. Graduate Courses.
B. Undergraduate Courses.

I. The Ancient Classical Course.
II. The Modern Classical Course.
III. The General Science Course.
IV. The English Course.
V. The Civic Historical Course. (School of Economics, Political Science, and History.)
VI. The Special Science Course, antecedent to Medicine.
VII. The Course for Normal School Graduates.

The College of Mechanics and Engineering embraces:

A. Graduate Courses in Engineering.
B. Undergraduate Courses.

I. The Civil Engineering Course, including Railway, Bridge, Structural, Municipal, and Highway Engineering.
II. The Mechanical Engineering Course.
III. The Electrical Engineering Course.

The College of Agriculture embraces:

I. The Experiment Station.
II. The Graduate Course.
III. The Long Agricultural Course.
IV. The Short Agricultural Course.
V. The Dairy Course.
VI. The Farmers' Institutes.

The College of Law embraces:

I. The Three Years' Course.

The School of Pharmacy embraces:

I. The Graduate Course.
II. The Pharmacy Course.
III. The Four Years' Pharmacy Course.

The School of Economics, Political Science, and History, embraces:

I. The Graduate Courses.
II. The Civic Historical Course.

The School of Education embraces:

I. The Graduate Courses.
II. The Course for Normal Graduates.
III. Special Undergraduate Courses in Philosophy and Pedagogy.
IV. The Department of University Extension.
V. The Summer School.

THE UNIVERSITY AND THE STATE.

The University of Wisconsin is a part of the free school system of the State. It was established by the constitution when the State was organized in 1848. The organic law establishing the University declares that its object shall be: "to provide the means of acquiring a thorough knowledge of the various branches of learning connected with scientific, industrial and professional pursuits." In the educational policy of the State, the University sustains the same relation to the high schools that the high

schools sustain to the primary and grammar schools. As those who have successfully completed the grammar grades may freely avail themselves of the advantages of the high schools, so those who have completed with credit any high school courses may advance to the opportunities offered by the University. If the courses of study in the high schools are denominated the 9th, 10th, 11th, and 12th grades, the four years' University course may with similar propriety be regarded as the 13th, 14th, 15th, and 16th grades. It is not expected that every pupil who completes the grammar grades will advance to the high school, and it is not practicable for every one who completes the high school to go forward to the University. Still, the school system of the State has been so arranged as to make the passage from one grade to another as easy and natural as possible, in order to afford every encouragement to the most complete and thorough education attainable. The State through the University undertakes to furnish thorough instruction in the various branches of a liberal education, as well as in the technical branches of agriculture, engineering, pharmacy, law, pedagogy, and music.

It is the general policy of the institution to foster the higher educational interests of the State, broadly and generously interpreted. It is its aim to make ample provision for the demands of advanced scholarship in as many lines as its means will permit. By prescribing a large portion of the studies of the regular courses in the earlier years, and by leaving a large number in the later portion to the selection of the student, it endeavors to give a wise measure of direction and at the same time leave sufficient room for choice to encourage individual adaptation and special development.

The University avoids all that is sectarian or partisan; but it endeavors to extend its sympathy and influence to whatever contributes to good citizenship and high character.

THE SUPPORT OF THE UNIVERSITY.

The University is supported partly by the income of federal grants, partly by taxation of the people of the State, and partly by private gifts. For such support there have been five federal grants, namely: The Two-Township Grant of 1848; The Supplementary Two-Township Grant of 1854; The Morrill Grant of 1862, for the support of studies pertaining to agricultural and mechanic arts; The Hatch Grant of 1887, for the support of agricultural experiment stations; and The Supplementary Morrill Grant of 1890.

Besides numerous appropriations for buildings and other specific purposes the State has made six grants of a permanent nature, namely: the one-tenth mill tax of 1876, increased to one-eighth mill in 1883; the one-tenth mill tax of 1891; the appropriation for the support of the Observatory in 1887; the appropriation for the support of Farmers' Institutes of 1885, increased in 1887; the appropriation for the College of Engineering in 1889 of one per cent. of the railroad license tax; and the one-fifth mill grant of 1897.

Of the private gifts that have come to the University that of Dane County for the purchase of lands for the University farm, that of the late Governor C. C. Washburn for the founding of the Washburn Observatory, and that of the late Judge Mortimer M. Jackson for the establishment of the Mortimer M. Jackson Professorship of Law, have been the most considerable and important.

HISTORY AND LOCATION.

In 1838 an act was passed by the territorial legislature establishing the University of the Territory of Wisconsin, and appointing a Board of Visitors for its government. No action toward establishing the University was taken under this law except the selection of two townships of land appropriated by Congress. In 1848 the constitution of the State of Wisconsin made provision for the establishment of a State University.

In 1849 the Board of Regents held its first meeting and began the work of organizing the University. The first building (now North Hall) was constructed in 1851. Four years from that time Agricultural Hall was completed, and in 1861 University Hall was finished. It has often been altered interiorly, and in 1895 the building was provided with additional stairways and halls. In 1866 the University was reorganized by act of the legislature, which also provided for uniting with the University the College of Agriculture, endowed with the proceeds of the Agricultural College grant given by the United States in 1862. In 1867 the first appropriation, of about $7,000 a year, was made by the State. Since that date the State has made repeated and large appropriations of money for the construction of buildings and for providing apparatus, and also for meeting the ordinary expenses of the institution. The College of Law was established in 1868; the College of Engineering began its work in 1870; the School of Pharmacy in 1883, and the School of Economics, Political

Science, and History in 1892. The Summer School was organized in 1887, the School of Music in 1895, and the School of Education in 1897.

The University of Wisconsin is picturesquely situated at Madison, the capital of the State of Wisconsin. The University grounds comprise 300 acres, and extend for more than a mile along the south shore of Lake Mendota, a sheet of water about four miles in width and six miles in length. University hill occupies the eastern part of the grounds. It rises abruptly from the lake and has two summits, of which the eastern and higher reaches a height of about one hundred feet above the lake. Most of the college buildings are placed on the summit and eastern slope of this hill. The western part of the grounds is lower and more nearly level, and is occupied by the Experimental Farm, belonging to the College of Agriculture. East of the University hill lies a small tract known as the Lower Campus, used for athletic sports and as the drill ground. At the session of 1893 the legislature provided for the purchase of Camp Randall for an athletic field. This is a tract of ground including 42 acres, and joining the University grounds to the southwest. During the past year 160 acres have been purchased for a special experimental farm for the College of Agriculture.

The buildings of the University which are used for instructional purposes are thirteen in number. The three oldest, University Hall, North Hall, and Agricultural Hall, stand on or near the eastern summit of University hill. Agricultural Hall is occupied by the offices, lecture rooms, and laboratories of the College of Agriculture; North Hall is used by the departments of German and Scandinavian languages, and the School of Pharmacy; while University Hall contains the lecture rooms for most of the remaining departments of language and literature. These buildings were erected out of the money derived from sales of land granted by the national government. Across the east front of the campus, at the foot of University hill, is a row of more recent buildings, all of them erected at the expense of the State of Wisconsin. At the south is Ladies' Hall, built in 1870, remodeled and enlarged in 1896, and used as a dormitory for young women; next stands the Library and Library Hall, completed in 1879. Still further north is Science Hall, the largest and most costly of the University buildings, completed in 1887, containing the lecture rooms, laboratories, and museums of most of the scientific departments of the University, and those of the College of Engineering. Next to lake Mendota is the Chemical Labora-

tory, built in 1885, and behind this is the Machine Shop, erected in the same year and greatly enlarged in 1894. Near this building is the Central Heating Plant, completed in 1894. Half-way up the slope of University hill, on the south side, is the building for the Law School, which, in addition to the library and lecture rooms of the College of Law, contains the offices of the Board of Regents and the President of the University, and the rooms of the School of Economics, Political Science, and History. On the western summit of University hill is the Washburn Observatory, built in 1878 by the late Hon. C. C. Washburn, and presented to the University. Near it are the Students' Observatory and the astronomer's house. On the western slope of the hill is the building for the Dairy School, constructed in 1891, and near it is placed the building for the departments of horticulture and agricultural physics. The laboratories for horticulture were built in 1893, and the building was completed in 1896. Further west lie the numerous buildings of the Experimental Farm and the dwelling house for the Dean of the College of Agriculture. Between the lower campus and the lake is placed the Armory and Gymnasium, authorized by the legislature of 1891, and still nearer the lake is the University Boat House and the Rowing Tank. On the western part of the Lower Campus is the new Library for the State Historical Society and the University.

GOVERNMENT.

The government of the institution rests upon the inherent obligations of students to the University and to the state. The University is maintained at the public expense for the public good. Those who participate in its benefits are expected, as a matter of honor, not only to fulfill the obligations of loyal members of the institution, of the community, and of the commonwealth, but actively to aid in promoting the intellectual and moral interests. Every student owes to the public a full equivalent for its expenditure in his behalf, in the form of superior usefulness to it, both while in the institution and afterwards. Students therefore cannot claim any exemption from the duties of good citizens and of loyal members of the community and of the University; on the contrary, they are under peculiar obligations loyally to fulfill every duty. As members of the institution, they are held responsible for regular attendance and the proper performance of their duties. The interests of faithful students and the well-being of the University demand that those who do not

conform to these manifest obligations should withdraw from the institution or be excluded. As members of the community, students are amenable to the law; and, if guilty of its infraction, are liable to a termination of their relations with the University. The University recognizes its civic relations and rests its administration upon civic obligations.

CLASS OFFICERS.

The care of the students in their studies is placed in charge of class officers, chosen from the Faculty. Each division of the classes is under such an officer, who directs the work of the students, assigns to each his studies and reports his progress at the end of each semester to his parent or guardian. The class officers receive all reports from instructors, both those on work completed at the end of the semester and special reports of deficiency or failure on the part of individuals. During the past year the position of Dean of Women was established by the Board of Regents, and Dr. Annie Crosby Emery was appointed to fill this position, entering upon her duties at the opening of the college year. In addition to performing the duties of Dean of Women, Dr. Emery fills the position of Assistant Professor of Classical Philology.

LIBRARIES.

The libraries of the University are the General Library, the Law Library, the Agricultural Library, and the Woodman Astronomical Library. They contain in the aggregate over 54,000 volumes and 14,000 unbound pamphlets.

The General University Library, including the department libraries catalogued therewith, contains over 48,000 volumes and 12,000 unbound pamphlets. More than 500 periodicals are regularly received. The catalogue is the usual dictionary card catalogue of authors, subjects, and titles in one alphabetic arrangement. Subject to certain restrictions, books may be drawn by all members of the University. Students are required to make a guarantee deposit of $2.00 with the Secretary of the Board of Regents preliminary to borrowing books from the library. This amount is refunded on presenting to the Secretary the library deposit card properly endorsed by the librarian. For consultation the library is open twelve hours daily during the academic year except on Sundays and legal holidays.

Through the kindness of Prof. Edward T. Owen, the General Library contains on deposit the Owen library of works on French

language and literature, numbering 900 volumes. Special appropriations in recent years have rendered the library especially strong in the lines of economic and political science, and in classcal philology.

At the opening of the college year a course of lectures cn the library and methods in library work is given to new students by the University librarian.

The College of Law has a special library of 3,500 volumes; and the Washburn Observatory is provided with the Woodman Astronomical Library, now containing 2,250 books and 2,000 pamphlets. Students also have free access to the State Law Library, comprising about 31,000 volumes, and by special arrangements are enabled to take out books from the free library of the city of Madison. This is a well-selected collectien of over 16,000 volumes.

The library of the State Historical Society contains over 100,000 volumes and 90,000 pamphlets. It is exceptionally rich in manuscript and other material for the study of the history of the Mississippi valley. The collections of the late Dr. Lyman C. Draper are included in the library. Its files of newspapers and periodicals are among the most complete in the United States. There are over 5,000 volumes of bound newspapers published outside of Wisconsin, and the files cover, with but few breaks, the period from the middle of the seventeenth century to the present. There is an excellent collection of United States government documents, and the material for the study of American local history, Western travel, the Revolution, Slavery, and the Civil War, is unusually abundant. In English history the library possesses the Calendars of State Papers, the Rolls Series, the publications of the Camden Society, the Records Commission, and the Historical Manuscripts Commission, the journals and debates of Parliament, and several important collections for the study of local history. The Tank collection (Dutch) offers facilities for the study of the Netherlands. The library of the Historical Society is accessible to all students of the University, and thus affords exceptional facilites for the prosecution of advanced historical work. The historical seminaries of the University have been generously granted special facilities in the rooms of the library. The Historical, State, University, and City libraries afford duplicate copies of historical material most in use, and to a large extent supplement one another.

The State legislatures of 1895 and 1897 made provision for a fire proof building for the libraries of the State Historical Society

and the University. The erection of this building is in charge of a commission, selected by the Governor, the State Historical Society, and the Regents of the University. The building is placed on the western part of the lower campus of the University. The foundation and first story of the Library are already in place and the building will be completed in 1899.

LABORATORIES.

CHEMICAL LABORATORIES.—The Chemical Laboratories, six in number, are in a building devoted exclusively to Chemistry. Four of these are general laboratories, viz.:

First. The Qualitative Laboratory, with accommodations for ninety-six students; *Second.* The Organic Laboratory, accommodating thirty-two students; *Third.* The Quantitative Laboratory, accommodating forty-eight students; and *Fourth.* The Laboratory of Physical Chemistry, accommodating twenty-five students.

These laboratories are large, well-lighted, conveniently arranged, and well supplied with the necessary apparatus and equipments.

PHYSICAL LABORATORIES.—The instruction in the department of physics is designed to meet the needs of all classes of students, from those just entering, with no knowledge of the subject, to those who have been well trained, and who are prepared to continue in the more advanced courses or to take up a line of original investigation.

The Physical Laboratories are located on the first floor and in the basement of the south wing of Science Hall, and are commodious and well lighted. Besides the lecture room and large apparatus room on the first floor, there are two laboratory rooms for purposes where great steadiness is not required. The lecture room has a seating capacity for 150 students, and is provided with all the appliances to facilitate a complete course of experimental lectures. In the basement are three large general laboratories for undergraduate work, all of which are liberally supplied with piers to insure the perfect stability of the instruments used. There are also in the basement a well-equipped photometric room and a number of laboratories devoted to special investigation. Besides current supplied from the numerous dynamos in the University shops, the various rooms of the physical laboratory are connected with the electric light and power circuits of the city.

The physical apparatus includes, in addition to the equipment for demonstration purposes, an excellent collection of instruments adapted to measurement and investigation. The laboratory offers special facilities for carrying out graduate study and research.

THE MINERALOGICAL LABORATORY.—The Mineralogical Laboratory has reagents and other necessary apparatus for complete courses in blow-pipe analysis and determinative mineralogy. There is a collection of hand specimens of minerals for laboratory use, and for comparative purposes. The students also have access to the large collections in the cabinet. A small room has been fitted with curtains, to serve as a goniometer room, and is supplied with a large reflection goniometer and the complete *Universalapparat* of Fuess.

The mineralogical lecture room is supplied with a complete set of about 150 glass crystal models by F. Thomas, of Siegen, a selected series of wooden crystal models from Kranz, of Bonn; Böhm and Wiedermann's wave-surface and dispersion models; Brill's plaster models of surfaces of elasticity, Werlein's models to show the characters of dispersion in monoclinic crystals; and a series of axis-systems.

THE PETROGRAPHICAL LABORATORY.—The Petrographical Laboratory contains at present fourteen microscopes, three by Voigt & Hochgesang, seven by Nachet, and four by Fuess, including one large stand by each of the last two. The large Fuess is supplied with an unusually complete set of excellent eye-pieces, objectives, and accessories. The collections of the laboratory are as follows: About 200 sections of minerals, cut in definite directions, 100 of which are Professor Klein's set as prepared by Voigt & Hochgesang; and Stürz set of European rock specimens and thin sections, known as the Rosenbusch collection; a set of American rocks, and thin sections by Julien; and the thin sections of the State Geological Survey. There is also available the very extensive collection of rocks and thin sections from the collection of Pre-Cambrian rocks of North America, belonging to the Lake Superior Division of the United States Geological Survey. This collection is one of the largest of its kind in the world, containing over 10,000 thin sections, and is particularly valuable to advanced students.

The collection of some 1,500 typical crystalline rocks, mostly European, and accompanied by 800 thin sections belonging to the assistant professor in charge of the department, is freely used by students.

The lecture room for geology is provided with a full set of reference manuals, a set of Zittel's Palæontologische Wandtafeln; a large relief map of the United States by E. E. Howell; a set of Shaler's models and photographs; a set of Davis' models showing the development of topographic features; numerous geological maps; a large collection of lantern slides; Newton's large electric projecting lantern, and other apparatus. The Newton lantern is adapted for projecting ordinary lantern slides. and has a front for microscopic slides, which projects directly on the screen thin sections of rocks both in ordinary and polarized light.

THE BIOLOGICAL LABORATORIES.—The elementary laboratory for the departments of botany and zoology is arranged to accommodate seventy-two students, and is provided with compound microscopes, dissecting microscopes, and other apparatus necessary to an elementary course in botany and zoology. The departments have about ninety compound microscopes, chiefly by Leitz and by Bausch & Lomb, fitted for elementary and advanced work, including seven microscopes furnished with oil immersion objectives.

The laboratories for advanced work in botany are fitted up with the apparatus and reagents necessary to an advanced course in vegetable histology, and to a course in vegetable physiology. All necessary reagents, ovens, paraffin baths and microtomes are provided for histological work. Among the more important pieces of apparatus are a Vogel's direct vision spectroscope, registering thermometers, centrifugal apparatus, horizontal microscope, respiratory apparatus, clinostats, and auxanometers. A conservatory for experimental work is connected with the laboratory for plant physiology.

The laboratories for advanced work in zoology are two in number, one being devoted to histology, and the other to vertebrate anatomy and embryology. The histological laboratory is provided with a full equipment of reagents, microtomes of various patterns, and microscopes. The anatomical laboratory is furnished with a collection of vertebrate skeletons and of wax models illustrating the development of some of the more important vertebrates and invertebrates. For illustrating the lectures in botany and in zoology, there are Auzoux models, both of plants and animals, an electric projecting lantern and microscope by Newton & Co., London, over 600 lantern slides, a large number of wall charts, microscope slides, etc.

The bacteriological laboratories are located in Agricultural Hall. The general laboratory occupies a part of the second floor, and has been entirely refitted; it accommodates twenty students, giving ample facilites for independent work. The laboratory is supplied at present with fifteen compound microscopes of late pattern, comprisng the best American and German makes. Most of these microscopes are fitted with the necessary immersion lenses and Abbe condensors for high power work; other necessary microscopical apparatus is also available. The laboratory is well equipped with the usual supply of sterilizers and incubators, kept at different constant temperatures, as well as numerous pieces of apparatus of home manufacture intended for investigational and instructional purposes. A large and constantly increasing supply of pure cultures of bacteria are kept on hand.

The research laboratory of the Experiment Station occupies a part of the first floor, and is well equipped for original investigation. The green houses of the Experiment Station and the University Creamery afford facilities for the prosecution of work on plant diseases and dairy products. Nearly all of the general bacteriological journals are kept on file in the library for ready reference. A collection of lantern slides for lecture illustrations are also in use.

THE PSYCHOLOGICAL LABORATORY.—The laboratory is designed to illustrate by practical experiments and demonstrations the courses in psychology; to give an opportunity to students of experimental psychology to study the methods, equipments, and results of this promising and rapidly progressing science; and to provide for original research in many directions.

Considerable apparatus has been purchased abroad and many pieces have been made at the machine shops of the University. The equipment includes a very complete series of apparatus for the study of the dermal senses; the typical and important instruments for experiments and demonstrations in psychological optics; and an unusual variety of apparatus for the study of the time relations of mental phenomena; considerable apparatus designed for statistical research on simple sense and motor tests; a variety of devices for the study of memory, attention, association, and other more complicated processes, and so on. The laboratory acquired a considerable number of pieces from the section of psychology at the World's Columbian Exposition, including almost the entire working laboratory there exhibited; and the equipment has been substantially increased during recent years.

Original research has been carried on for several years and the more important results have been published in the *American Journal of Psychology*, the *Psychological Review*, and elsewhere.

In addition to four series of studies from the laboratory already published, the work done in the laboratory has been the basis of several articles that have appeared or are about to appear in various periodicals, as well as of theses submitted for degrees.

The engineering, assaying, pharmacy, and agricultural laboratories are described under their respective departments.

MUSEUMS.

THE GEOLOGICAL AND MINERALOGICAL MUSEUM.—The museum of the geological and mineralogical departments occupies the entire south wing of the second floor of Science Hall. Systematic collections of typical and impressive specimens have been arranged in glass cases, while the more extensive series for comparative purposes and the working collections are stored in drawers beneath.

Relief Models.—For illustration in general and structural geology the collection embraces large topographical-geological models of the Colorado Cañon, the Henry Mountains, the Auvergne, the Yosemite Valley, the Uintah Mountains, Mt. Vesuvius, the Leadville Region, Lookout Mountain, etc.

Paleontological Collection.—This embraces a considerable number of Ward and Howell's casts of gigantic fossil forms, including *Megatherium Cuvieri*, *Glyptodon*, the skull and tusks of *Elephas ganesa*, *Dinotherium*, and *Mastodon*, and an unusually good set of Mesozoic reptilian forms. The fossils include a systematic collection, embracing all geological horizons, obtained by purchase, and the *Powers Collection*, the generous gift of Mr. H. C. Powers, of Chicago. This latter collection is especially rich in fossils of the Trenton and other Silurian deposits of Wisconsin.

The collection of the Wisconsin Academy of Science, which contains the type specimens described in the official reports of the last State Geological Survey, is deposited in the museum and is accessible to students.

The Mineral Collection.—The systematic collection of minerals contains 2,500 to 3,000 specimens, representing the different groups and containing many rare specimens. With a view to the

impressive illustration of mineralogical types, the larger and many of the smaller but choice specimens have been displayed in glass cases.

The Henry Collection of Minerals.—The University Museum contains the W. T. Henry collection, consisting of from 30,000 to 40,000 specimens. It is especially representative of the lead and zinc ore deposits of southwestern Wisconsin and adjoining states, and is exceptionally complete in its exhibition of the various forms of ore, of the order of deposition, and of the pseudomorphic changes that have taken place in the original deposits. Crystallographically the collection is valuable from the specimens of calcite, cerusite, azurite, galena, and sphalerite. The large number of duplicate specimens will be utilized in enlarging the collection by exchanges.

Crystal Collection.—A small collection of crystals illustrating the different grades of symmetry and the forms occurring on the best crystallized species occupies one case. With this collection has been included a set of Goldbach's artificially prepared crystals.

Rock Collection.—The rock collections embrace Stürz's Rosenbusch collection of typical European rocks, and the Julien collection of typical American rocks, as well as a considerable collection obtained from other sources.

Metallurgical Collection.—A small collection, illustrating the metallurgy of the different metals, contains specimens representing the ores of each, and the products of the different reducing processes.

The Zoological and Botanical Museum occupies the entire third story of the south wing of Science Hall, directly above the geological museum. Among the specimens at present placed in the cases may be named a good collection of vertebrate skeletons; a large number of Blaschka glass models of invertebrates; an alcoholic collection of invertebrates from the Naples Zoological Station; representative collections of echinoderms, corals, and mollusks. The botanical cases contain a collection of Auzoux models of flowers and a collection of specimens of wood. The Owen collection of Lepidoptera, comprising five thousand species, and over twenty thousand specimens, is deposited in Science Hall.

The Herbarium of the University (Room 41, Science Hall) includes the Lapham collection, chiefly of flowering plants, purchased by the State from the estate of I. A. Lapham, of Mil-

waukee. This contained about 8,000 species. These have been mounted and arranged, and are now accessible for consultation. The Wisconsin plants have been separated from the rest, and it is the intention to make them a basis of a complete representation of the Wisconsin flora. Large additions have been made to this herbarium by Prof. L. S. Cheney and Prof. H. L. Russell.

Mr. Lapham's collection also included a considerable number of algae, lichens, and mosses. The collection of mosses has been very greatly extended by gifts, purchases, exchanges, and collections, so that it now includes almost all of the species known in North America, and a large number of those of other countries. Many valuable types and sets of exsiccati are included.

The Herbarium also sends out a small party during each summer for collecting plants of the state. In the past three seasons the Wisconsin river valley has been explored and several thousand specimens added to the Wisconsin herbarium.

When the museums are not open to the public, access may be gained by visitors at all reasonable hours by calling upon the janitor of the building, whose room is on the first floor of Science Hall.

THE WASHBURN OBSERVATORY.

The Washburn Observatory is excellently equipjped for astronomical work. Its principal instruments are: An equatorially mounted telescope of 15½ inches aperture, constructed by Alvan Clark and Sons, and provided with graduated circles, driving clock, micrometers, a spectroscope, astro-photometer, and a very complete set of eye-pieces; a meridian circle, by A. Repsold and Sons, of Hamburg, with collimators, and the usual accessories of such an instrument.

A full account of the Washburn Observatory will be found on a later page, under the College of Letters and Science.

PHYSICAL TRAINING.

Military drill and gymnastic exercises are required of the young men of the Freshmen and Sophomore classes, and of special students of the first two years' attendance. Gymnastic exercise is also required of the young women, for whom a thoroughly equipped gymnasium has been provided. The University is situated on the shores of lake Mendota, a beautiful sheet of

water, which invites exercise and recreation in boating. The University Boat House Association has erected a boat house, and the University has built a Rowing Tank for the use of the University crew.

An Athletic Field of about ten acres has been enclosed in Camp Randall. The field has been graded, under-drained, provided with two tracks, one-third and one-fourth mile; and a grand stand has been built accommodating 1,500 spectators.

GENERAL INFORMATION.

LITERARY AND SCIENTIFIC SOCIETIES.

The literary societies, the Athenaean, Hesperian, and Philomathian composed of gentlemen, and the Castalian and Laurean, composed of ladies, are sustained with unusual interest and constitute an important means of intellectual training. Numerous public exhibitions are given by these societies, of which the annual Joint Debate between two of the gentlemen's literary societies is the most important literary event of the college year. This debate has now been maintained for twenty-five years. In oratory the main public events are the Junior Oratorical Exhibition, and the Annual Contest for the selection of a representative in the annual meeting of the Northwestern Oratorical League.

Besides these literary societies in the College of Letters and Science, three similar organizations are maintained in the College of Law, and two in the College of Agriculture. The College of Engineering maintains two engineering societies; and in the School of Pharmacy there is a Pharmaceutical Association. The most important scientific organization is the Science Club, including both officers of instruction and advanced students, which seeks to promote an interest in scientific study and research. It conducts public meetings for the untechnical discussion of scientific topics of current interest to which all members of the University are invited. In several departments of the University there are held journal clubs or societies for furthering the distinct work of the departments. Among these are, the Bildungsverein; the Germanistische Gesellschaft; a Scandinavian society, the Nora Samlag; the Classical Club, the English Literature Journal Club, the Mathematical Club, the Physics Journal Club, the Biological Club, the Geological Club and the Chemical Club. In other departments where no such organization has been effected similar results are reached by means of the various seminaries. The graduate students of the University have organized a Graduate Club, and the women have organized a Woman's Self Government Association. The religious organizations of the University include the Young Men's Christian Association with a membership of 212, and the Young Women's Christian Association with a membership of 105.

The publications conducted by the students include the *Daily Cardinal*, the *Alumni Cardinal*, a weekly edition issued for the benefit of the Alumni; a monthly journal, the *Wisconsin Aegis;* and an annual, the *Badger*, issued by the Junior Class. The students of the College of Engineering issue a quarterly publication, the *University of Wisconsin Engineering Magazine.*

LADIES' HALL.

Ladies' Hall was entirely rebuilt and greatly enlarged in 1896. This building was erected in 1870 and was intended to include accommodations for recitation rooms, chapel, and dormitory for the Woman's College as then organized. When the University became a co-educational institution the building was devoted to the purposes of a dormitory, and also furnished rooms for the Department of Music. The arrangement of the suites of rooms, which required four students to occupy one sitting-room, was inconvenient, and the plan of the building, combining recitation rooms and dormitory, unfitted it for the best service in either direction.

In the remodeling of the building an addition 75 feet by 50 feet was built on the west end. The basement and first story of the addition contain the woman's gymnasium, the second floor contains the lecture and practice rooms for the Department of Music, the third floor is occupied by chambers, and the fourth contains the dining room. The main part of the old building has been entirely remodeled inside. It contained originally three stories, which have been increased to four. The staircase has been reconstructed in the center of the building, and the arrangement of the rooms in the wing of the old building has been changed. The rooms are now arranged in suites of two, comprising a study and a chamber, and intended for two occupants, or in single rooms, intended for one student. The building will accommodate in this way eighty students.

The rooms are lighted by electricity and the heating apparatus is now connected with the central boiler plant, so that there is no fire for heating in the building. Freight and passenger elevators, operated by electricity, are provided.

The account of the Woman's Gymnasium is contained under the heading Physical Culture on a later page of the catalogue.

The rooms for the Department of Music, which are now entirely confined to the new addition, comprise offices, rooms for practicing, and a large lecture room.

Rooms are provided in the upper story for the literary societies. A piazza has been constructed across the front of the building, and that on the south side of the former wing has been enlarged so as to include all three stories.

Students' rooms are carpeted and furnished, but occupants are expected to provide washstand furniture, towels, napkins, napkin rings, sheets, pillow cases, counterpanes, and blankets. Young women occupying this building are under the immediate charge of the Mistress of Ladies' Hall, and are required to board in the Hall. They are expected cheerfully to conform to the requirements necessary for a family of students. No deduction is made for voluntary absence, and any commutation of charges for board in cases where students leave before the close of the semester, except in cases of necessity, is entirely voluntary with the matron in charge. The cost of board is $3.50 per week.

The prices of rooms at Ladies' Hall vary according to location. Persons occupying a room may retain the same for the succeeding year by application and making a deposit of $10 not later than May 1st. The deposit of $10 required from all students, new as well as old, to secure a room, will be credited on the rent of the room, if taken; but if the room is not taken, will be forfeited, unless notification is received by the Secretary prior to September 1st. Application for rooms and the payment of fees for the same should be made in all cases to the Secretary of the Board of Regents, who will assign all rooms. The balance due for room rent must be paid to the Secretary, not later than the second week after the beginning of each semester. Rooms are rented to *bona fide* students of the University only. Application for rooms may be made at any time, but rooms will not be assigned to new students prior to May 1st. After that date they will be assigned in the order of application and the payment of the $10, and subject to the provision above made for former occupants.

If for any reason one of the occupants of a suite shall be obliged to give up her place in the suite, the remaining person must take a single room, if one is vacant, or pay the price for the full suite, during the time it is occupied by her alone.

A person entering the Hall for the second semester only, shall pay the price of the room charged for the second semester, with the additional sum of $10.

LIST OF ROOMS IN LADIES' HALL WITH RENT OF EACH.
"A" is the first floor; "B," the second, etc.

Floor.	Room No.	Suits for Two or Single.	To Secure.	1st Semester.	2d Semester.	Total for Each Person.
A	1	Suite	$10	$20	$15	$45
A	2	"	10	25	15	50
A	3	"	10	20	15	45
A	4	"	10	25	15	50
A	5	"	10	20	15	45
A	6	"	10	20	15	45
B	1	Suite.	10	20	15	45
B	2	"	10	25	15	50
B	3	"	10	20	15	45
B	4	"	10	25	15	50
B	5	"	10	20	15	45
B	6	"	10	20	15	45
B	7	"	10	20	10	40
B	8	"	10	25	15	50
B	10	Single	10	40	30	80
B	12	"	10	45	35	90
B	14	"	10	40	25	75
*B	16	"	10	50	35	95
B	20	"	10	40	30	80
B	22	"	10	40	30	80
B	24	"	10	45	35	90
B	26	"	10	40	30	80
B	28	"	10	45	30	85
B	30	"	10	30	20	60
B	11	"	10	20	15	45
B	13	"	10	20	15	45
*B	15	"	10	25	15	50
*B.	17	"	10	25	15	50
C	1	Suite	10	20	15	45
C	2	"	10	25	15	50
C	3	"	10	20	15	45
C	4	"	10	25	15	50
C	5	"	10	20	15	45
C	6	"	10	20	15	45
C	7	"	10	20	10	40
C	10	Single	10	40	30	80
C	12	"	10	45	35	90
C	14	"	10	40	25	75
C	16	"	10	40	25	75
C	18	"	10	40	20	70
C	20	"	10	40	30	80
C	22	"	10	40	25	75
C	24	"	10	45	35	90
C	26	"	10	40	30	80

Floor.	Room No.	Suits for Two or Single.	To Secure.	1st Semester.	2d Semester.	Total for Each Person.
C	28	Single	$10	$ 40	$30	$80
C	30	"	10	25	15	50
* C	Parlor	"	10	45	35	90
C	21	"	10	20	15	45
C	23	"	10	25	15	50
C	25	"	10	25	15	50
C	27	"	10	25	15	50
C	29	"	10	20	10	40
C	31	"	10	20	10	40
*D	8	Single	10	30	20	60
D	10	"	10	25	20	55
D	12	"	10	30	20	60
D	14	"	10	25	15	50
D	16	"	10	25	15	50
D	18	"	10	25	15	50
D	20	"	10	25	15	50
D	22	"	10	25	15	50
D	24	"	10	30	25	65
D	26	"	10	25	15	50
D	28	"	10	25	20	55
D	30	"	10	20	15	45
*B	16	If occupied by two.	10	25	15	50
*B	15		10	10	10	30
*B	17		10	10	10	30
*C	24		10	25	15	50
*C	Parlor		10	25	15	50
*D	8		10	15	10	35

ROOMS AND BOARD.

Rooms, furnished and unfurnished, can be obtained in the city at reasonable rates. The cost of board in clubs is from $2.00 to $2.50 per week; in private families from $2.50 to $4.00 per week. Washing costs from sixty to sixty-five cents per dozen. Many of the students support themselves in whole or in part. The places offering available work are eagerly sought for and cannot always be obtained at once. Those dependent on themselves should secure some means before coming here, and be ready to wait and learn how to help themeslves.

CHARGES AND FEES.

A full statement of charges and fees is given on pages 74-78.

THE COLLEGE YEAR.

The college year is divided into two semesters. The first semester opens on the last Wednesday in September. Registration and examinations for admission will be held on the preceding Tuesday, and on the opening day of the semester. The second semester will ordinarily begin on the second Monday in February; in the coming college year the date of the opening second semester will be February 13, 1899. The studies of the University have been so arranged that students can begin their course with the second semester; but persons desiring to enter the University at this time should come to Madison during the week preceding the opening of the second semester, as the recitations will begin on Tuesday morning, and all arrangements for rooms, board, books, etc., as well as registration at the University, must be made before that time. Commencement occurs on the Thursday preceding the last Wednesday in June. In 1898 the date will be Thursday, June 23.

There are two recesses or vacations during the college year, one at Christmas and one at Easter. The Christmas recess begins with the morning of December 24th, and recitations are resumed on the morning of January 3d. No regular class examinations occur at Christmas, and no new classes begin immediately after the Christmas recess, so that students can not enter the University at this time. Those who can not enter at the opening of the year must wait for the beginning of the second semester in February. There is no vacation between the first and second semesters.

The Easter recess occurs at Easter, beginning with the Thursday morning before Easter Sunday. Recitations will begin on the morning of Tuesday following Easter. No examinations are held at this time and no new classes begin after the Easter recess.

DEGREES.

FIRST DEGREES.

The baccalaureate degrees are conferred at graduation upon those who have successfully completed the regular courses leading to degrees, and who have conformed with all other requirements of the University. The degrees for the several courses are as follows:

Académic.

BACHELOR OF ARTS, for the Ancient Classical Course.
BACHELOR OF SCIENCE, for the General Science Course.
BACHELOR OF LETTERS, for the Modern Classical, the English, and the Civic Historical Courses.
BACHELOR OF PHILOSOPHY IN PEDAGOGY for the Course for Normal Graduates.

Professional.

BACHELOR OF LAWS, for the Law Course.
GRADUATE IN PHARMACY for the Pharmaceutical Course.
BACHELOR OF SCIENCE IN PHARMACY, for the Four Years' Pharmacy Course.

Technical.

BACHELOR OF SCIENCE IN AGRICULTURE, for the Agricultural Course.
BACHELOR OF SCIENCE IN ENGINEERING, for the courses in Civil Engineering, Mechanical Engineering, Mining and Metallurgical Engineering, Electrical Engineering.

A graduate of any one of the courses may receive the baccalaureate degree of any other course by completing the additional studies required in that course, but two baccalaureate degrees cannot be taken in one year. For a second bachelor's degree in the College of Letters and Science there are required one year's additional study and a special thesis.

The conditions on which the bachelor's degrees are given will be found stated under the appropriate colleges and courses on subsequent pages.

HIGHER DEGREES.

The University confers the degrees of Master of Arts, Master of Letters, and Master of Science upon graduates who have previously taken the degrees of Bachelor of Arts, Bachelor of Letters, and Bachelor of Science in the College of Letters and Science. The degree of Doctor of Philosophy is also granted. The conditions on which these degrees are given will be found stated under the Department of Graduate Study on page 50.

The higher degrees of Civil Engineer, Mechanical Engineer, and Electrical Engineer are conferred as second degrees in the College of Engineering. The degree of Master of Pharmacy is conferred as a second degree upon Graduates in Pharmacy and the degree of Master of Science in Pharmacy is given as a second degree to Bachelors of Science in Pharmacy.

The degree of Master of Science in Agriculture is conferred on Bachelors of Science in Agriculture.

The conditions on which these second degrees in the professional colleges are granted will be found stated under Department of Graduate Study and also under the head of the respective colleges.

HONORS

HONORS IN SPECIAL STUDIES.

Honors are given at graduation for special work of high order of excellence done in any department. Such honors will be voted by the Faculty to those students whose graduation theses show exceptional excellence and who have completed with unusual success a long course of study in the department in which the thesis is presented. The thesis must show work additional to all requirements for graduation equal to two hours per week for one year. Students desiring to become candidates for special honors in any department must make application to the Faculty at the opening of the second semester through the professor in whose department the honors are sought.

SCHOLARSHIPS.

The John A. Johnson Scholarships.

The University is indebted to the liberality of the Hon. John A. Johnson, of Madison, for ten scholarships of the annual value of about $35 each, established under the following conditions.

The sum received by one student in one year shall not exceed $50, nor the sum received during his college course exceed $200. Until the year 1900 the sum will be limited to students speaking one of the Scandanavian languages (Norse, Swedish, Danish, or Icelandic). No student can receive aid from this fund unless he has attended a common school one year, or has attended the University one year. The recipient of aid will be expected to return the money received by him to the fund, if he shall at any time be able to do so. The income of the fund will be dispensed by a committee of the Faculty. This committee consists of the President of the University and Professors Olson and Bull.

The Amelia H. Doyon Scholarships.

By the will of Mrs. Amelia H. Doyon, late of Madison, the University has received a gift of five thousand dollars, to be known as The Amelia H. Doyon Fund. The income from this fund is to be divided into two equal parts, to be designated as The Amelia H. Doyon Scholarships, which are to be given to two young women in attendance at the University, to be selected by the Faculty. In making this selection the Faculty is to take into consideration the scholarship or standing of the persons selected and their need of financial help. Neither of these scholarships are to be bestowed on any young woman who has not been in attendance as a student at the University of Wisconsin for at least one year.

An account of the Graduate Fellowships and Scholarships is given on later pages.

DEPARTMENT OF GRADUATE STUDY.

COMMITTEE ON GRADUATE STUDIES.

C. K. ADAMS, LL. D., President of the University.
C. F. SMITH, Ph. D., Professor of Greek and Classical Philology. *Chairman.*
E. A. BIRGE, Ph. D., Sc. D., Dean of the College of Letters and Science.
W. A. HENRY, Agr. B., Dean of the College of Agriculture.
R. T. ELY, Ph. D., LL. D., Director of the School of Economics, Political Science, and History.
J. C. FREEMAN, LL. D., Professor of English Literature.
D. C. JACKSON, C. E., Professor of Electrical Engineering.
EDWARD KREMERS, Ph. D., Professor of Pharmaceutical Chemistry.
W. H. ROSENSTENGEL, A. M., Professor of the German Language and Literature.
J. W. STEARNS, LL. D., Director of the School of Education.
C. A. VAN VELZER, Ph. D., Professor of Mathematics.
F. J. TURNER, Ph. D., Professor of American History.

ORGANIZATION.

The Graduate Department is organized for the encouragement of research at the University.

The University aims to afford adequate means for advanced study and research, and excellent facilities have already been provided along important lines. Personal assistance is rendered by professors to graduates according to individual needs. Classes for advanced students are organized and seminaries are conducted in which original research may be carried on.

The advanced studies of the various departments lead to graduate study. The preparation of theses by members of the senior class, and the courses of instruction leading to theses, are intended to foster the spirit of investigation and to serve as an introduction to research work. Under the opportunities for elective studies the undergraduate student is enabled to concen-

trate work upon a leading line of study for several years, whereby in his senior year he is enabled to do advanced work in certain classes designed for graduates and undergraduates.

Graduates from this University, or from other colleges and universities of recognized standing, and other advanced students suitably qualified, are permitted to become members of the graduate department.

The Regents of the University have established fellowships for the encouragement of graduate study; and in all of its departments the University furnishes abundant facilities for the publication of the results of original research. The laboratories and library facilities of the University, which are good in all lines, and are unexcelled in some directions, have been already described on preceding pages.

UNIVERSITY FELLOWSHIPS.

For the purpose of promoting higher scholarship and more extended original study than the academic courses afford, the Board of Regents has established ten University Fellowships of $400 each, of which two are specially devoted to Latin and Greek.

The following are the regulations respecting these fellowships:

1. Any fellowship to which the present regulations apply may be held by any graduate of a college of recognized standing or any one whose education is equivalent to that represented by a college degree. Those about to take such a degree are eligible as candidates, the regulations applying to the time of entrance upon the duties of the fellowship Men and women are equally eligible.

2. Fellowships will be granted upon application only; such application, with accompanying evidence of merit, attainment, and ability, to be in the hands of the President before May 1st of the collegiate year preceding that during which the fellowship is held.

3. All fellowships will be filled each year. Fellows may be reëlected for one additional year only.

4. Applications must be accompanied by evidence of scholarship, ability, and general worthiness; such as theses (whether prepared for this or other purposes), published writings, testimonials from instructors, outline of educational course pursued, special distinctions gained, and the like. Applications for reappointment should contain a full account of the work of the

preceding year. Applications to receive attention must contain a definite statement of the special studies which the applicant intends to pursue.

5. The fellowships will be assigned to the several departments according to the studies which the fellows intend to pursue.

6. Each fellow shall pursue his studies under the direction of the professor or professors in charge of his special studies. Assignment of University services to the fellows shall be made by the President in consultation with the head of the department to which the fellow has been assigned, and the work assigned may be equivalent to one hour of teaching daily, or the supervision of laboratory work for two hours daily.

7. At a meeting of the Faculty in the month of May (which meeting shall be duly announced as the meeting for the election of fellows), the President shall call upon the several heads of the departments in which applications have been received, to make a statement of the merits of the candidates in their departments; after all such statements have been made, the members of the Faculty will cast their ballots for as many candidates as there are fellows to be elected, and those receiving the highest number of votes (provided that each receive a majority of the votes cast) shall be recommended to the Board of Regents for appointment to fellowships.

Vacancies in fellowships due to resignation or other cause may be filled as they occur at the option of the Faculty.

HONORARY FELLOWSHIPS.

The Regents have established Honorary Fellowships, equal in number to the regular fellowships, and filled in a similar way. No compensation is attached to these positions except the remission of University fees, and no teaching service is required from these fellows. Persons who have held fellowships in the University and who desire to continue graduate studies after the expiration of the term of the fellowship may be elected to honorary fellowships. Candidates for fellowships qualified in every respect to hold a regular fellowship, who desire to devote all of their time to study rather than perform the teaching service required of regular fellows, may be elected honorary fellows; but no person is eligible to an honorary fellowship unless he is a graduate of at least one year's standing.

PHARMACEUTICAL FELLOWSHIPS.

Through the generosity of friends of the School of Pharmacy, funds have been provided for the following fellowships in pharmacy:

The August Uihlein Fellowship.

Mr. August Uihlein, of Milwaukee, has generously established a pharmaceutical fellowship on a financial basis of $400 per annum for two years. The holder of this fellowship during the year 1897-98 is Mr. Karl G. Hunkel, Ph. G., U. W. '94.

The United States Pharmacopoeia Research Fellowship.

In order to prepare the way for the decennial revision of the Pharmacopoeia in 1900, the Committee on Revision of the U. S. Pharmacopoeia has appointed a number of research committees. Since 1895 the work on volatile oils and their array has been assigned to the Professor of Pharmaceutical Chemistry, who has been provided with assistance for the experimental work. During the present year Miss M. M. James, Ph. G., '96, and Mr. J. A. Anderson, Ph. G., '97, have been appointed. A part of the work of another committee, of which Prof. H. H. Rusley of New York is chairman, is also being done in the School of Pharmacy this year, viz.: by Mr. R. H. Denniston, Ph. G., '97. This work is being done under the direct supervision of the Professor of Pharmacognosy.

UNIVERSITY SCHOLARSHIPS FOR GRADUATES.

Through the generosity of an alumnus two graduate scholarships of the value of $250 each are awarded annually in the literary departments of the University. One of these, called the "William F. Allen Graduate Scholarship," is held by Miss A. M. Pitman, a graduate of the Ancient Classical Course; the other, called the "J. C. Freeman Graduate Scholarship," is held by Miss A. S. McLenegan, a graduate of the English Course.

German Americans of the city of Madison, wishing to awaken and encourage a deeper interest in the study of German from an historical and comparative point of view, have provided for a University Graduate Scholarship in German Philology of the annual value of $250 for each of the collegiate years ending June, 1899, 1900, and 1901.

Applications for this scholarship, which will be available for the first time in June, 1898, ought to be made before May 1st, to the professor in charge of German philology in the University (at present Dr. Ernst Voss, Madison, Wis.)

UNIVERSITY PUBLICATIONS.

There are several series of publications issued by the University and published by the State under authority of law. From the Washburn Observatory there are issued the publications of the Washburn Observatory, of which there have thus far appeared nine volumes. From the College of Agriculture there are issued the Quarterly Bulletins, of which thus far sixty-five have appeared; the Annual Reports, now numbering fourteen, and the Bulletin of the Farmers' Institutes, of which eleven numbers have appeared.

Besides these the University issues four series of publications, known as Bulletins of the University of Wisconsin, of which the first number appeared in May, 1894. These are issued in four series, under the direction of a Committee of Publication consisting of:

Charles Kendall Adams, President of the University, with the following editors: William H. Hobbs (Chairman), Science; Nelson O. Whitney, Engineering, and Frederick J. Turner, Economics, Political Science, and History.

The following Bulletins have been already issued:

1. Economics, Political Science, and History Series; Volume 1, No. 1. The Geographical Distribution of the Vote of the Thirteen States on the Federal Constitution, 1787-8, by Orin Grant Libby, A. M., Fellow in History, with an introduction by Frederick J. Turner. Pp. 116, pls. 2. July, 1894. No. 2. The Finances of the United States from 1775 to 1789, with Especial Reference to the Budget, by Charles J. Bullock, A. B., Fellow in Economics. Pp. 157, June, 1895. No. 3. The Province of Quebec and the Early American Revolution. A study in English-American Colonial History, by Victor Coffin, Ph. D., Assistant Professor of European History. Pp. 307, June, 1896.

Volume 2, No. 1. New Governments West of the Alleghenies since 1780, by George Henry Alden, Ph. D., recently Fellow in History, University of Wisconsin, Acting Assistant Professor of History, University of Illinois. Pp. 74. April, 1897. Price, 50 cents.

In preparation:

Municipal History and Organization of the City of Chicago, by Samuel Edwin Sparling, Ph. D., Assistant in Political Science, University of Wisconsin.

2. Science Series. Vol. I., No. 1. On the Speed of Liberation of Iodine in Solutions of Hydrochloric Acid, Potassium Chlorate, and Potassium Iodide, by Herman Schlundt, Assistant in Chemistry. Pp. 33, December, 1894. No. 2. On the Quartz Keratophyre and Associated Rocks of the North Range of the Baraboo Bluffs, by Samuel Weidman. Pp. 21, pls. 3, January, 1895. No. 3. Studies in Spherical and Practical Astronomy, by George C. Comstock, Director of the Washburn Observatory. Pp. 50, June, 1895. No. 4. A Contribution to the Mineralogy of Wisconsin, by William Herbert Hobbs, Assistant Professor of Mineralogy and Petrology. Pp. 48, pls. 5, June, 1895. No. 5. Analytic Keys to the Genera and Species of North American Mosses, by Charles Reid Barnes, Professor of Botany, and Fred DeForest Heald, recently Fellow of Botany. Pp. 211, January, 1897.

In preparation:

On the Action of Dilute Electrolytes on the Sense of Taste, by Louis Kahlenberg, Ph. D., Instructor in Physical Chemistry and Lecturer on Pharmaceutical Technique, University of Wisconsin.

3. Philology and Literature Series.

In press:

The Development of American Literature from 1815 to 1833, by William B. Cairns, Ph. D., Instructor in Rhetoric, University of Wisconsin.

4. Engineering Series; Volume I. No. 1. Track, by L. F. Loree, M. Am. Soc. C. E., Special University Lecturer. Pp. 24, April, 1894. No. 2. Some Practical Hints in Dynamo Design, by Gilbert Wilkes, M. Am. Inst. E. E., Special University Lecturer. Pp. 16, May, 1894. No. 3. The Steel Construction of Buildings, by C. T. Purdy, C. E., Special University Lecturer. Pp. 27, October, 1894. No. 4. The Evolution of a Switchboard, by A. V. Abbott, C. E., Special University Lecturer. Pp. 32, pls. 4, October, 1894. No. 5. An Experimental Study of Field Methods Which Will Insure to Stadia Measurements Greatly Increased Accuracy, by Leonard Sewell Smith, B. C. E., In-

structor in Engineering. Pp. 45, pl. 1, May, 1895. No. 6. Railway Signaling, by W. McC. Grafton, C. E. Special University Lecturer. Pp. 38, July, 1895. No. 7, Emergencies in Railroad Work, by L. F. Loree, M. Am. Soc. E., Special University Lecturer. Pp. 42, December, 1895. No. 8. Electrical Engineering in Modern Central Stations, by Louis A. Ferguson, A. B., Special University Lecturer. Pp. 33, April, 1896. No. 9. The Problem of Economical Heat, Light, and Power Supply for Building Blocks, School Houses, Dwellings, etc., by G. Adolph Gerdtzen, B. S., Alumni Fellow in Engineering. Pp. 69, May, 1896. No. 10. Topographical Surveys, their Methods and Value, by J. L. Van Ornum, C. E., Special University Lecturer. Pp. 39, January, 1897.

Volume II. No. 1. A. Complete Test of Modern American Transformers of Moderate Capacity, by Arthur Hillyer Ford, B. S., Fellow in Electrical Engineering, with an Introduction by Professor D. C. Jackson. Pp. 88, August, 1896. No. 2. A. Comparative Test of Steam Injectors, by George Henry Trautmann, B. S., with an Introduction by Professor Storm Bull. Pp. 34. June, 1897. Price, 25 cents.

In preparation:

The Superintendent of Bridges and Buildings, by Onward Bates, C. E., M. Am. Soc. C. E., M. Inst. C. E., Superintendent of Bridges and Buildings, C. M. & St. P. Ry.

The University thus makes ample provision for the publication of original work in investigation done by members of the Faculty or by advanced students. In addition to these publications of the University, there are published in Madison the Proceedings of the State Historical Society and the Transactions of the Wisconsin Academy of Sciences, Arts, and Letters, in which may appear the results of investigation in lines indicated by the names of the Societies.

HIGHER DEGREES.

SECOND DEGREES.

The degrees of Master of Arts, Master of Letters, and Master of Science are conferred upon graduates of the University who have previously taken the degrees of Bachelor of Arts, Bachelor of Letters, and Bachelor of Science, respectively, and who, after

graduation, have pursued an approved course of study equivalent to the work of one year of graduate studies in the University and who present a satisfactory thesis upon the leading subject pursued. Students who desire to do part of their work for the Master's degree by correspondence, or *in absentia*, may accomplish by either of these methods not more than half of the work required for the degree. At least one semester must be spent in residence at the University.

The work must consist of one major and one minor subject, must be in the general line of advanced study implied by the degree sought, and must be approved by the Committee on Graduate Studies. Two-thirds of this study must be devoted to the major subject and one-third to the minor. Study for a profession will not be accepted, but original investigation in connection with a profession, or special and scholarly study collateral to it, may be accepted, in the discretion of the Faculty. A thesis showing creditable original research must be presented at least one month before the close of the academic year, and if the thesis is satisfactory an examination will be conducted by a committee of the Faculty on the major and minor subjects.

Graduates of this or of similar institutions who pursue the course in law at the University, and who, by reason of their superior training, are able to take additional studies advantageously, may receive a second degree on graduation from the Law School on condition of having satisfactorily pursued graduate studies in the College of Letters and Science equivalent to five hours a week during two years of their course, and by conforming to the other required conditions.

The degrees of Civil Engineer, Mechanical Engineer, Mining Engineer, Metallurgical Engineer, and Electrical Engineer are conferred as second degrees upon Bachelors of Science in the Civil, Mechanical, Mining, and Metallurgical, and Electrical Engineering Courses respectively, (1) who pursue advanced professional study at the University for one year, and present a satisfactory project or thesis; or (2) who furnish suitable evidence of three years of professional work (of which one must be spent in a position of responsibility) and present a satisfactory thesis.

The degree of Master of Pharmacy will be conferred upon Graduates in Pharmacy who satisfactorily complete a course of one full year at the University in advanced pharmacy, or in some science or sciences specially allied to pharmacy, and who shall present a satisfactory thesis embodying the results of original investigation.

The degree of Master of Science in Pharmacy will be conferred upon Bachelors of Science in Pharmacy, under conditions similar to those required for second degrees in the College of Letters and Science.

The University offers its higher degrees to graduates of other institutions of high standing who shall reside at the University and pursue the requisite studies under the immediate direction of the Faculty.

THIRD DEGREES.

The degree of Doctor of Philosophy will be conferred upon successful candidates after three years of graduate study, of which the last year or the first two years must be pursued at this University. This degree will not, however, be conferred simply on the ground of the completion of study for the prescribed length of time. Special attainments are requisite; particularly the power of original thought and independent investigation. The candidate will be examined on three subjects, one major and two minors, which must be approved by the Committee on Graduate Studies not later than the beginning of the year in which the candidate expects to take the degree. A thesis must be presented which shall give evidence of original research and independent treatment. The applicant must announce himself as a candidate at least as early as the beginning of his last year of study, and his thesis must be placed in the hands of the Committee on Graduate Studies at least two months before the close of the academic year. The subject of the thesis must have the approval of the head of the department in which the major subject is carried on as early as November 1st of the collegiate year in which the candidate expects to take his degree.

In case the candidate is successful, he is required to put his thesis into print and deposit one hundred copies of the same in the Library of the University. If the thesis is printed in some journal, or as a Bulletin of the University, reprints therefrom will be accepted by the Librarian, but these must be provided with a special cover in proper thesis form. The diploma may be conferred before the thesis is printed, provided a written or typewritten copy is deposited with the Librarian, and the sum of fifty dollars with the Secretary of the Board of Regents. The money will be refunded on presentation of the printed copies.

All candidates for this degree must have a reading knowledge of French and German at least one year before the degree is conferred.

COURSES OF INSTRUCTION FOR GRADUATES.

In each of the departments of the University, graduate courses of instruction are offered, to which the courses offered for graduates and undergraduates of suitable attainments serve as an introduction. These courses are described in subsequent pages under the heading, Departments of Study, in the College of Letters and Science, College of Engineering, College of Agriculture, and School of Pharmacy. A brief reference is given here to these courses to enable a student to form some idea of the range and extent of graduate work.

In most departments the graduate courses change from year to year so that a consecutive course of graduate study can be elected, extending over two or three years.

COLLEGE OF LETTERS AND SCIENCE.

Philosophy.

Professor Stearns: Course 7, History of Philosophy; Course 9, The Philosophy of Modern Science.

Professor Jastrow: Course 2, Experimental Psychology; Course 4, Comparative Psychology; Course 5, Abnormal Psychology; Course 3, Research in Psychology.

Assistant Professor Sharp: Course 11, Readings in German Philosophy; Course 10, The Theory of Cognition; Course 15, Advanced Ethics.

The Philosophical Seminary, conducted by all the instructors in the department, is open to graduates and undergraduates of suitable attainments.

Pedagogy.

Professor Stearns: Course 2, School Supervision; Course 4, The Herbartian Pedagogy; Course 6, Problems in Applied Psychology.

Professor O'Shea: Course 13, Educational Psychology and Methods of Teaching. Course 14. Practice-Teaching. Course 15, Seminary.

In the School of Economics, Political Science, and History the following courses are offered:

Economics.

Professor Ely: Course 12, the Distribution of Wealth; Course 11, History of Economic Thought; Course 16, Public Finance; Course 17, American Public Finance.

Professor Scott: Course 13, Theories of Value; Course 14, Theories of Rent, Wages, Profit and Interest; Course 15, Theories of Production and Consumption.

Professors Ely and Scott: Economic Seminary. For 1898 the subject will be Recent Development of Economic Theory.

Sociology.

Dr. Meyer: Course 2, Historical Survey of Sociological Thought; Course 10, Seminary in Sociology.

Political Science.

Professor Parkinson: Course 12, Comparative Constitutional Law; Course 18, International Law.

Dr. Reinsch: Course 5, Introduction to the History of European Law; Course 8, History of Political Thought.

Dr. Sparling: Course 15, Comparative Administrative Law; Course 13, Municipal Government in Europe and the United States.

Professor Parkinson, Dr. Sparling, and Dr. Reinsch: Course 19, Political Science Seminary.

History.

Professor Turner: Course 13, Economic and Social History of the United States; Course 12, Constitutional and Political History of the United States, Colonial Period to War of 1812. Course 21, Seminary in American History.

Professor Haskins: Course 17, Methods of Research and Criticism; Course 18, Paleography and Diplomatics; Course 19, Seminary in Mediaeval History.

Assistant Professor Coffin: Course 20, Seminary in Modern European History.

A historical conference for graduates is held fortnightly throughout the year.

Greek.

Professor Smith: Course 11, Greek Seminary, the year being given to the study of Thucydides; Course 12, State Antiquities; Course 13, Greek Drama and Scenic Antiquities (Seminary); Course 14, Lyric Poetry (Seminary); (Courses 13, 14, omitted 1897-98.) Course 16, Journal Club (with other Classical Professors). The subject of the Seminary changes from year to year.

Assistant Professor Laird; Course 15, Greek Dialects (Seminary); Course 17, Comparative Greek Grammar; Course 3, Comparative Latin Grammar; Course 5, Sanskrit.

Latin.

Professor Slaughter: Course 13, Latin Seminary; the Roman Drama.

Assistant Professor Laird: Course 12, Latin Grammar.

Assistant Professor Emery: Course 14, Latin Syntax.

Hebrew.

Professor Williams: Graduate courses in Hebrew, Arabic, and Hellenistic Greek.

German.

Professor Rosenstengel: Course 11, Faust; The History of German Literature; Course 13, Seminary, for those intending to become teachers of German; Courses 14-16, German Literature.

Assistant Professor Voss: German Philology; Course 7, Language and Literature of the Sixteenth Century; Course 8a, Modern Low German; Course 9a, Middle Low German; Course 9b, Old Saxon; Course 10, Philological Seminary.

French.

Professor Owen: Course 11, The Principles of Language.

Assistant Professor Giese: Course 12, French Literature, XVI.-XIX. Centuries.

Miss Gay: Course 13, Philology of the Oldest French Literature.

Scandinavian.

Professor Olson: Course 4, Old Norse or Icelandic.

English.

Professor Freeman: Course 12, Shakespeare; Course 19, English literature Seminary, given in 1898-99 to Lowell and Emerson.
Associate Professor Hubbard: Course 3, Beowulf; Course 5, Philology Seminary.

Mathematics.

Professor Van Velzer: Course 9, Differential Equations; Course 11, Analytic Geometry of Two Dimensions; Course 15, Analytic Geometry of Three Dimensions; Course 22, Theory of Numbers.
Professor Slichter: Course 18, Partial Differential Equations of Mathematical Physics. Course 19, Hydrodynamics.
Assistant Professor Skinner: Course 16, Quaternions; Course 21, Theory of Substitutions.
Dr. Dowling: Course 6, Elliptic Functions; Course 8, Advanced Calculus; Course 10, Trigonometry.

Chemistry.

Professor Daniells: Advanced Inorganic Chemistry.
Assistant Professor Hillyer: Advanced Organic Chemistry.
Dr. Kahlenberg: Physical Chemistry.
See also Professor Kremers' courses under School of Pharmacy.

Physics.

Professor Snow and Assistant Professor Austin: Course 12, Graduate Study in Theoretical and Practical Physics.
Professor Davies: Course 10, Mathematical Theory of Sound; Course 11, Mathematical Theory of Electricity; Course 12, Mathematical Physics.
Assistant Professor Austin: Course 7, Introduction to Mathematical Physics.

Astronomy.

Professor Comstock offers at the Washburn Observatory abundant facilities for research work.

Geology.

Professor Van Hise: Course 5, Physical Geology and Pre-Cambrian Geology; Course 6, Principles of Metamorphism.
Assistant Professor Clements: Course 4, Paleontology.

Assistant Professor Hobbs. Course 3, Advanced Petrology.
Professor Van Hise and Assistant Professor Hobbs: Course 7, Investigation of Pre-Cambrian Areas of Wisconsin.

Biology.

Professor Birge: Course 11, Advanced Invertebrate Zoology, and special work in the investigation of lake life.
Professor Barnes: Course 18, Vegetable Physiology; Course 19, Bryology.
Professor Russell: Course 34, Advanced Bacteriology.
Assistant Professor Miller: Course 8, Advanced Histology.
Assistant Professor Marshall: Course 10, Invertebrate Embryology; Course 11, with Professor Birge.
Assistant Professor Cheney: Course 22, Advanced Vegetable Anatomy.
Assistant Professor True: Course 23, Plant Ecology. Course 24, Physiology of Certain Plant Constituents.

Opportunity for research work is offered in the Summer School.

COLLEGE OF MECHANICS AND ENGINEERING.

The laboratories of the College of Mechanics and Engineering are well equipped for advanced investigation in industrial branches, and encouragement is given to students of the College who desire to do work of research.

The following lecture and laboratory courses are offered to graduate students:

Pure and Applied Mechanics.

Assistant Professor Maurer: Course 6, Graphics; Course 8, Advanced Course in Strength of Materials.
Assistant Professor Richter: Course 7, Testing Materials.

Topographical and Geodetic Engineering.

Assistant Professor Smith: Courses 6 and 7, Advanced Geodesy; Course 8, Advanced Topography.

Railway Engineering.

Professor Whitney: Course 4, Railway Economics; Course 5, Railway Standards.

Municipal Engineering.

Professor Turneaure: Course 3, Design of Water Supply and Sewerage Systems; Course 6, Biology of Water Supplies.
Professor Whitney: Course 4, Roads and Pavements.

Steam Engineering.

Professor Bull: Course 9, Advanced Design.
Assistant Professor Richter: Course 11. Advanced Laboratory Work.

Electrical Engineering.

Professor Jackson: Courses 4, 6, 7, and 9, Theory and Application, Alternating Currents, and the Electrical Transmission of Power.
Assistant Professor Fortenbaugh: Courses 6a and 9, Electric Railways; Course 9, Dynamo Design.
Mr. Burgess: Course 2, Applied Electro-Chemistry; Course 5, Electric Light and Transmission of Power; Course 10, Graduate Conference for the consideration of Engineering problems.
Reading and research.

Structural Engineering.

Professor Turneaure: Course 7c, Swing Bridges; Course 8, Bridge Specifications and Construction.

Machine Design.

Professor Jones: Courses 6 and 8, Advanced Designing.

COLLEGE OF AGRICULTURE.

In the College of Agriculture research work is offered to graduates and undergraduates of suitable preparation in all the lines of study carried on at the Experiment Station. Work is constantly in progress in the various directions of Animal Husbandry, Dairy Husbandry, Agricultural Chemistry, Soil Physics, Bacteriology, and Horticulture, and ample opportunities are offered for students desiring to take part in these investigations or to carry on other studies along similar lines.

SCHOOL OF PHARMACY.

Professor Kremers: Course 5, The polyatomic alcohols of the paraffin series and their derivatives, with special reference to the chemistry of sugars and glucosides. Course 6, Hydrocymenes and derivatives, with special reference to the chemistry of volatile oils. (1897-8.)

Course 4, Nitrogen derivatives of the carbon compounds, preparatory to the study of alkaloids and ptomaines. (1898-99.)

Course 7, Advanced laboratory work. Adapted to the individual.

Assistant Professor Cheney: Advanced Vegetable Anatomy.

Assistant Professor True: Course 1, Plant Ecology; Course 2, Physiology of certain plant constituents.

EXPENSES.

The expenses for graduate students are the same as those for undergraduates. The tuition of students not residents of Wisconsin is $9.00 per semester. The general incidental fee is $6.00 per semester. The cost of board in clubs is from $2.00 to $2.50 per week; in private families from $2.50 to $4.00 per week. Students working in the laboratories are required to pay a fee to cover the cost of materials and instruments used by them. A list of these charges and deposits will be found under the head of Charges and Fees, on pages 74-78.

COLLEGE OF LETTERS AND SCIENCE.

STAFF OF INSTRUCTION.

C. K. ADAMS, LL. D., President of the University.
E. A. BIRGE, PH. D., SC. D., Dean and Professor of Zoology.
L. W. AUSTIN, PH. D., Assistant Professor of Physics.
C. R. BARNES, PH. D., Professor of Botany.
J. C. W. BROOKS, Professor of Military Science and Tactics.
L. S. CHENEY, M. S., Assistant Professor of Pharmaceutical Botany.
J. M. CLEMENTS, PH. D., Assistant Professor of Geology.
VICTOR COFFIN, PH. D., Assistant Professor of European History.
G. C. COMSTOCK, PH. B., LL. B., Professor of Astronomy.
W. W. DANIELLS, SC. D., M. S., Professor of Chemistry.
J. E. DAVIES, A. M., M. D., LL. D., Professor of Electricity and Magnetism and Mathematical Physics.
J. C. ELSOM, M. D., Professor of Physical Culture.
R. T. ELY, PH. D., LL. D., Professor of Political Economy.
ANNIE C. EMERY, PH. D., Assistant Professor of Classical Philology.
D. B. FRANKENBURGER, A. M., Professor of Rhetoric and Oratory.
J. C. FREEMAN, LL. D., Professor of English Literature.
W. F. GIESE, A. M., Assistant Professor of Romance Languages.
C. H. HASKINS, PH. D., Professor of Institutional History.
H. W. HILLYER, PH. D., Assistant Professor of Organic Chemistry.
W. H. HOBBS, PH. D., Assistant Professor of Mineralogy and Petrology.
F. G. HUBBARD, PH. D., Associate Professor of English Philology.
JOSEPH JASTROW, PH. D., Professor of Experimental and Comparative Psychology.
ALEXANDER KERR, A. M., Professor of the Greek Language and Literature.
A. A. KNOWLTON, A. M., Assistant Professor of Rhetoric.
A. G. LAIRD, PH. D., Assistant Professor of Ancient Languages.
W. S. MARSHALL, PH. D., Assistant Professor of Zoology.
W. S. MILLER, M. D., Assistant Professor of Vertebrate Anatomy.

J. E. Olson, B. L., Professor of the Scandinavian Languages and Literature.

M. V. O'Shea, B. L., Professor of the Science and Art of Teaching.

E. T. Owen, A. B., Professor of the French Language and Literature.

F. A. Parker, Professor of Music.

J. B. Parkinson, A. M., Professor of Constitutional and International Law.

W. H. Rosenstengel, A. M., Professor of the German Language and Literature.

H. L. Russell, Ph. D., Professor of Bacteriology.

W. A. Scott, Ph. D., Professor of Economic History and Theory.

F. C. Sharp, Ph. D., Assistant Professor of Philosophy.

E. B. Skinner, A. B., Assistant Professor of Mathematics.

M. S. Slaughter, Ph. D., Professor of Latin.

C. S. Slichter, M. S., Professor of Applied Mathematics.

C. F. Smith, Ph. D., Professor of Greek and Classical Philology.

B. W. Snow, Ph. D., Professor of Physics.

H. A. Sober, A. B., Assistant Professor of Latin.

J. W. Stearns, LL. D., Professor of Philosophy and Pedagogy.

F. J. Turner, Ph. D., Professor of American History.

C. R. Van Hise, Ph. D., Professor of Geology.

C. A. Van Velzer, Ph. D., Professor of Mathematics.

E. K. J. H. Voss, Ph. D., Assistant Professor of German Philology.

W. H. Williams, A. B., Professor of Hebrew and Hellenistic Greek.

Katherine Allen, M. A., Assistant in Latin.

V. H. Bassett, A. B., Assistant in Chemistry.

Arthur Beatty, Ph. D., Instructor in Rhetoric.

W. B. Cairns, Ph. D., Instructor in Rhetoric.

W. G. Caskey, A. B., Instructor in Elocution.

J. E. Davies, Student Assistant in Gymnastics.

L. W. Dowling, Ph. D., Instructor in Mathematics.

W. D. Frost, M. S., Instructor in Bacteriology.

Lucy M. Gay, B. L., Instructor in French.

E. D. Jones, Ph. D., Instructor in Statistics and Economics.

Louis Kahlenberg, Ph. D., Instructor in Physical Chemistry.

F. T. Kelly, B. S., Instructor in Hebrew and Hellenistic Greek.

O. G. Libby, Ph. D., Instructor in History.

A. T. Lincoln, B. S., Assistant in Chemistry.

Abby S. Mayhew, Instructor in Physical Culture.

F. W. Meisnest, B. S., Instructor in German.

B. H. MEYER, PH. D., Instructor in Sociology.
F. B. PETERSON, Student Assistant in Gymnastics.
J. F. A. PYRE, PH. D., Instructor in English Literature.
P. S. REINSCH, Ph. D., LL. B., Instructor in Political Science.
HARRIET T. REMINGTON, M. L., Instructor in German.
THEODORE RUNNING, M. S., Assistant in Mathematics.
A. R. SEYMOUR, M. L., Assistant in French.
C. H. SHANNON, PH. D., Instructor in Greek and Sanskrit.
H. D. SLEEPER, Instructor in Music.
C. M. SMITH, B. S., Assistant in Physics.
GRANT SMITH, B. S., Assistant in Botany.
S. E. SPARLING, PH. D., Assistant in Political Science.
SUSAN A. STERLING, M. L., Instructor in German.
G. W. WILDER, B. S., Assistant in Physics.
R. W. WOOD, A. B., Instructor in Physics.

ADMISSION TO THE UNIVERSITY.

I. EXAMINATIONS AT THE UNIVERSITY.

The regular examinations of the University are two in number; one in June and one in September. The earlier one is intended for those who wish to be examined while fresh from their preparatory studies and thus to set at rest all doubts as to their admission; and for those who wish to test their qualifications at an early date that they may have time to make up deficiencies if necessary. The September examination immediately precedes the opening of the fall term.

For the current year the earliest examinations will be held on Thursday and Friday, June 16th and 17th, beginning at 9 o'clock A. M. The later examinations will be held on Tuesday and Wednesday, September 27th and 28th, beginning at 9 o'clock A. M. Students who are in any doubt as to their qualifications are urged to present themselves in June. All candidates are required to be present at 9 o'clock on the first day of the examinations.

Examinations will also be held on Thursday and Friday, February 9 and 10, 1899.

The examinations will cover the following topics:

GROUP I. *Subjects required of all candidates:*

a. GEOGRAPHY, political and physical.

b. HISTORY OF THE UNITED STATES: Channing, Thomas, Johnston, Montgomery (students), or an equivalent.

c. ARITHMETIC.

d. ALGEBRA: Addition, subtraction, multiplication, division, equations of the first degree with one unknown number, simultaneous equations of the first degree, factors, highest common factor, lowest common multiple, quadratic equations, simultaneous equations above the first degree, theory of indices (positive, negative, fractional, and zero), and radicals.

GEOMETRY: Plane and solid geometry. In solid geometry special attention should be given to the geometry of the sphere.

e. ENGLISH IN GENERAL: No pupil will be accepted in English whose written work is notably deficient in point of *spelling, punctuation, idiom,* or *division into paragraphs.*

f. ENGLISH COMPOSITION: 1. The candidate will be required to write two essays of not less than two hundred words each, on subjects chosen by himself from a considerable number—perhaps ten or fifteen—set before him in the examination paper, and one of the topics chosen must be taken from the books assigned for general reading under English Literature.

2. In place of the essay on the topic drawn from the books set for general reading, the candidate will be allowed to offer an exercise book containing the first draft of essays written during his preparatory course, on topics taken from the works prescribed for general reading. These essays must be written under the eye of the teacher without consulting the books from which the subjects are taken, and without other assistance, must be kept in the care of the teacher, and sent by him to the examiner at least one week before the date of the entrance examination, with his certificate that they have been written in accordance with these requirements.

g. ENGLISH LITERATURE. The following lists include (1) a series of books for general reading, which may also be used as a basis for work in English Composition; (2) a limited number of masterpieces for thorough study. In addition to the essays called for under the head of *English Composition,* there will be required such further tests as seem suited to secure a careful reading of all the books prescribed in series (1). The written statement of the teacher will be sufficient, in general, for this purpose. In the case of the books set for more thorough

study, the candidate will be examined on subject-matter, form, and substance, and the examination will be of such a character as to require a thorough study of each of the works named, in order to pass it sucessfully.

I. For General Reading and Composition work:

1898—Milton's Paradise Lost, Books I. and II.; Pope's Iliad, Books I. and XXII.; The Sir Roger de Coverley Papers in The Spectator, Goldsmith's The Vicar of Wakefield, Coleridge's Ancient Mariner, Southey's Life of Nelson, Carlyle's Essay on Burns, Lowell's Vision of Sir Launfal, Hawthorne's The House of the Seven Gables.

1899—Pope's Translation of the Iliad (Books I., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, De Quincey's Flight of a Tartar Tribe, Cooper's Last of the Mohicans, Lowell's Vision of Sir Launfal, Hawthorne's House of the Seven Gables.

1900—Pope's Translation of the Iliad (Books I., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, Scott's Ivanhoe, De Quincey's Flight of a Tartar Tribe, Cooper's Last of the Mohicans, Tennyson's Princess, Lowell's Vision of Sir Launfal.

1901—George Eliot's Silas Warner, Pope's Translation of the Iliad (Books I., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, Scott's Ivanhoe, Shakespeare's Merchant of Venice, Cooper's Last of the Mohicans, Tennyson's Princess, Coleridge's Rime of the Ancient Mariner.

1902—The same as for 1901.

2. For thorough study.

1898—Shakespeare's Macbeth, Burke's Speech on Conciliation with America, De Quincey's The Flight of a Tartar Tribe, Tennyson's The Princess.

1899—Shakespeare's Macbeth, Milton's Paradise Lost (Books I. and II.), Carlyle's Essay on Burns, Burke on Conciliation with America.

1900—Shakespeare's Macbeth, Milton's Paradise Lost (Books I. and II.), Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

1901—Shakespeare's Macbeth, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas, Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

1902—Shakespeare's Macbeth, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas, Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

ENGLISH GRAMMAR. There is included in the requirement for entrance a knowledge of the leading facts of English Grammar, and tests of such knowledge will be made a part of the examination.

GROUP II. *Requirements for Admission to the Ancient Classical Course.*

a. The studies enumerated in Group I.

b. LATIN: Grammar and Elementary Book (Collar and Daniell, Tuell and Fowler, Harkness); Cæsar, four books or an equivalent amount of Nepos, Cæsar (at least two books) and selections; Cicero, seven orations (selections from the letters as given, for example, in Kelsey's edition, may be substituted for two orations); Virgil, six books; Composition (preferably in connection with Cæsar and Cicero, as for example in Daniell's Exercises in Latin Composition).

c. GREEK: Grammar; Lessons; Xenophon's Anabasis, four books; Homer's Iliad, three books or an equivalent amount of Xenophon's prose; Greek composition.

d. ANCIENT HISTORY: Myers' and Allen's Ancient History; Myers' Ancient History or a substantial equivalent.

e. ENGLISH HISTORY: Gardiner's English History for Schools, or Montgomery's Reading Facts of English History.

Students prepared to enter the Modern Classical Course may be admitted as freshmen to the Ancient Classical Course and graduate with the degree of Bachelor of Arts on the following conditions: They shall take elementary Greek five times per week during the Freshman year; continue Greek during Sophomore and Junior years and complete all the other requirements of the Ancient Classical Course.

GROUP III. *Requirements for Admission to the Modern Classical Course.*

a. The studies enumerated in Group I.

b. LATIN as stated in Group II., b.

c. HISTORY as stated in Group II., d., e.

d. GERMAN: Correct pronunciation, the essentials of grammar (Collar-Eysenbach's, Joynes-Meissner's, Whitney's, or an equivalent), and the ability to apply them (two terms'

work); acquisition of a vocabulary sufficient to enable students to read and translate sixty reading lessons in any standard reader correctly and understandingly; practice in the oral use of German in connection with the reading lessons, and the memorizing of from 9 to 12 German poems (two terms' work), and the careful study of at least two plays, as Minna von Barnhelm, Der Neffe als Onkel, or Die Journalisten (two terms' work).

GROUP IV. *Requirements for Admission to the Civic Historical Course.*

a. The studies enumerated in Group I.
b. LATIN as stated in Group II., b.
c. HISTORY as stated in Group II., d., e.
d. One of the following:
   1. German as stated in Group III., d., or
   2. Science as stated in Group V., c., d., e.; or
   3. English literature as stated in Group VI., c.; and Physics as stated in Group V., c.

GROUP V. *Requirements for Admission to the General Science Course, to all the Courses in Engineering, and to the Four Year's Pharmacy Course.*

a. The studies named in Group I.
b. GERMAN as stated in Group III., d., or an equivalent amount of French.
c. PHYSICS: Carhart and Chute, Gage, or Avery, with laboratory work.
d. PHYSIOLOGY: Martin's The Human Body (briefer course).
e. BOTANY: Two terms' study required, of which at least 60 hours shall be laboratory work devoted to the anatomy and physiology of plants. It is urged that part of this time be given to a study of cryptogams. For entrance in 1898-99 and thereafter a knowledge of the main groups of cryptogams will be required.
f. ADAPTIVE WORK, amounting to one daily recitation for two years.

This may consist of various subjects. The University advises:

1. Two years' daily work in French or Latin; or,
2. One year's work in history, equivalent to that stated in Group II., d., e., and

One year's work in English literature, as stated in Group V., c.

If these studies cannot be taken, a selection from the following studies may be offered:

3. Rhetoric, civil government, mental science, theory and art of teaching, zoology, astronomy, or other science. No subject can be offered which has been pursued in high school for a shorter time than twelve weeks, or which is less in amount than a standard high school text-book on the subject. The total amount offered must be equivalent of a daily recitation for two years. The two years' work may be made up of these studies in any combinations, under the conditions stated above.

GROUP VI. *Requirements for Admission to the English Course.*

a. The studies named in Group I.

b. HISTORY as prescribed in Group II., d., e.

c. ENGLISH LITERATURE: A brief outline of the History of the English Literature. Careful study of representative writers. For the outline history there may be substituted a study of Gayley's Classic Myths in English Literature. The whole to be equal to a daily recitation for one year.

d. SCIENCE as prescribed in Group V., c., d., e.

e. ADAPTIVE WORK as stated in Group V., f.

Students entering this course are advised to present either Latin, French, or German as their adaptive work. Candidates not presenting any foreign language are urged to make a thorough review of English grammar. Experience has shown that a not inconsiderable number of students fail in French and German at the University from deficient preparation in English grammar.

Real equivalents will be accepted for the requirements given above. Students desiring admission into any course must present those requirements which are essential to the work of the course.

Admission of Special Students.

Candidates under twenty-one years of age desiring to take special courses are required to present the same qualifications as candidates for one of the regular courses.

Persons twenty-one years of age, who are not candidates for a degree, and who wish to take special studies, are permitted to do so upon giving satisfactory evidence that they are prepared to take the desired studies advantageously. If they sub-

sequently desire to become candidates for a degree, or to take a regular course, they must pass the required entrance examinations.

II. Admission Upon Certificate.

ACCREDITED SCHOOLS.—Any high school or academy whose course of instruction covers the branches requisite for admission to one or more of the courses of the University may be admitted to its accredited list of preparatory schools after a satisfactory examination by a committee of the Faculty. Application for such an examination may be made by an officer of the school to the President of the University, on the basis of which a committee of the Faculty will examine the course of study and the methods of instruction in the school, and on their favorable recommendation and the concurrence of the Faculty it will be entered upon the accredited list of the University. No school will be placed upon the list whose course of study is not fully equal to the four-year course of high schools recommended by the State Superintendent. The *graduates* of such an approved school will be received by the University, on presentation of a proper certificate, into any of its courses for which they have been fitted. Students of an accredited school who are not graduates must expect to be examined on the same terms as other candidates.

The University desires to keep itself fully informed regarding the work of its accredited schools by means of annual reports and frequent inspections. Every accredited school is required to report each year concerning its teachers, course of study, methods of instruction, and material equipment. Blank forms are furnished by the University for this purpose. Where the teaching force of a school remains unchanged, reinspection must be invited once in three years, or more frequently if the University is not satisfied with the condition of the school or the results of its work. Upon a change in the instructional force, application should be made for reinspection if the school desires to remain on the accredited list. If the work of the new teacher or teachers has been recently examined in connection with some other school, a new examination may not be required, but an examination should in all cases be invited. The necessary expenses attending the visit of the examining committee are met by the University.

Principals of accredited schools are requested to note the statements regarding English, German, Latin, and adaptive work under Terms of Admission; and especial attention is called to the examination of freshmen in English as stated on p. 81.

ACCREDITED SCHOOLS.

For All Courses.

SCHOOL.	PRINCIPAL.
Ashland,	J. T. HOOPER.
Austin (Ill.)	B. F. BUCK.
Beaver Dam: Wayland Academy,	
Beloit,	F. E. CONVERSE.
Chicago High Schools,	A. G. LANE.
Chicago: Harvard School,	J. J. SCHOBINGER, J. C. GRANT.
Davenport (Iowa),	H. H. ROBERTS.
Delafield: St. John's Military Academy	REV. S. T. SMYTHE.
Des Moines (Iowa); West	W. O. RIDDELL.
Detroit (Mich.): School for Boys,	FREDERICK WHITTON.
Dubuque, (Iowa),	F. H. SMART.
Faribault (Minn.): Shattuck School,	JAMES DOBBIN.
Fond du Lac,	L. A. WILLIAMS.
Fond du Lac: Grafton Hall,	B. TALBOT ROGERS.
Hillside Home School,	ELLEN C. LLOYD-JONES JANE LLOYD-JONES.
Janesville,	D. D. MAYNE.
La Crosse,	W. R. HEMMENWAY.
Lake Forest (Ill.): Lake Forest Academy,	A. G. WELCH.
Madison,	J. H. HUTCHINSON.
Madison: Wisconsin Academy,	CHARLOTTE RICHMOND.
Marinette,	GUY E. MAXWELL.
Milwaukee: East Side,	A. J. ROGERS.
Milwaukee: South Side,	S. A. HOOPER.
Milwaukee: West Side,	C. E. MCLENEGAN.
Milwaukee Academy,	JULIUS H. PRATT, JR.
Milwaukee-Downer Col.; Seminary Dep't.,	MISS E. C. SABIN.
Monroe,	A. F. ROTE.
Oak Park (Ill.),	D. O. BARTO.
Racine College,	H. D. ROBINSON.
Rockford (Ill.),	B. D. PARKER.
Sheboygan,	J. E. RIORDAN.

SCHOOL.	PRINCIPAL.
Tomah,	E. H. CASSELS.
Waukesha: Carroll College,	W. L. RANKIN.
Winona (Minn.),	W. A. BARTLETT.

For Modern Classical, Civic Historical, General Science, English, Engineering, Four Years' Pharmacy, and Agricultural Courses.

SHOOL.	PRINCIPAL.
Appleton: Ryan High School,	R. W. PRINGLE.
Aurora (Ill.): East,	W. J. PRINGLE.
Aurora (Ill.): West,	A. V. GREENMAN.
Baraboo,	J. E. NECOLLINS.
Bayfield,	A. W. MCCULLOCH.
Beaver Dam,	H. B. HUBBELL.
Berlin,	F. A. LOWELL.
Boscobel,	G. W. GEHRAND.
Brodhead,	R. E. RIENOW.
Burlington,	J. M. TURNER.
Burlington (Iowa),	E. POPPE.
Chicago: Kenwood Institute,	ANNA E. BUTTS.
Chippewa Falls,	R. L. BARTON.
Columbus,	M. H. JACKSON.
Darlington,	J. M. STEVENS.
Decorah (Iowa),	E. A. PARKS.
Delavan,	C. W. RITTENBURG.
Des Moines (Iowa): North,	W. N. CLIFFORD.
Dodgeville,	O. J. SCHUSTER.
Eau Claire,	M. S. FRAWLEY.
Edgerton,	H. A. ADRIAN.
Elkhorn,	C. D. KIPP.
Evansville,	H. F. KLING.
Fort Atkinson,	A. W. WEBER.
Freeport (Ill.),	S. E. RAINES.
Green Bay: East Side,	W. O. BROWN.
Green Bay: West Side,	A. W. BURTON.
Hudson,	S. B. TOBEY.
Ironwood (Mich),	L. L. WRIGHT.
Ishpeming (Mich.),	RICHARD HARDY.
Joliet (Ill.)	J. S. BROWN.
Lake Geneva,	A. F. BARTLETT.
Lancaster,	L. L. CLARKE.
Manitowoc: North Side,	H. J. EVANS.

SCHOOL.	PRINCIPAL.
Menomonie,	J. E. HOYT.
Merrill,	ANNA E. ANDERSON.
Mineral Point,	A. R. JOLLEY.
Neenah,	J. F. CONANT.
Oconto,	R. L. COOLEY.
Oshkosh,	BUEL T. DAVIS.
Prairie du Chien,	J. A. PRATT.
Racine,	A. N. OZIAS.
Ripon,	A. E. SCHAUB.
River Falls,	H. L. WILSON.
Sinsinawa: St. Clara's Academy,	DOMINICAN SISTERS.
Shullsburg,	R. E. SMITH.
Stevens Point,	H. A. SIMONDS.
Superior: Broadway,	J. S. GRIFFIN.
Superior: Nelson Dewey,	C. R. FRAZIER.
Watertown,	C. F. VIEBAHN.
Waukesha,	H. L. TERRY.
Waupaca,	J. L. THATCHER.
Wausau,	KARL MATHIE.
Wauwatosa,	W. H. GOODALL.
West De Pere,	J. D. CONLEY.
Whitewater,	H. A. WHIPPLE.

For Modern Classical, Civic Historical, General Science, Engineering, Four Year's Pharmacy, and Agricultural Courses.

Kaukauna,	I. M. ALLEN.
Prescott,	JAMES GOLDSWORTHY
Sparta,	F. E. DOTY.
Viroqua,	W. W. WILLIAMS.

For Modern Classical, Civic Historical, English, and Agricultural Courses.

McGregor (Ia.),	F. N. WILLIAMS.
Richland Center,	A. E. BRAINERD.

For Modern Classical and Civic Historical Courses.

De Pere,	VIOLET M. ALDEN.

For Civic Historical, General Science, English, Engineering, Four Year's Pharmacy and Agricultural Courses.

Mauston,	A. H. FLETCHER.
Portage,	W. G. CLOUGH.

For Civic Historical, English, and Agricultural Courses.

SCHOOL.	PRINCIPAL.
Oregon (Ill.)	W. J. SUTHERLAND.

For General Science, English, Engineering, Four Year's Pharmacy, and Agricultural Courses.

Antigo,	C. O. MARSH.
Arcadia,	G. O. BANTING.
Augusta,	L. W. WOOD.
Black River Falls,	J. H. DERSE.
Centralia,	S. M. KYES.
Clintonville,	W. H. HICKOK.
Cumberland,	D. E. CAMERON.
Durand,	J. W. NESBIT.
Fox Lake,	F. W. LUCAS.
Grand Rapids,	GUY S. FORD.
Jefferson,	W. J. HAMMILL.
Kenosha,	E. C. WISWALL.
Lake Mills,	A. B. WEST.
Lodi,	R. E. LOVELAND.
Manitowoc: First Ward,	W. H. LUEHR.
Marshfield,	J. B. BORDEN.
Mayville,	M. A. BUSSEWITZ.
Mazomanie,	O. M. SALISBURY.
Mondovi,	G. M. MCGREGOR.
Milton Junction,	J. T. HEALY.
New Lisbon,	S. A. BOSTWICK.
New Richmond,	J. W. T. AMES.
Oconomwoc,	C. R. CROSS.
Poynette,	H. S. YOUKER.
Prairie du Sac,	J. F. BERGEN.
Reedsburg,	W. N. PARKER.
Rhinelander,	F. S. HYER.
Sauk City,	H F. LUEDERS.
Shawano,	E. H. REYNOLDS.
Sheboygan Falls,	F. F. SHOWERS.
Spring Green,	W. H. SCHULTZ.
Stoughton,	A. H. SHOLTZ.
Stoughton Academy,	K. A. KASBERG.
Sturgeon Bay,	E. E. BECKWITH.
Sun Prairie,	JAMES MELVILLE.

SCHOOL.	PRINCIPAL.
Two Rivers,	E. E. CARR.
West Bend,	D. T. KEELEY.

For General Science, Engineering, Four Years' Pharmacy, and Agricultural Courses.

Rice Lake,	E. C. MCCLELLAND.

For English and Agricultural Courses.

Appleton: Third Ward,	W. F. WINSEY.
Chippewa Falls: Notre Dame School,	SISTER M. F. XAVIER
Elroy,	W. E. UTENDORFER.
Evansville Seminary,	A. L. WHITCOMB.
Hartford,	E. W. PRYOR.
Horicon,	E. T. JOHNSON.
Kewaunee,	M. MCMAHON.
Medford,	F. W. THOMAS.
Neillsville,	W. L. MORRISON.
Menasha,	W. C. HOPKINS, JR.
Necedah,	C. H. MAXSON.
New London,	TAYLOR FRYE.
Omro,	E. E. SHELDON.
Onalaska,	B. F. OLTMAN.
Oregon,	FRANKLIN GOULD.
Seymour,	R. H. SCHMIDT.
Sharon,	G. M. SHELDON.
Washburn,	H. W. ROOD.
Waupun: South Ward,	F. C. HOWARD.

GRADUATES OF THE STATE NORMAL SCHOOLS.

The certified standing of any student in the regular courses of the Normal schools of this State will be accepted for entrance to the University in place of an examination.

The University offers a course designed especially for Normal graduates and leading to the degree of Bachelor of Philosophy in Pedagogy.

This course includes advanced instruction in pedagogy and those studies in language and science, both required and elective, which will best fit the graduate of our Normal schools for the successful conduct of his chosen profession. Announcement of the details of this course will be found on page 86. To this course graduates of the Normal schools will be admitted with

the rank of junior, on the presentation of their diplomas. Graduates of the Normal schools who desire admission to the other courses of the University will be admitted to such courses after the year 1896-7 with the provisional rank of juniors. They will be required, however, to take two years of work of rank equivalent to that of juniors and seniors in the University and will be required to make good deficiencies in the basal work of the freshman and sophomore years. Full credit will be given for all work done in the Normal Schools which lies parallel to the University courses.

STUDENTS FROM OTHER COLLEGES AND UNIVERSITIES.

Students from other institutions, who have pursued standard college courses equivalent to those of this University, will be admitted to a like standing upon the presentation of proper certificates of creditable standing and honorable dismission. Students of other colleges of good standing who have not taken such standard courses, but who have studied one year in the college proper, may be admitted to the University as special students without examination, or, upon such an examination as may be necessary to determine their attainments, they may be admitted to any course or to any class for which they are found fitted. Students coming from other institutions are advised to bring authenticated records of their standing. In all cases of reasonable ground for doubt, the University reserves the right to test the value of such records by actual examination.

No person will be admitted to the University later than November 1st of the year in which he expects to graduate.

GRADUATE STUDENTS.

Graduates of this University and other colleges and universities of good standing are admitted to graduate courses without examination.

CHARGES AND FEES—GENERAL CHARGES.

All fees are required to be paid strictly in advance at the beginning of each semester, before cards are issued by the class officer entitling the student to admission to class; except those in the College of Law as indicated below. Graduate students, except honorary fellows, pay the same fees as undergraduates, whether they are in attendance at the University or *in absentia*.

Tuition is free for all students from the State of Wisconsin, except in the College of Law.

After ten days from the beginning of the semester, no fees are returned except by special vote of the Board of Regents.

College of Letters and Science, College of Mechanics and Engineering, School of Pharmacy, School of Economics, Political Science, and History, School of Education.

Tuition for non-resident students, per semester	$9.00
Incidental fee for all students, per semester	6.00
Additional fee for students electing studies in the College of Law, per year	25.00

College of Agriculture.

Long course, tuition for students not residents of Wisconsin, per semester	$9.00
Long course, incidental fee for all students, per semester.	6.00

In the Short course and Dairy course there are no charges for students who have been residents of Wisconsin for one year before their first admission to the University .

Short course, incidental fee for students not residents of Wisconsin	10.00
Short course, tuition charge for students not residents of Wisconsin	6.00
Dairy course, incidental fee for students not residents of Wisconsin	10.00
Dairy course, tuition charge for students not residents of Wisconsin	6.00
Dairy course, lecture fee for students not residents of Wisconsin	10.00

College of Law.

Tuition fee, first year	$75.00
Tuition fee, second year	50.00
Tuition fee, third year	25.00
Tuition fee for students graduating in one year	100.00

The fees for students graduating in two years are the same as in the first two years of the three year course.

The fees in the College of Law are to be paid for the year at the beginning of the first semester. There is no additional fee for non-resident students in this College.

Wisconsin Summer School.

Fee for each course of recitations extending through six weeks $5.00
Fee for three weeks' general course for grade teachers.... 5.00

Summer School of Literary Science.

General fee for all students..... $15.00

School of Music.

Persons who are members of other colleges or schools of the University may take the courses of music specified on page 127 without charge. Members of the School of Music and of other departments, who take special lessons, will pay fees as stated in the announcement of the School on a subsequent page of the catalogue.

Ladies' Hall.

Room rent, heat, and light, see page 38.
Board in Ladies' Hall, payable to the Matron, per week... $3.50
These fees are subject to change at the opening of the College year.

LABORATORY FEES.

BIOLOGICAL LABORATORIES.—The laboratory fee for the elementary course in biology and for most of the advanced courses is $8.00 per year. The fee for vertebrate histology, for embryology, and for bacteriology, $8.00 per semester.

CHEMICAL LABORATORIES.—In these laboratories the deposit for a year's course is twenty dollars. The amount refunded will depend on the chemicals used and the care exercised by the student. The ordinary cost of a year's course is from fifteen dollars to twenty dollars.

GEOLOGY AND MINERALOGY.—Blowpipe analysis, per semester, $5.00, blowpipe analysis, two-fifths study, $2.00; three-fifths study, $3.00; petrography, per semester, $5.00.

PHYSICAL LABORATORIES.—The laboratory fee in the physical laboratories is $2.00 for each unit-hour (two hours per week of actual work) per semester.

PSYCHOLOGICAL LABORATORY.—The laboratory fee for the course in Experimental Psychology (Philosophy: 2) is $3.00; for other experimental work $3.00 per semester, $5.00 per year.

COLLEGE OF ENGINEERING.—The charge for laboratory work is $1.50 per unit-hour (two hours per week of actual work) per semester. There is also a charge of $1.50 per year for periodicals, supplied to the Engineering Reading Room.

SCHOOL OF PHARMACY.—For general laboratory privileges a charge is made of $1 per unit hour and semester. A separate account will be kept with the accountant of the storage room for special apparatus and material. The student will purchase coupons from the Secretary of the Board of Regents ($5 at a time) and present them at the storage room. At the end of the year full credit will be given for such pieces of apparatus as are taken back, in accordance with the rules of the storage room.

COLLEGE OF AGRICULTURE.—The following laboratory fees are required: Dairy School Laboratory, $6.00; Farm Dairy Laboratory, $1.00; Bacteriology; University Students, $8.00; Advanced Dairy Course, $6.00; Pasteurizing Course, $1.00; Shop-work, $5.00.

Students of the Long Course in Agriculture pay for gas and for apparatus at the same rate as in the General Chemical Laboratory.

GYMNASIUM AND MILITARY DRILL.

Young men in the College of Letters and Science, College of Mechanics and Engineering, and the four-year courses in Agriculture and Pharmacy, are required to take gymnastic exercises during the first two years of their course, and are also required to take military drill. Students required to drill must provide themselves with a uniform. This should be procured at Madison, and costs about fifteen dollars.

Gymnasium fee	$2.00
Locker fee	1.00
Key deposit (returnable)	.50

Young women are required to take gymnastic exercises during the first two years of their course. A gymnasium fee of $1.00 per year is required, and $1.00 additional from those who make use of a locker. They must also provide themselves with a suitable costume; directions for which will be furnished by the instructor in gymnastics on application.

Students entering the four-year academic or technical courses of the University should expect to pay the fee for general expenses ($6), and if not residents of the State, the tuition fee ($9) mentioned above; the gymnasium fees ($2 or $3) and laboratory fees for such courses as begin in Freshman year. Young men must be prepared to defray the cost of a uniform, about $15, and young women must provide a gymnasium suit.

THE GRADUATE DEPARTMENT.

For the full statement of the organization of the Graduate Department reference is made to the heading Department of Graduate Study, pages 44-59, and for the announcement of special courses for graduates see the statements made under the Department of Study on subsequent pages.

THE UNDERGRADUATE DEPARTMENTS.

REQUIREMENTS FOR GRADUATION.

The unit-hour is the standard for computing the amount of work required for graduation. This is equal to one hour of recitation or lecture per week per one semester. Two hours of laboratory work or two hours of regularly prescribed military drill or physical exercise in the gymnasium are credited as one unit-hour. Students are expected to take 15 hours per week in recitations, lectures, and laboratory work, making 30 unit-hours per year, and 120 for the course. In addition two hours per week (one unit-hour per semester) of gymnastics are required during the first two years, making a total of four unit-hours. The men are required to drill two hours per week during the first two years, giving a credit of four unit-hours. The total requirements for class-room work, military drill, and the gymnasium are, therefore, 128 unit-hours for the men and 124 for the women.

No student will be permitted to receive a credit toward graduation of more than eighteen unit-hours in one semester in regular studies except by permission of the Faculty obtained in advance.

WORK IN SUMMER SCHOOL.

Arrangements have been made by which the work of the Summer School may be credited as part of the work required for graduation. Courses in the Summer School have different values, and by attendance at one session of the School a total amount of credit may be acquired not exceeding five unit-hours.

GRADUATION IN LESS THAN FOUR YEARS.

Students desiring to graduate in three years in one of the regular four-year courses may do so by taking eighteen hours of recitations per week ,and by attending three sessions of the Summer School. No credit will be given for a repetition in the Summer School of studies taken in the University, or for repeat-

ing in the University, work done in the School. Students will therefore need to select carefully the work taken in the Summer School with reference to the required and elective studies of the course in which they intend to graduate. Students of the classical courses will find it possible to secure their science in the Summer School, and students in the science course may take electives in history, politics, or allied subjects. These are mentioned simply as illustrations, but students must be careful not to select studies in the Summer School which constitute also an integral part of a study in the University, which they also propose to take in their course. Thesis work can be done in the Summer School with great advantage to the student if the professor under whom the thesis is taken is a teacher in the School, and is able to devote the time necessary for the supervision of the thesis. In case a student desires to do thesis work arrangement should be made with the professor during the college year; and any student hoping to shorten his course by means of the Summer School should consult his class officer in selecting his studies.

ADJUSTMENT OF UNDERGRADUATE AND LAW COURSES.

The courses of the College of Letters and Science and those of the College of Law have been so adjusted to each other that it is now possible for a student to graduate from both colleges of the University in six years. Students in the College of Letters and Science will be permitted to elect studies in the College of Law during the last two years of their course; the amount to be thus elected is not to exceed a total of six hours per week for one year. This privilege will not be extended to Normal graduates attempting to graduate in two years, nor to undergraduates of other colleges who enter this University with the rank of Seniors. Students who have completed this amount of work in the Law School will be admitted to the Middle Class of the College of Law on graduation from the College of Letters and Science, thus enabling them to complete the course for the Bachelor of Law in two additional years. Members of the College of Law will also be permitted to elect studies in the College of Letters and Science which are related to the studies of their professional course, and may receive credit for this work in their law course, to an amount not exceeding four hours per week for one year.

ENGLISH FOR GRADUATION.

After the college year 1897-98 the required rhetoric and composition will be course 1 as stated on p. 105, and will be required of all freshmen. The grade of the work in course 1 will be higher than that heretofore required of the freshmen. Early in the first semester of 1898-99 the freshmen will be examined in English composition. This examination will be a practical one. The student will be required to write an essay, or more than one, on a familiar theme, planning his work by paragraphs and constructing both paragraphs and sentences in accordance with the simpler principles of composition. The stress will be laid on neatness of manuscript and the avoidance of errors in spelling, punctuation, and grammar. These are essentials. The examination is to ascertain the student's ability to put material with which he is familiar into clear, correct English, rather than his ability to recite rhetorical or grammatical rules. A student failing in this examination will, for the present, be allowed to take English composition twice a week for one year as a preparatory study. Admission to course 1 is provisional. Students will be promptly dropped into the preparatory class if they are unable to carry the work.

On the completion of course 1, a provisional pass mark is given; if at any time, later in his course, a student is reported as deficient or careless in English composition he will be required to take additional work in that subject.

UNDERGRADUATE COURSES.

The University offers, in the College of Letters and Science, seven courses of study leading to the bachelor's degree: The Ancient Classical Course, leading to the degree of Bachelor of Arts; the Modern Classical, the English, and the Civic Historical courses, leading to the degree of Bachelor of Letters; the General Science and Pre-medical courses, leading to the degree of Bachelor of Science; the course for Normal graduates, leading to the degree of Bachelor of Philosophy in Pedagogy. In the Ancient Classical and the Modern Classical courses, languages, ancient and modern, are the central studies. In the General Science and Pre-medical courses, science occupies the leading place; in the English Course, the English language and literature; in the Civic Historical Course, history, economics, and political science are the main lines.

The Pre-medical Course is intended to give a broad and solid foundation for the professional medical course, together with collegiate culture. Students desiring a similar course of scientific study introductory to the practice of pharmacy are referred to the account of the Four Years' Course in Pharmacy on a subsequent page.

The requirements for graduation in the College of Letters and Science have been remodeled during the past year in such a manner as to bring the former Course System and the former Group System nearer to each other. The change has been made for the purpose of adopting features of the Group System into the courses without changing the privileges of the Group System.

Especial attention is directed to the opportunity offered in each course for election during Sophomore year. Through this privilege students can elect courses which are antecedent to the major study of junior and senior years. Since it is necessary for students to elect their major study at the opening of junior year, it will be wise for sophomores to consult with their class officers regarding this study.

Students who desire to specialize in a department which regularly offers no sophomore study in the course that they have entered may avail themselves of this means of securing the special instruction which they desire. This arrangement may be employed, for example, by students in the General Science Course, who desire to study the history, English, or languages offered in the sophomore year of other courses and to continue the studies of the selected department during junior and senior years. Similar combinations can be made by students in other courses.

Especial attention is called to the courses in philosophy and pedagogy, of which an account is given on later pages under the heading, School of Education.

The courses as remodeled will be put into operation as rapidly as possible. Seniors of 1898-99 will necessarily complete their work in accordance with the former requirements, but both seniors and juniors will arrange their courses of study with class officers, who will adjust them as nearly as possible to the present requirements for graduation. Members of the sophomore class will be required to complete the rhetoric according to the former system. Sophomores of the Ancient Classical and Modern Classical courses will take rhetoric in place of history; those in the Civic Historical, English, or General Science courses will also

take rhetoric and postpone to junior year one of the studies of sophomore year, under the advice of the class officer.

In all courses the requirements for the two upper years are alike and are as follows:

Junior and Senior Years: The student must elect a major study from one department to the amount of five hours per week for two years. This amount, however, is to include his senior thesis, for which a credit of two hours per week is given during senior year. He must complete all required studies which have been postponed from sophomore year, and elect courses sufficient to complete 120 unit-hours of class and laboratory work, besides the required drill and gymnastics.

The major study may be elected by a student from any course or from any department which he is prepared to enter—in a language, or science, in philosophy, or history, etc. If the major is selected from the departments of ancient languages a smaller amount is permitted in consideration of the large amount of time devoted to those subjects in freshman and sophomore years. The total amount need be only five hours for one year, besides the thesis, in Greek or Latin or in both languages together.

GROUP STUDENTS.

Students who desire to extend the prosecution of a major study beyond the amount which would naturally come in the courses as described, may be accepted as group students in any department at the opening of the sophomore year. In this case they may substitute studies assigned by the head of the department to the amount of five hours in the place of studies required during sophomore year. In this manner, provision may be made for special study in those departments whose work does not ordinarily begin in sophomore year, such as philosophy, pedagogy, geology, astronomy, and bacteriology, and also for extending the courses in other departments.

Students who avail themselves of this privilege must complete before graduation at least 10 unit-hours of science and 24 unit-hours of language study in two languages besides English. The degree given will be that of the student's course with the name of the department in which the major study lies, but a student of the Ancient Classical Course will not receive the B. A. degree unless he completes the Latin and Greek of the sophomore year.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF ARTS.

Ancient Classical Course.

Freshman Year: Greek 5*; Latin 4; mathematics 3; English 3; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class room.

Sophomore Year: Greek 3; Latin 3; modern language 4; science 5; history 2 or 3; elective 2-5; military drill 2; gymnastics 2; 34 unit-hours required for the year, of which 30 are in class room and laboratory.

During the Sophomore year the student must take military drill and gymnastics and must elect two of the three languages offered. From the remainder of the list he must choose enough to make a total of 15 hours per week in regular class exercises, completing in junior and senior years studies postponed from sophomore year. Sophomores of 1898-99 will take rhetoric 2 in place of history.

Junior and Senior Years: See p. 83.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF LETTERS.

1. Modern Classical Course.

Freshman Year: German 5; Latin 4; mathematics 3; English 3; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class exercises.

Sophomore Year: German 3; Latin 3; French 4; science 5; history 2 or 3; elective 2-5; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class room and laboratory.

The sophomore class in 1898-99 will take rhetoric in place of history. During the sophomore year a student must take military drill and gymnastics and must take two of the three languages offered. From the remainder of the list he must choose enough to make a total of 15 hours per week in regular class exercises, completing in junior and senior years studies postponed from sophomore year.

Junior and Senior Years: See p. 83.

*The figures denote the number of recitations per week.

2. Civic Historical Course (School of Economics, Political Science and History.)

Freshman Year: Latin or German 4; mathematics 3; history 5; English 3; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class exercises.

Sophomore Year: German 4 (if not taken in freshman year); French 4; history 3; economics and political science 3; science 5; elective 3-5; military drill 2; gymnastics 2; 34 unit-hours, of which 30 are in class room and laboratory.

The sophomore class of 1898-99 will take rhetoric 2 hours per week. During the sophomore year the student must take military drill and gymnastics, and from the remainder he must elect enough to make a total of 15 hours per week in regular class exercises, completing in junior and senior years studies postponed from sophomore year.

Junior and Senior Years: See page 83.

3. English Course.

Freshman Year: German 4; mathematics 3; history 5; English 3; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class exercises.

Sophomore Year: Required study, German 4; Foreign language besides German 4; science 5; Anglo-Saxon 3; English literature 5; elective 3-5; military drill 2; gymnastics 2.

The student must take military drill and gymnastics and elect 11 hours from the work enumerated above, completing in junior and senior years studies postponed from sophomore year. In 1898-99 the sophomore class will take rhetoric 2 hours per week.

Junior and Senior Years: See page 83.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE.

1. General Science Course.

Freshman Year: Biology 5*; German 4; mathematics 3; English 3; military drill 2; gymnastics 2; 34 unit-hours for the year, 30 of which are in class exercises.

Sophomore Year: German 3; French 4; physics 5; chemistry 5; elective 3-5; military drill 2; gymnastics 2; 34 unit-hours for the year, of which 30 are in class room and laboratory.

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*The figures denote the number of recitations per week.

The sophomore class of 1898-99 will take rhetoric 2 hours per week. During the sophomore year the student must take military drill and gymnastics and elect 15 hours per week in regular class exercises, completing in junior and senior years studies postponed from sophomore year.

Junior and Senior Years: See page 83.

2. Pre-Medical Course.

The required studies of the four-years' Pre-medical Course, leading to the degree of Bachelor of Science, are the same as those of the General Science Course. The students in the Pre-medical Course are required to turn their scientific work and their elections in the direction of those sciences which are preliminary to the study of medicine.

3. Engineering and Agricultural Courses and Four-Years' Pharmacy Course.

For details of these courses, look under College of Engineering, College of Agriculture, and School of Pharmacy, on later pages.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF PHILOSOPHY IN PEDAGOGY.

Course for Normal Graduates.

Graduates of the advanced courses of the State Normal schools are admitted to advanced standing in the various courses of the University on conditions which may be found on page 73 of this catalogue. The following special course for normal graduates has been arranged, leading in two years to the degree of Bachelor of Philosophy in Pedagogy. It is intended especially for those graduates of normal schools who desire a wider training for the profession of teaching than is offered by the normal courses. The course contains a minimum required amount of advanced studies in philosophy and pedagogy, with opportunity for further elections in those subjects. It requires also a continuous study of foreign language during the two years of the course. In other directions the student may elect his studies either with entire freedom, or under certain restrictions. It is expected that the normal graduate will give especial attention to fitting himself for

teaching in one or two of the main lines of instruction, and the requirements and electives have been so arranged as to permit him to attain this end. He may devote himself especially to science, to literature, to history, or to any practicable combination of these studies. He will be required, however, to make one of these lines of study his major work, and will not be permitted to elect a large number of short, scattered courses of instruction, since it is the especial design of this course to enlarge and complete his knowledge in certain definite directions.

The attention of the student is called to the necessity of directing his work from the first to the preparation of a satisfactory graduation thesis. In most cases the thesis will probably be written on some topic suggested by pedagogy or philosophy. If, however, the student is capable of pursuing advanced work in any department, he may arrange for his thesis in that direction; but in such case it will be necessary for him to plan his course from the beginning, with a view of satisfying the requirements of a thesis.

Junior Year: Latin, French, or German 4; philosophy 3; advanced pedagogy 3; language, history, English, advanced mathematics, or science 5; electives 3 to 5; 18 hours per week required.

Senior Year: Continuation of Latin, French, or German 4; philosophy and advanced pedagogy 5; electives from language, science, history, economics, mathematics, or English 7; thesis 2; 18 hours per week required.

DEPARTMENTS OF INSTRUCTION.

Part of the courses of instruction described on the following pages are elementary courses for undergraduates, others are advanced courses for undergraduates and graduates, while still others in each department are designed especially for graduates. A full account of graduate work is given on pages 44-59 of the catalogue.

PHILOSOPHY.

PROFESSOR STEARNS, PROFESSOR JASTROW, AND ASSISTANT PROFESSOR SHARP.

A full account of the 18 courses in Philosophy is given on later pages under the School of Education. See page 151.

Students who desire to elect a major in Philosophy are recommended to choose an introductory course in Sophomore year.

PEDAGOGY.

PROFESSOR STEARNS AND PROFESSOR O'SHEA.

A full statement of the higher courses in Pedagogy is found on later pages under the School of Education. See page 153.

ECONOMICS AND STATISTICS.

PROFESSOR ELY, PROFESSOR SCOTT, DR. JONES, DR. MEYER, AND MR. WESTON.

A full statement of the courses in these departments is given on pages 132-135 of this catalogue, under the heading School of Economics, Political Science, and History.

Course 1, Economic History of England is required of freshmen in the Civic Historical Course, and English Course. Repeated each semester, *Tu., Th., at* 9 and 12.

Course 2, The Elements of Economic Science is required of students in the Civic Historical Course. Repeated each semester, *Tu., Th., S., at* 8 and 9.

SOCIOLOGY.

PROFESSOR ELY, ASSISTANT PROFESSOR SHARP, AND MR. JONES, ASSISTED BY SPECIAL LECTURERS.

A full statement of the ten courses offered in Sociology is given on pages 139-141 of the catalogue.

POLITICAL SCIENCE.

PROFESSOR PARKINSON, DR. REINSCH, DR. SPARLING.

A full statement of the nineteen courses offered in Political Science is given on pages 139-142 of the catalogue.

The introductory course of Elementary Law is given on *Tu. and Th., at* 11; the elementary course on Constitutional Law on *M., W., F.. at* 9.

HISTORY.

PROFESSOR TURNER, PROFESSOR HASKINS, ASSISTANT PROFESSOR COFFIN, DR. LIBBY, AND MR. BECKER.

A full statement of the twenty-two courses in History is given on pages 144-148 of the catalogue under the heading of the School of Economics, Political Science, and History.

Course 1, Ancient History, is required of freshmen in the Civic Historical Course. *First semester; M., Tu., W., Th., F., at* 10 and 12.

Required of freshmen in the English Course. *Second semester; M., Tu., W., Th., F., at* 8, 9 and 12.

Course 2, English History, is required of freshmen in the English Course. *First semester; M., Tu., W., Th., F., at* 9 and 12.

Required of freshmen in the Civic Historical Course. *Second semester; M., Tu., W., Th., F., at* 10 and 12.

GREEK.

PROFESSOR SMITH, PROFESSOR KERR, ASSISTANT PROFESSOR LAIRD, ASSISTANT PROFESSOR EMERY, DR. SHANNON, AND MR. CATRON.

1. *Elementary Greek.* White's Beginner's Greek Book, Xenophon's Anabasis, Homer's Odyssey, Greek Composition. *Throughout the year; M., Tu., W., Th., F., at* 12. Assistant Professor LAIRD and Mr. CATRON.

2. *First Semester:* Lysias, Xenophon, Goodwin's Grammar. *M., Tu., W., Th., F., at* 9. Professor SMITH and Assistant Professor LAIRD.

Second Semester: Selections from Herodotus Homer. *M., Th., F., at* 10. Professor KERR and Assistant Professor EMERY.

Greek Composition, *throughout the year; Tu., at* 9. Assistant Professor LAIRD. (Course 2 is required of Ancient Classical freshmen.)

3. *First semester:* The Philippics of Demosthenes, Euripides, Goodwin's Moods and Tenses. *M., Th., F., at* 10. Professor KERR.

Second semester: Plato's Apology and Crito, Thucydides VII., Jebb's Primer of Greek Literature. *M., Th., F., at* 10. Professor SMITH and Assistant Professor EMERY.

Greek Composition, *throughout the year; Tu., at* 10. Professor SMITH. (Course 3 is required of Ancient Classical sophomores.)

4. Herodotus, one book, Xenophon's Memorabilia, or selected Dialogues of Lucian. *Throughout the year; M., F., at* 11. Assistant Professor LAIRD. (Course 4 is an elective for sophomores, but is open also to such freshmen as receive the permission of the instructor.)

5. *First Semester:* Greek Lyric Poets, study of meters. *M., W., F., at* 11. Professor SMITH.

Second Semester: Demosthenes' De Corona, Aristotle's Politeia, Thucydides. *M., W., F., at* 11. Professor SMITH. (Open to juniors and seniors, omitted in 1898-99.)

6. Greek Dramatic Poets. *First Semester:* Aeschylus (one play), Sophocles (two plays), study of meters.

Second Semester: Aristophanes, Aristotle's Poetics, discussion of the Greek Drama. *M., W., F., at* 11. Professor SMITH. (Open to juniors and seniors.)

7. Advanced Greek Composition. *First Semester: T., at* 11. Professor SMITH and Assistant Professor LAIRD. (Open to juniors, seniors, and graduates.)

8. Plato. The Protagoras, Gorgias, and Phaedo. This course is intended as an introduction to the study of Greek Philosophy. *Throughout the year; Tu., Th., at* 11. Professor KERR. (Open to juniors and seniors.)

9. Modern Greek Language and Literature. A study of the changes in form and structure which the language has undergone since the classical period. Readings from contemporary Greek authors, and a comparison of their writ-

ings with the prose and poetry of the Attic Greek. Papers and discussions upon topics connected with the course of reading. (Elective for juniors and seniors.) *Throughout the year; Tu., Th., at* 11. Professor KERR. (Courses 8 and 9 are given in alternate years. Course 9 omitted in 1898-99.)

10. Lectures on the life of the ancient Greeks, illustrated by means of lantern slides. Once a week, *throughout the year; W., at* 5. Professor SMITH. (A knowledge of Greek is not required for this course, omitted in 1898-99.)

The object of the graduate courses in Greek is to secure, on the part of advanced students, graduates especially, wide reading in Greek authors, acquaintance with the latest results of philological investigation through constant reading of critical journals, the forming of habits and learning of methods of research. In pursuance of the last named purpose especially, the Greek Seminary meets to hear and to discuss carefully prepared papers, the members leading in turn. It is to be understood that the preparation for each lead will require the greater portion of a student's time for at least two weeks. The work will be occasionally varied and relieved by extempore exercises in reading and writing Greek. The work of the Seminary will be supplemented by courses of lectures, and regular reports will be made by the members on the contents of classical periodicals.

11. Thucydides, studied throughout the year, the whole of the author being read privately by the members of the class. Each member leads in turn, presenting a paper embodying a critical discussion of some passage of the text, or of some topic especially assigned. *Throughout the year, Sat.*, 9-11. Professor SMITH.

12. Greek Antiquities, State and Private. One exercise a week, *throughout the year.* Professor SMITH.

13. Greek Drama. During the first semester several tragedies of Æschylus or of Sophocles will be critcally studied and interpreted, in the second semester certain comedies of Aristophanes, especial stress being laid upon the treatment of the dramas as literature. As supplementary to this course the Scenic antiquities will be studied, Haigh's Attic Theatre being used as a basis. *Throughout the year, Sat.*, 9-11. Professor SMITH. (Omitted, 1898-99.)

14. Lyric Poetry. Especial attention is given to Pindar and to Bacchylides. Wide reading in the fragments of the other

lyric poets will also be required of the class. *Throughout the year, Sat.*, 9-11. (Omitted in 1898-99.) Professor SMITH.

15. Greek Dialects. A study of dialect sounds and forms based on the inscriptions. Cauer's Delectus Inscriptionum Græcarum will in the main be followed. The members of the class will lead in turn, and special problems for investigation will also be assigned. *Two hours a week throughout the year.* Assistant Professor LAIRD.

16. Journal Club. Reports on and discussions of current philological literature. *One hour a week throughout the year.* Professors SMITH, KERR, and SLAUGHTER, and Assistant Professors LAIRD, SOBER and EMERY.

[Courses 11-15 are conducted mainly on the Seminary plan. Courses 11-16 are open to graduates, and, by special permission, to others who have had the junior 3-hour elective, or its equivalent.]

17. Comparative Greek Grammar. (See Comparative Philology 2.)

Comparative Philology.

1 Lectures on the principles of the life and growth of language. *Second semester; F.*, 9. Assistant Professor LAIRD. (Open to juniors and seniors. A knowledge of Greek and Latin is not required.)

[2. Greek and Latin Grammar. History of the sounds and forms *Throughout the year. Tu., Th., at* 9. Assistant Professor LAIRD.]

3. Elementary Sankrit. Perry's Sanskrit Primer. Selections from Lanman's Reader. *Throughout the year; M., W.*, 10. Assistant Professor LAIRD.

4. Advanced Sanskrit. Selections from the Rig-Veda. Wackernagel's Altindische Grammatik. *Throughout the year; W.*, 11. Assistant Professor LAIRD.

(Courses 2, 3, 4 are intended primarily for graduates, but are open, by permission, to juniors and seniors.)

Note: In the absence of Assistant Professor Laird on leave in Germany, his courses for the year 1897-98 have been given by Dr. Shannon.

LATIN.

PROFESSOR SLAUGHTER, ASSISTANT PROFESSOR SOBER, ASSISTANT PROFESSOR EMERY, MISS ALLEN, AND MR. SHOWERMAN.

1. Cicero and Vergil. Cicero's Orations (three), Vergil's Aeneid (six books), Latin Grammar and Composition. This course is offered for the benefit of students whose preparation in Latin has for any reason been deficient. It can not be counted for the bachelor's degree. *Throughout the year; M., Tu., W., Th., F., at* 8. Mr. SHOWERMAN.

2. Cicero, Livy, Terence. Cicero de Senectute, Livy (two books), Terence (two plays), Latin Composition, and Roman Literature. Private readings. Required of freshmen of Ancient Classical and Modern Classical courses and alternative with German for freshmen of the Civic Historical course. *Throughout the year; M., Tu., Th., F.* Four divisions: M. Cl. at 10, A. Cl. at 11, Civ. H. at 8. Assistant Professor SOBER and Miss ALLEN.

3. Horace. The Odes, Satires, and Epistles of Horace. Required of sophomores of Ancient Classical and Modern Classical courses. *Throughout the year; two divisions. Three times weekly.* Professor SLAUGHTER and Assistant Professor EMERY.

4. (a) Cicero and Catullus. (b) Pliny and Martial. Elective for sophomores. *Throughout the year; W. and F., at* 2. Assistant Professor SOBER.

5. Exercises in Writing Latin. Elective for sophomores. *Weekly throughout the year; M., at* 2. Professor SLAUGHTER.

6. Juvenal and Tacitus. Open to juniors and seniors. *Throughout the year; Tu., and Th., at* 8. Assistant Professor SOBER.

[7. a) Topography and Remains of Ancient Rome; lectures illustrated with lantern slides and photographs. (b) Reading of Latin Inscriptions and Manuscripts (See Course 18, under History.) Open to seniors and graduates. *Throughout the year; Tu., and Th., at* 8. Assistant Professor SOBER.

Courses 6 and 7 are given in alternate years. Course 7 will be given in 1898-9.]

[8. a) Plautus (Captivi and Trinummus), Terence (Adelphi). Selections from the fragments of Ennius and Lucilius,

Horace (Epistles II., 1). (b) Lectures on Roman Literature. *Throughout the year; M., W., F., at* 8. Professor SLAUGHTER.]

9. a) Lucretius. (b) Vergil and the Roman Epic. *Throughout the year; M., W., F., at* 8. Professor SLAUGHTER.
Courses 8 and 9 are open to juniors and seniors, and are given in alternate years. Course 8 will be given in 1898-9.

10. Teachers' Course. *Weekly throughout the year; S., at* 8. Assistant Professor SOBER.

11. Life of the Romans. Lectures, illustrated with lantern slides and photographs. *Weekly throughout the year.* Professor SLAUGHTER. (Given in 1898-9.)

12. Latin Grammar. (See Comparative Philology, Course 2.)

13. Seminary. The Seminary is intended for graduate students, but will be open to others of suitable preparation with the consent of the director. To accommodate those who are studying for the doctor's degree, the work is arranged to cover three years: (a) Horace, critical and exegetical study of the Odes (given in 1896-7); (b) The Roman Drama. The critical work of the Seminary will be based upon the Miles Gloriosus of Plautus. (Given in 1897-8); (c) Lucretius, Bk. III. (Given in 1898-9.) *Throughout the year, W. and F., at* 9. Professor SLAUGHTER.

14. Syntax. A course of lectures on Latin syntax is given in connection with the work of the Seminary, and is intended primarily fc graduate students. The subjects are: (a) the simple sentence (1896-7); (b) the compound sentence (1897-8); (c) the cases (1898-9.) *Weekly throughout the year; M., at* 9. Assistant Professor EMERY.

HEBREW AND HELLENISTIC GREEK.

PROFESSOR WILLIAMS AND MR. KELLY.

Hebrew and Arabic.

1. Genesis and the general principles of the Hebrew language. *Throughout the year. Four times a week.* Professor WILLIAMS.

2. Historical Hebrew. Samuel and textual criticism. *Throughout the year. Twice a week.* Mr. KELLY.

3. Ruth, Esther, Jonah, and selected Psalms. Etymology and Vocabularies. *Throughout the year. Twice a week.* Mr. KELLY.

4. Minor Prophets. *Throughout the year. Twice a week.* Professor WILLIAMS.

5. Exercises in writing Hebrew. *Throughout the year. Once a week.* Mr. KELLY.

7. Hebrew Seminary. Isaiah will form the center of the work for 1897-98. *Throughout the year. Once a week.* Professor WILLIAMS.

   It is hoped that clubs for the study of Isaiah may be formed in the cities and towns of the state, and that this work may receive direction and help from the work of the Seminary.

8. Psalms and Job. *Throughout the year. Twice a week.* Professor WILLIAMS.

9. Advanced Hebrew Grammar. *Throughout the year. Twice a week.* Professor WILLIAMS.

10. Elementary Arabic. *First semester. Twice a week.* Mr. KELLY.

11. Advanced Arabic. Selections from the Quran. *Second semester. Twice a week.* Mr. KELLY.

12. Elementary Assyrian. *Throughout the year. Once a week.* Professor WILLIAMS.

Hellenistic Greek.

13. Selected chapters from the Gospels, and the general principles of Hellenistic Greek. For students who have not studied Classical Greek. *Throughout the year. Four times a week.* Professor WILLIAMS.

14. Luke and Acts. *Throughout the year. Twice a week.* Mr. KELLY.

15. Matthew and Mark. Etymology and Vocabularies. *Throughout the year. Twice a week.* Mr. KELLY.

16. John's Epistles and Revelation. Syntax and Vocabularies. *Throughout the year. Twice a week.* Mr. KELLY.

17. John. Critical study and textual criticism. Advanced Syntax. *Throughout the year. Twice a week.* Professor WILLIAMS.

18. Pauline Epistles. *Throughout the year. Twice a week.* Professor WILLIAMS.

FRENCH.

PROFESSOR OWEN, ASSISTANT PROFESSOR GIESE, MISS GAY, AND MR. SEYMOUR.

1. General Elementary Course. Otto's French Conversation Grammar; Roman d'un Jeune Homme Pauvre and La Petite Fadette (the former read mainly and the latter altogether independently of the class-room); Le Cid, Le Misanthrope, Athalie. *Throughout the year; Tu., W., F., S., at* 10. Assistant Professor GIESE.
2. Special Elementary Course for Classical Students. The same as 1 with the addition of lectures on the history of the French language, consideration of Latin etymologies, and treatment of the subject generally from the standpoint of the classics. Additional material for translation will be assigned as the progress of the class allows. *Throughout the year; M., W., F., S., at* 9. Miss GAY.
3. Special Elementary Course for Engineers. A modification of 1 in the interest of the College of Mechanics and Engineering. *Throughout the year; M., Tu., W., Th., F., at* 11. Mr. SEYMOUR.

   By subdivision of the above 3 courses, six elementary classes are established, covering the additional hours *Tu., W., Th., F., at* 12. As many students desire a reading knowledge only, the effort of the above elementary courses is concentrated upon reading. Students are expected at the end of an elementary course to read with sufficient ease and accuracy to make a practical use of French text-books in the prosecution of their other studies.
4. Composition, etc. Written and oral translation into French from English, dictation, and original composition. *Throughout the year; usually Tu. and Th., at* 12. Miss GAY.
5. Continuation of Course 4. *Throughout the year; two hours a week.* Miss GAY.
6. Advanced Reading and Syntax. Reading in class of parts of Cinq-Mars, Ursule Mirouet; reading independently for examination of the Histoire de Charles XII. and other easy French to be assigned. *Throughout the year; M., W., F., at* 11. Professor OWEN.
7. Continuation of Course 6. Reading of Travailleurs de la Mer, etc. *Throughout the year; usually Tues. and Th. at* 12. Professor OWEN.

8. Conversation. This exercise is open only to students who have finished course 1 or 3, or an equivalent. *Two hours a week throughout the year;* Assistant Professor GIESE.

9. Continuation of Course 8. *Throughout the year; two hours a week.* Assistant Professor GIESE.

10. Lectures on Thought and Language *weekly during the first semester.*

The following courses are offered with especial reference to graduate students, courses to be determined more exactly as graduate needs appear, as follows:

11. A course in the Principles of Language, confined to correspondence of thought and sentence, especially as illustrated in the English and Romance languages. Given in the first semester of 1895-96. Professor OWEN.

12. A general course of lectures on French literature, XVI.—XIX. centuries, with collateral reading. *Throughout the year; M., W., at* 12. Assistant Professor GIESE.

13. A philological course in the oldest French literature. *Throughout the year; two hours a week.* Alternates with course 14. Given in 1897-98. Miss GAY.

14. A continuation of 13. *Throughout the year; two hours a week.* Miss GAY.

The method pursued in the above will approximate to that of the Seminary. Special Seminary courses will be furnished if this seems desirable.

SPANISH.

ASSISTANT PROFESSOR GIESE AND PROFESSOR OWEN.

1. Elementary. Translations into English of the Spanish exercises in Sauer's Conversation Grammar, Knapp's Spanish Readings and Marsh's Doña Perfecta. *Throughout the year; three times a week.* Alternates with Italian. Given during the year 1897-98. Professor OWEN.

[2. Advanced. Reading of selections from Crevantes (Don Quixote), from Calderon (El Magico Prodigioso), and from modern poets. *Throughout the year; two hours weekly.* Given in 1898-99. Assistant Professor GIESE.]

ITALIAN.

ASSISTANT PROFESSOR GIESE AND PROFESSOR OWEN.

[1. Elementary. Translation into English of the Italian Exercises in Sauer's Conversation Grammar, and of Manzoni's I Promessi Sposi. *Three hours a week throughout the year.* This course is in general like that in Spanish, with which it alternates. Given in 1898-99. Professor OWEN.]

2. Advanced. Dante and other classics. *Throughout the year; two hours a week.* Given in 1897-98. Assistant Professor GIESE.

SCANDINAVIAN LANGUAGES.

PROFESSOR OLSON.

This department offers instruction in all of the Scandinavian languages (Norwegian, Danish, Swedish, and Old Norse). From one year's instruction in Modern Norse the student is expected to be able to read both Norwegian and Danish authors, as Norway and Denmark have practically the same literary language. Courses 1 and 2 are devoted principally to Norwegian authors, but additional instruction in Danish and Swedish literature is offered to students desiring to pursue these branches beyond the limits of the prescribed courses. In course 1, sub-course *a* may be elected separately; the effort is here concentrated upon acquiring a reading knowledge of the language. In course 2, which is designed for students who have completed course 1, or who already have some knowledge of the language, sub-courses *a* and *b* may be elected separately.

1. Modern Norse. Elementary. *First semester,* a: Olson's Grammar and Reader, *M., W., F., at* 12; b: Written and oral translation into Norse, *Tu., Th., at* 12. *Second semester,* a; Grammar and Reader continued, Ibsen's Et Dukkehjem, and Björnson's En glad Gut, *M., W., F., at* 12; b: Written and oral translation into Norse, the reading of easy prose selections, with exercises in conversation, *Tu., Th., at* 12.

2. Modern Norse. *First semester,* a: Kielland's Skipper Worse, and selections from the Reader, *M., W., F., at* 11; b: Overland's Lærebog i Norges Historie, and selections from Norwegian and Danish poetry, *Tu., Th., at* 11. *Second semester,* a: Ibsen's Brand, and Peer Gynt, *M., W., F., at* 11; b: Tegner's Frithiofs Saga (in Swedish), and selections from Swedish poetry, *Tu., Th., at* 11.

3. History of Scandinavian Literature. Seip and Broch's Litteraturhistorie, with exercises in composition and the study of Hofgaard's Grammatik, and Aars's Retskrivningsregler. *Throughout the year; M., W., F., at* 10.

4. Old Norse or Icelandic. Vigfusson and Powell's Reader, with lectures on early Scandinavian history, literature, and mythology. *Throughout the year; Tu., Th., at* 10.

All courses are elective. Any of the courses for which the student is prepared may constitute minor studies under the Group System. Those who make the Scandinavian languages their major line should take all of the courses.

The Scandinavian department of the University library affords excellent advantages to students pursuing these studies.

GERMAN.

PROFESSOR ROSENSTENGEL, ASSISTANT PROFESSOR VOSS, MISS STERLING, MISS REMINGTON, MR. MEISNEST, MISS HERFURTH.

A. Required Studies.

English and Civic Historical Courses—

1. Grammar (Joynes-Meissner's), and Reader (Rosenstengel's). *Freshman; M., W., Th., S., at* 10; *M., W., F., S., at* 11; *M., Tu., W., Th., at* 12. Miss STERLING, Miss REMINGTON, Mr. MEISNEST, Miss HERFURTH.

2. Historical Reader (Beresford-Webb's), and Freytag, Aus dem Jahrhundert des Grossen Krieges. *Sophomore; Tu., W., F., S., at* 9; *Tu., W., Th., F., at* 8. Miss REMINGTON.

General Science Course—

3. (a) Science Reader (Dippold's), and Cohn's Ueber Bakterien. *Freshman; M., W., Th., S., at* 10. Miss STERLING, Mr. MEISNEST.

   (b) Monographs. Rose's Chemie, Schmidt's Physikalische Geographie, Schmidt's Geologie. Sophomores who have not, during their freshman year, gained a reading knowledge of scientific German, satisfactory to the instructor. *Twice a week.** Miss STERLING.

4. Monographs. Haeckel's Ueber Arbeitsteilung in Natur und Menschenleben, Helmholtz's Ueber Goethe's Naturwissen-

*Hours and days on consultation.

schaftliche Arbeiten, Cohn's Licht und Leben, and Walther's Allgemeine Meereskunde. Junior or senior, if French is not elected. *Tu., F., at* 10; and *W.*, at 8. Miss STERLING.

Engineering Course—

5. Science Reader (Dippold's), Rosenthal's Elektrische Erscheinungen, and Siemen's Elektrische Telegraphie. *Freshman; M., Tu., W., Th., F., at* 11. Mr. MEISNEST.

Ancient Classical Course—

6. Grammar (Joynes-Meissner's), Reader (Rosenstengel's), and Classical Readings. *Sophomore; M., W., F., S., at* 9. Mr. MEISNEST.

Modern Classical Course—

7. Reader of German Literature (Rosenstengel's), and Schiller's Wilhelm Tell (Buchheim's). *Freshman; five times a week at* 12. Miss STERLING.

8. Goethe's Hermann und Dorothea (Buchheim's), and Schiller's Maria Stuart (Breul's). *Sophomore; Tu., Th., at* 10; Professor ROSENSTENGEL.

B. Elective Studies.

9. Historical Monographs: Schiller's Egmonts Leben und Tod; Schiller's Belagerung von Antwerpen; Schönfeld's German Historical Prose. *E. C. & C. H. junior or senior; M., W., S., at* 12. Miss REMINGTON.

10. a Lessing's Nathan der Weise (Primer's); Goethe's Iphigenie auf Tauris (Valentine's) and Goethe's Torquato Tasso (Wittich's). *M. C. junior; M., W., F., at* 9. Professor ROSENSTENGEL.

b Goethe's Goetz von Berlichingen (Goodrich's); first semester. Goethe's Egmont (Buchheim's), second semester. Alternating with Schiller's Wallenstein (Carruth's). *First semester:* Wallenstein's Lager and Die Piccolomini, *Second semester:* Wallenstein's Tod. *M. C. juniors; W., F.*, 12-1. Assistant Professor Voss.

C. For Undergraduates and Graduates.

11. Goethe's Faust (Thomas'). General survey of the development of German language and literature (Lehmann's Uebersicht.) *M. C. seniors; M., W., F., at* 11. Professor ROSENSTENGEL.

12. Conversation, Composition, and Translation. *Tu., Th., at* 11, *F., at* 12. Professor ROSENSTENGEL.

13. Teachers' class. Review of and lectures on German grammar, and systematic practice in teaching German. (Joynes-Meissner's Grammar, and Matthias' Kleiner Wegweiser.) *Three times a week during the second semester.** Professor ROSENSTENGEL.

14. Lectures on the history of German literature from the earliest times to the time of Klopstock, with reading of selections from authors of the periods considered. (Old and Middle High German authors in modern German translations.) *Once a week.** Miss STERLING.

15. The literature of the 18th and 19th century, especially Goethe and Schiller. Lectures. *Twice a week, first semester.** Professor ROSENSTENGEL.

16. The German drama of the present. Lectures, and readings from Litzmann, Das Deutsche Drama. *Twice a week, second semester.** Professor ROSENSTENGEL.

GERMAN PHILOLOGY.

ASSISTANT PROFESSOR VOSS.

A. For Undergraduates and Graduates.

1. History and Grammar of the Modern High German Literary Language, based on Behaghel's Die Deutsche Sprache. (This course may well serve as an introduction to the study of German philology.) *Twice a week. First semester.*

2. a Elementary Middle High German. Paul's mhd. Grammatik and extracts from the Nibelungenlied. *Twice a week. First semester.*

   b Advanced Middle High German. Paul's mhd. Grammatik, Kudrun, and F. Vogt's mhd. Literatur. *Twice a week. Second semester.*

3. Early Modern High German. Meyer, Einfuehrung in das Aeltere Neuhochdeutsche. *Two hours. First semester.*

4. Old High German. (Introductory Course.) Braune's Abriss der ahd. Grammatik, and readings from Braune's ahd. Lesebuch. *Twice a week. Second semester.*

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*Hours and days on consultation.

5. Gothic Grammar with readings from the Gospels. Braune-Balg, Gothic Grammar. *Two hours. Second semester.*
6. Duden, Etymologie der neuhochdeutschen Sprache and Hempl, German Orthography and Phonology. *Once a week, throughout the year.*

B. For Graduates.

7. Studies in the language and literature of the XVI. century. Hans Sachs, Luther, Murner, Brant. Lectures and reading of selections from Braune's Neudrucke deutscher Litteraturwerke des XVI. und XVII. Jahrhunderts. *Two hours. Throughout the year.*
8. a Modern Low German from an historical point of view. Nerger, Grammatik des mecklenburgischen Dialekts and reading of selections from Fritz Reuter's Ut de Franzosentid. *First semester. Once a week.*

   b An introduction to the Dutch language. (This course alternates with 8a.)
9. a Middle Low German from an historical point of view. Luebben's mnd. Grammatik nebst Chrestomathie. *Once a week, second semester.*

   b. Old Saxon. Gallée-Behaghel, asaechs. Grammatik, and extracts from the Heliand, ed. Behaghel or Heyne. (This course alternates with 9a.)
10. Philological Seminary: A proseminary which meets once a week throughout the year leads up to the work of the seminary. The programme of the proseminary will vary according to the needs of the students. The work of the seminary proper is distributed over three years. The chief aim is to make the student acquainted with the scientific methods used by the foremost scholars and investigators in this line of work, and to teach him to work independently. In the seminary texts of the different stages of the language will be studied from an historical and comparative point of view. In addition to this, the members of the seminary are expected to furnish a paper on a self-chosen subject out of the realm of German philology or higher literary criticism. *Three hours a week, throughout the year.* Two divisions, meeting alternately.

Middle High German Division: (1897-98) Walter von der Vogelweide, first semester. Hartmann von Aue, second semester.

Old High German Division: Tatian, first semester. Otfrid, second semester.

In the seminary as well as in all the courses in German philology, German will be used as far as possible.

For the sake of promoting the interest in German philology in the broadest meaning of the word, the "Germanistische Gesellschaft" has been organized to meet every fortnight throughout the year.

ENGLISH LANGUAGE AND LITERATURE.

PROFESSOR FREEMAN, ASSOCIATE PROFESSOR HUBBARD, DR. PYRE, AND MR. BLEYER.

I. Language.

1. Anglo-Saxon and Middle English. An introduction to the historical study of English. *First semester*, Anglo-Saxon; *Second semester*, Middle English. *Throughout the year; M., W., F., at* 9. Required in the English course, junior year. The work of the first semester may be elected without the work of the second semester. Associate Professor HUBBARD.

2. Anglo-Saxon Poetry. Study of selections, survey of Anglo-Saxon literature. *Second semester, M., W., F., at* 8. Open to students who have taken the Anglo-Saxon of course 1. Associate Professor HUBBARD.

3. Beowulf. Introduction to the study of old Germanic life. *First semester; M., W., F., at* 8. Open to seniors. Associate Professor HUBBARD.

4. Modern English Grammar. A course for teachers of English. *Tu., Th., at* 9. Open to students who have taken course 1. Associate Professor HUBBARD.

5. English Philology Seminary. Critical study of texts; historical Grammar; dialects. *Two hours a week throughout the year.* Open to graduates. Associate Professor HUBBARD.

See also Comparative Philology, course 1; French, course 10.

II. Literature.

6. General Survey of English Literature. Recitations and study of representative masterpieces. This course is prerequisite to all other courses in English Literature. *Throughout the year; M., W., F., at* 9 *and* 11. Required of sophomores in the English course. Students entering the University at the beginning of the second semester may elect the work of the second semester, if properly qualified. Dr. PYRE.

7. Chaucer. History of the literature of the XIV. and XV. centuries. *First semester; M., W., F., at* 8. Mr. BLEYER.

[8. The Literature of the Elizabethan Period. *First semester; M., W., F., at* 12. Mr. BLEYER. Given in alternate years; 1899-1900, 1901-1902.

[9. The Eighteenth Century. *Second semester; M., W., F., at* 10. Mr. BLEYER. Given in alternate years; 1897-98, 1899-1900.]

10. The English Romantic Movement. *First semester; M., W., at* 10. Professor FREEMAN. Given in alternate years; 1898-99, 1900-1901.

11. The Victorian Era. *Second semester; M., W., F., at* 10. Dr. PYRE. Given in alternate years: 1898-99, 1900-1901.

12. The Drama. Shakespeare. *Throughout the year; M., Tu., W., Th., at* 11. A part of the first semester is devoted to History of the English Drama, the remainder of the year to Shakespeare. Open to seniors. Professor FREEMAN.

[13. The Epic. Milton, Spenser. *First semester; Tu., Th., at* 11. Professor FREEMAN. Given in alternate years; 1899-1900, 1901-1902.]

[14. English Lyric Poetry. *Throughout the year; Tu., Th., at* 10. Professor FREEMAN. Given in alternate years; 1899-1900, 1901-1902.]

15. The Novel. *Second semester; M., W., at* 11. Professor FREEMAN. Given in alternate years, 1898-99, 1900-1901.

16. American Writers. *Second semester; M., W., F., at* 12. Professor FREEMAN or Dr. PYRE.

17. Literary Criticism. *Second semester; M., W., at* 10. Professor FREEMAN.

18. Poetics. *First semester; Tu., Th., at* 12. Dr. PYRE.

19. English Literature Seminary. Subject for 1894-95, Robert Browning; subject for 1895-96, Carlyle, Ruskin, Arnold, Newman; subject for 1896-97, Tennyson; subject for 1897-98, Coleridge; subject for 1898-99, Lowell and Emerson; Two hours a week in one session, *throughout the year; Tu.*, 4-6. Open to graduates and properly qualified seniors. Professor FREEMAN and Associate Professor HUBBARD.

The attention of students who intend to teach English is called to courses 1, 4, and 6.

RHETORIC AND ORATORY.

PROFESSOR FRANKENBURGER, ASSISTANT PROFESSOR KNOWLTON, DR. CAIRNS, MR. CASKEY, AND DR. BEATTY.

1. Rhetoric. Analysis of themes, fundamental qualities of style, paragraph formation, essays and orations with personal criticism. Text book, Genung's Practical Rhetoric, with supplementary readings from English masterpieces, and lectures on rhetorical criticism. *Three times a week* during the year. Required of freshmen in all courses. Professor FRANKENBURGER, Assistant Professor KNOWLTON, Dr. CAIRNS, and Dr. BEATTY.

Students who enter the University will hereafter be examined in English. See p. 81.

2. Rhetoric. Exercises in debates, essays, orations, with personal criticism. Text-book: Genung's Practical Rhetoric, with supplementary readings from English masterpieces, and lectures on rhetorical criticism. *Twice a week during the year.* Required of sophomores in 1898-99. Professor FRANKENBURGER, Assistant Professor KNOWLTON, Dr. CAIRNS, and Dr. BEATTY.

3. Advanced Rhetoric. Open to those who have completed courses 1 or 2 above. Analysis of great essays, orations and prose fiction, with higher rhetorical and literary criticism. Text-book: D. J. Hill's Science of Rhetoric, and lectures with supplementary readings. *Throughout the year; M., W., F., at* 12. Elective. Professor FRANKENBURGER.

[4. Forensics. *M., W., F., at* 12. *throughout the year.* Elective. Professor FRANKENBURGER. To be given in 1899-1900.]

5. Analytical study of masterpieces, ancient and modern. *Twice a week throughout the year; Tu., and Th., at* 11. Elective. Assistant Professor KNOWLTON.

6. Advanced Composition. This course is supplementary to course 7. *Throughout the year; M., W., F., at* 11. Elective. Assistant Professor KNOWLTON.

7. Rhetorical Seminary. Original composition; the philosophy of criticism with the deduction and application of literary canons. *Two hours a week in one session during the year.* Open to all seniors and juniors who have taken courses 1 or 2. Professor FRANKENBURGER, Assistant Professor KNOWLTON, Dr. CAIRNS, and Mr. BEATTY.

8. Lectures on literary and rhetorical criticism. *Once a week throughout the year.* Dr. BEATTY.

9. Elocution and Dramatic Reading. Bell's Principles of Elocution, with lectures and gesture; declamation with personal criticism; dramatic reading, Macbeth and Othello, or Julius Caesar and Hamlet. Open to those who have taken course 9 or its equivalent. *Twice a week throughout the year.* Professor FRANKENBURGER.

10. Elocution. Voice culture, reading, declamation, orations, and gesture exercises. Lectures will be given upon vocal physiology, the proper use and care of the voice, reading, and gesture. *Throughout the year; M., W., F.* Mr. CASKEY.

11. Oratorical Delivery. Open to those who have had sufficient previous preparation to be able to do the work. Declamations and reading from the works of the great orators. Lectures upon the principle of gesture and upon oratorical delivery. *First semester; M., W., F.* Mr. CASKEY.

12. Elocution. Reading and declamation with special reference to analysis of emphasis, and to the interpretation of thought and the feeling by voice and gesture. Lectures upon emphasis and gesture, and upon the interpretation of poetry. *Second semester; M., W., F., at* 9. Mr. CASKEY.

13. Elocution and Oratory. (Elective in Law School.) Voice training for effective quality; special drill on methods of reading statutes and other documents before a court or a jury. Practice in declamation and reading from the great orators, and in extempore speaking. Lectures on vocal physiology, and on the use and care of the voice, and on principles of gesture. *Twice a week during the year.* Mr. CASKEY.

14. Elocution. (Elective in College of Engineering.) Voice training, and plain reading and speaking of the kind most needed by business and professional men. Lectures upon the use and care of the voice, and upon the principles of effective reading and speaking. *Second semester; twice a week.* Mr. CASKEY.

Arrangements can be made for private lessons by consulting Mr. CASKEY.

MATHEMATICS.

PROFESSOR VAN VELZER, PROFESSOR SLICHTER, ASSISTANT PROFESSOR SKINNER, DR. DOWLING, MR. RUNNING, AND MR. TALLMAN.

1. Algebra. Progressions, arrangements and groups, binomial theorem, theory of limits, undetermined coefficients, derivatives and series. Text-book: Van Velzer and Slichter's University Algebra. *First semester; three times a week.* Professor VAN VELZER, Assistant Professor SKINNER, Dr. DOWLING, and Mr. TALLMAN.

   This course will be repeated in the second semester if a sufficient number of students desire it at that time to form a class.

2. Trigonometry. In this course the ratio system is used exclusively and special stress is laid upon goniometry. *Second semester; three times a week;* same divisions as course 1.

3. Algebra (continuation of course 1). This course is elective for all students who have taken course 1. *Second semester; twice a week.* Assistant Professor SKINNER.

4. Analytic Geometry (elementary course). Straight line, conic sections, general equations of the second degree, transcendental curves, and an introduction to geometry of three dimensions. *Twice a week for one year.* Dr. DOWLING.

5. Calculus (elementary course). Differentiation and integration of functions of one variable with the usual geometric applications. *Three times a week for one year.* Dr. DOWLING.

6. Elliptic Functions. This course must be preceded by course 9. *Twice a week for one year.* Dr. DOWLING.

8. Calculus (advanced course). Partial derivatives and multiple integrals with the usual geometric applications. *Twice a week for one year.* Dr. DOWLING.

9. Differential Equations. Ordinary and partial differential equations with a few geometric and mechanical applications. This course must be preceded by course 8 or taken along with it. *Three times a week for one year.* Professor VAN VELZER.

10. Higher Trigonometry. This course must be preceded by course 5. *Second semester; twice a week.* Assistant Professor SKINNER.

11. Analytic Geometry of Two Dimensions (advanced course). Modern methods in plane analytic geometry. This course must be preceded by course 4. *Three times a week for one year.* Professor VAN VELZER.

12. Theoretical Mechanics. An elementary course in analytical mechanics. This course may be taken by those who have had analytic geometry and calculus. *Three times a week for one year.* Professor SLICHTER.

13. Newtonian Potential Function. Lectures and required readings on the theory of potential with an introduction to spherical harmonics. *Twice a week for one year.* Professor SLICHTER.

14. Projective Geometry. *Twice a week for one year.* Dr. DOWLING.

15. Analytic Geometry of Three Dimensions. This course should be preceded by courses 8 and 11. *Twice a week for one year.* Professor VAN VELZER.

[16. Quaternions. *Twice a week for one year* in alternate years. This course will not be given in 1898-99. Assistant Professor SKINNER.]

[17. Theory of Functions. *Three times a week for one year* in alternate years. Dr. DOWLING.]

18. Partial Differential Equations of Mathematical Physics. Based on Riemann's Lectures, and Byerly's Spherical Harmonics. *Twice a week for one year* in alternate years. Professor SLICHTER.

[19. Theoretical Hydrodynamics. Lectures on fluid motion. *Twice a week for one year,* in alternate years. This course will be given in 1898-99. A course in Theory of Elasticity may be substituted for this course. Professor SLICHTER.]

20. Modern Algebra. Invariants, covariants, etc. This course must be preceded by courses 3 and 8. *Twice a week for one year,* in alternate years. Professor VAN VELZER.]

[21. Theory of Substitutions. *Three times a week for one year,* in alternate years. Assistant Professor SKINNER.]

22. Theory of Numbers. *Twice a week for one year* in alternate years. Professor VAN VELZER.

Other Advanced Courses. To graduates and others prepared to take them, courses will be given when desired in definite integrals, advanced differential equations, Abelian functions, and higher plane curves.

Mathematical Group.

Students who desire to take the degree of B. A., B. L. or B. S. in mathematics will be admitted to the mathematical group at the beginning of the sophomore year. Such students may omit studies prescribed for the sophomore year of the course to an amount not exceeding six hours a week and substitute five hours a week of mathematics therefor. Students expecting to write theses in applied mathematics should take the course in mechanics in their junior year.

ASTRONOMY.

PROFESSOR COMSTOCK.

1. General Astronomy. Fundamental concepts of astronomy and the more important problems associated with them, so far as the latter admit of treatment by elementary methods. This course is essentially non-mathematical. *Three times a week during the first semester.*

2. Observatory Work and Methods. This course is designed to give to the student some familiarity with the principal astronomical instruments and the methods of employing them in research. It can be undertaken only by students who have completed a course in general physics, the mathematics of the freshman year and course 1 in Astronomy. The mathematics of the sophomore year must either precede or be taken concurrently with the course. *Twice a week during the first semester; three times a week during the second semester.*

3. Special Topics in Celestial Mechanics. Integration of the equations of motion. Computation of ephemerides for undisturbed motion. Double star orbits. Comet orbits. Special perturbations.

This course presupposes in the student a working knowledge of the infinitesimal calculus and the elements of dynamics. *Three times a week during the first semester, twice a week during the second semester.*

4. Astrophysics. An elementary course in astrophysics with special reference to spectroscopy and photometry is offered to students who have completed course 1 in Astronomy. Especial attention will be given to the experimental side of the subject, including the use of the instruments both in the laboratory and when attached to the telescope. *Three times a week during the second semester.*

5. Graduate Courses. Graduate students and others desiring to pursue advanced astronomical studies will be received in the Washburn Observatory as assistants and will take part in the regular series of observations with the equatorial telescopes or with the meridian instruments, at the same time continuing their theoretical studies. Facilities for independent original work will be afforded to such students, and such work, if of sufficient value, will be printed in the Publications of the Washburn Observatory. Ten volumes of these Publications, representing the work of the observatory prior to 1897, have already been issued.

For other courses of instruction consult the title Astronomy, in the announcement of the College of Mechanics and Engineering. See, also, the title Washburn Observatory.

PHYSICS.

General Physics: PROFESSOR SNOW, ASSISTANT PROFESSOR AUSTIN, MR. WOOD, MR. SMITH, MR. WILDER and MR. SHEDD.
Mathematical Physics: PROFESSOR DAVIES.

1. General Lectures and Introductory Laboratory Practice. Given as a full study throughout the year. Required of students in the General Science and Engineering courses. Also elective for students in the Ancient and Modern

Classical, Civic Historical, and English courses. Lectures *M., Tu., W., Th., at* 12 o'clock. Professor SNOW. One recitation by the class in smaller sections at hours to be assigned. Professor SNOW, Mr. WOOD, and Mr. SMITH. Laboratory practice twice a week at hours to be arranged. Assistant Professor AUSTIN, Mr. WOOD, Mr. SMITH, and Mr. WILDER.

In the general lectures, the subjects of mechanics and heat, electricity and magnetism, acoustics, and optics are treated and are fully illustrated by the extensive collection of apparatus for lecture room demonstration. In the laboratory the work is of such a nature as to acquaint the student with the theory and practice of physical measurement.

The course as thus arranged is intended for those taking up the study for the first time, or for those who have studied it only in an elementary manner. A knowledge of plane trigonometry including the use of logarithms is required for registration.

2. Advanced Laboratory Practice. Presupposes the completion of course 1 or its equivalent. Required of juniors in the Physics Group and elective for all other courses. *Three times a week throughout the year.* Professor SNOW, Assistant Professor AUSTIN and Mr. WOOD.

It is desired in this course to give the student further practice in careful physical manipulation, and to acquaint him with the most accurate methods employed in the determination of physical constants.

3. This Work. Required of seniors in the Physics Group. Full study throughout the year. Professor SNOW, Assistant Professor AUSTIN and Mr. WOOD.

At the beginning of the first semester, the student is expected, with the advice of the instructors, to take up some special line of investigation, which is to be conducted, under the direction of those in charge of the department, throughout the year. Not only are the facilities of the laboratory placed at the command of these students, but, as occasion may require, any piece of special apparatus necessary to the carrying out of their investigations will be secured.

4. Precision of Electrical Measurements. A laboratory course in the exact determination of electrical quantities. This

course involves the highest accuracy attainable in making determinations of electrical constants and magnetic elements in absolute measure. *First semester; three times a week; hours to be assigned.* Required of juniors in Electrical Engineering. Mr. SHEDD.

5. Theoretical Physics. Part I. Mathematical Introduction and Mechanics. Part II. Elementary Electricity and Magnetism. *Three hours per week throughout the year.* Required of juniors in the Physics Group.

6. Theoretical Physics. Part III. Theory of Heat, including gas theory and elementary thermo-dynamics. Part IV. Theory of Light, based on Preston's Light as a text, but with a more complete treatment of the dispersion theory and diffraction. *Three hours per week throughout the year.* Required of seniors in the Physics Group. Mr. WOOD.

Courses 5 and 6 are open to all students who desire a more thorough knowledge of physics than can be obtained in the general course. The small amount of the higher mathematics required is given in the introduction.

7. Introduction to the Study of Mathematical Physics. This course of lectures will treat of the fundamental equations of mathematical physics, and will be preparatory to the more advanced courses offered by Professor Davies in Mathematical Physics. *Twice a week throughout the year.* Elective for juniors in the Physics Group. Assistant Professor AUSTIN.

8. History of Mathematical Physics in the Nineteenth Century. This course is primarily intended for graduate students having a fair knowledge of the elements of mathematical physics, but is also open to such undergraduate students as can avail themselves of it. *Twice a week throughout the year.* Professor DAVIES.

9. Mathematical Theory of Sound. An exhaustive mathematical treatment of the subject of acoustics. This course presupposes the equivalent of course 7. A knowledge of differential equations will also be required. *Throughout the year; M., W., F., at* 2. Professor DAVIES.

10. Mathematical Theory of Electricity and Magnetism. This course follows the treatment of the subject as given in Gray's Theory of Absolute Measurements of Electricity and Magnetism, and Webster's Electricity and Magnetism. *Four lectures a week throughout the year.* Professor DAVIES.

11. Mathematical Physics. This course will supplement course 7. It will be mainly concerned with waves in elastic media, including electro-magnetic waves and light. It is intended to make the study of normal functions as applied to such subjects especially thorough and fundamental. The subject will be taught by lectures, reference being made to the most recent standard works on theoretical physics. *Full study throughout the year.* Professor DAVIES.

This course can be continued as a graduate course by such students as desire to make a specialty of the subject.

12. Graduate Study. This course is designed for those who have completed the equivalent of the work represented by the preceding courses, and who now desire to devote some time to investigation in special lines. No feature of the department is emphasized more strongly than this. Persons desiring to enter upon such a course are advised, with the assistance of the instructors, to select some special line of research to which several months of time may be devoted. This work will be encouraged by reserving rooms in the laboratory which are devoted exclusively to research work, and by securing whatever special apparatus may be necessary to the successful carrying out of original investigation. Professor SNOW, Professor DAVIES, Assistant Professor AUSTIN, Mr. WOOD.

13. Colloquium. A class, meeting one evening each week, for the critical reading and discussion of the current periodical literature. Professor SNOW, Professor DAVIES, Assistant Professor AUSTIN, Mr. WOOD, Mr. SMITH, Mr. WILDER, and Mr. SHEDD.

Required of all students in the Physics Group.

CHEMISTRY.

PROFESSOR DANIELLS, ASSISTANT PROFESSOR HILLYER, DR. KAHLENBERG, MR. LINCOLN, AND MR. BASSETT.

1. General Elementary Chemistry. A daily exercise throughout the year as follows: *First semester.* Descriptive Inorganic Chemistry; lectures and laboratory work. *Lectures at* 2. Professor DANIELLS, Assistant Professor HILLYER Mr. LINCOLN and Mr. BASSETT. *Second semester.* Qualitative Analysis until the Easter recess; then Descriptive

Organic Chemistry, lectures and laboratory work. Assistant Professor HILLYER, Mr. LINCOLN, and Mr. BASSETT.

2. Advanced Inorganic Chemistry, second year. Preparation of chemically pure salts; determination of the equivalence of elements and the density of gases; chemical theories and their verification; the principles of gravimetric and volumetric analysis and their applications in the analysis of ores, crude metals, slags, technical products, and gases, together with one exercise each week in theoretical chemistry, the solving of chemical problems and the history of chemistry. *Daily throughout the year.* The amount of time devoted to this subject may be more or less than that of a full study, and will be arranged upon consultation with the instructors. Professor DANIELLS and Mr. LINCOLN.

3. Advanced Inorganic Chemistry, third year. The amount of time and the character of the work will be arranged upon consultation with the instructors. Besides the work required for a graduation thesis, it may consist of advanced work in theoretical, physical, or anayltical chemistry, or in research work. Professor DANIELLS and Dr. KAHLENBERG. For graduates and undergraduates.

4. Toxicology, etc. A course in toxicology, urine analysis, and sanitary water analysis will be given the second semester of each year. Open only to those who have taken at least one semester of quantitative analysis. Professor DANIELLS.

5. Quantitative Analysis for students in Pharmacy, daily during the first half of the first semester. Professor DANIELLS and Mr. LINCOLN.

6. Water Analysis for students in Engineering. Analysis of mineral waters, sanitary water analysis, the examination of waters for manufacturing purposes, sources of contamination, methods of purification, etc. *Daily during the second semester.* Professor DANIELLS.

7. Advanced Organic Chemistry. Reviews and expansion of the work of the elementary course, with laboratory work mainly in the preparation of aromatic compounds, accompanied by special work on assigned topics. *Full study; first semester.* Assistant Professor HILLYER.

Study of methods of preparation of organic compounds: oxidation, reduction, hydrolysis, dehydration, preparation of salts. Following this work either organic analysis may be taken up or the study of organic compounds of special interest to those preparing for medicine or work in the biological sciences. For graduates or undergraduates. Assistant Professor HILLYER.

8. Physical Chemistry. a. General Course: *First semester*, Stoichiometry. The theory of the constitution of matter; mass relations of chemical compounds; the properties and the kinetic theory of gases; relations between physical and chemical properties of liquids; properties and theory of solutions; physical and chemical properties of solids; periodic law and theory of chemical compounds. Lectures and recitations. *Tu. and Th., at* 8. *Second semester*, chemical energy and chemical affinity, thermal chemistry; electro-chemistry with special attention given to the theory of electrolytic dissociation, conductivity of electrolytes, electrolysis, primary and secondary batteries; the law of mass action, chemical equilibrium, and chemical kinetics. Lectures and recitations, *M., W., and F., at* 8.

Students entering this course should have a knowledge of descriptive inorganic chemistry, qualitative analysis, descriptive organic chemistry, and should have taken a year's work in physics. A knowledge of mathematics through the calculus is also highly desirable. Dr. KAHLENBERG.

b. Laboratory Practice in Physico-chemical Measurements. The calibrating and testing of apparatus; determination of molecular weights and volumes; thermal and optical properties of liquids, solutions and solids; conductivity of electrolytes and electromotive forces of galvanic chains; speed of chemical reactions; studies in chemical equilibrium. Ostwald's Physico-chemical Measurements. This course supplements course 1 and together with it makes a full study. Dr. KAHLENBERG.

9. Electrochemistry. The work embraces the historical development of the subject, a detailed study of the conductivity of electrolytes, electrolysis and the chemistry of primary and secondary batteries with special reference to the theory of electrolytic dissociation. This course is de-

signed for students that have taken course 1, and also for students of physics and engineering. Two lectures per week throughout the year at hours to be arranged. Laboratory work sufficient to make a full study may be elected in connection with these lectures. Dr. KAHLENBERG.

10. Advanced Physical Chemistry. The second year's work in physical chemistry will consist mainly of laboratory work, in connection with which lectures on special subjects will be given and original articles will be assigned for reading and study. The character of the laboratory work will as far as possible be chosen to meet the individual needs of the student. In the first semester the special lectures will be on thermal chemistry, and in the second semester on mathematical chemistry. One hour per week, at times to be arranged. Lectures and laboratory work together make a full study. For graduates and undergraduates.

11. Research Work in Physical Chemistry. Advanced students can take up research work in physical chemistry. The character of this work will be determined by the preparation that the student has and the facilites of the laboratory. *Full study.* Dr. KAHLENBERG.

Twelve hours' laboratory work a week is regarded as the equivalent of a full study.

The chemical library is well supplied with works of reference and with chemical periodicals, enabling students to familiarize themselves with the most recent investigations bearing upon the work in hand.

The division of time between organic and inorganic chemistry for the junior and senior years will be made after consultation with the instructors.

Students who wish to become practical chemists, physicians, teachers, etc., will, so far as possible, be given work that will be of greatest service in accomplishing the end they have in view.

Instructors and advanced students meet weekly during the year to report on articles in the current chemical journals and on assigned topics suggested by recent work in chemistry. Nearly all the more important chemical journals are accessible for use in this work, and the department library is steadily growing by accessions of the best books of reference.

MINERALOGY, PETROLOGY, AND GEOLOGY.

PROFESSOR VAN HISE, ASSISTANT PROFESSOR HOBBS, AND ASSISTANT PROFESSOR CLEMENTS.

For students who wish to take a general educational course in geology no definite prerequisites are specified. To pursue successfully a long course in mineralogy or geology, at least elementary courses in physics and chemistry are prerequisite. Further, all students who intend to take geology as a major study should, if possible, take mineralogy 2 during the first semester of the previous year, and a full year's work in this subject is a very advantageous preparatory study to advanced work in geology. It is advised that when possible the mineralogy be taken in the sophomore year. Under the Group system the courses are arranged by the professor in charge. The special work may be geology, under Professors VAN HISE and CLEMENTS, or mineralogy or petrology, under Assistant Professor HOBBS.

MINERALOGY.

ASSISTANT PROFESSOR HOBBS.

1. General Course. Given as a full study throughout the year, Crystallography and physical mineralogy are considered, and descriptive mineralogy is begun during the first semester. Williams' Elements of Crystallography is used as a text in the course of crystallography. Physical and descriptive mineralogy is treated in lectures, quizzes, and practicums. Blowpipe analysis and determinative mineralogy by blowpipe methods are taken up in the second semester. Additional work with the goniometer in measuring and projecting crystals is undertaken by all special students, in connection with the work in crystallography. *M., Tu., W., Th., F., at* 11 *during the first semester, and from* 8 *to* 10 *during the second semester.*
2. Engineer's Course. A short course adapted to the needs of engineering students is given twice a week during the first semester. The morphological and physical properties which are of most value for purposes of identification of minerals are briefly studied, then the simple blowpipe tests, but the greater part of the time is devoted to the examination and identification of mineral species by blowpipe and physical tests. The commoner minerals and

those of economic importance are given special attention. Required of civil engineers in the sophomore year. *First semester.*

3. Blowpipe Analysis. A short course in blowpipe analysis especially adapted to the needs of pharmacy students. *Twice a week during the second semester.*

4. Crystallography for Students of Chemistry and Pharmacy. In the first semester a three-fifths course in crystallography is given for the benefit of students of chemistry and pharmacy. Williams' Elements of Crystallography will be used as a text in considering the symmetry and classification of crystals and will be followed by practice in the measurement of crystals by means of the contact and reflecting goniometers. The projection and drawing of crystals will be briefly considered. The optical means of distinguishing the symmetry of a crystal will also be considered and illustrated by practice with the polarizing microscope, each student being supplied with an instrument for his special use. *M., W., F., at* 9, though this hour may be changed if another is found to be more convenient.

GEOLOGY.

PROFESSOR VAN HISE, AND ASSISTANT PROFESSORS HOBBS AND CLEMENTS.

1. Part I. General Geology. *Three times a week:* The geological forces, both epigene and hypogene, now modifying the world; their past, present, and future work; rocks and their original and secondary structures. *Twice a week:* The physiography of the United States, each province being treated in reference to its development, and in its relations to population. A course especially adapted to students who intend to teach physical geography, those making a specialty of history, and those wishing to obtain a general comprehension of the character of the earth upon which we live.

Numerous short excursions. First semester to holiday vacation. *M., Tu., W., Th., F., or M., W., F., at* 12. Professor VAN HISE.

Part II. Historical Geology. Special emphasis is given to the history of the North American Continent, including both

its physical and life development. Lecture room and laboratory work. First semester from holiday vacation. *M., Tu., W., Th., F.; or M., W., F., hours to be determined.* Assistant Professor CLEMENTS.

Required of group students in geology and seniors in civil engineering. This course is so arranged that it can be taken as a three-fifths or five-fifths study for the first semester.

2. Part I. Applied Geology. Treats of potable waters, structural materials, soils, mineral fertilizers, mineral fuels, iron, copper, lead, and zinc ores. Must be preceded by course 1. Required of group students in geology and seniors in civil engineering. First six weeks of second semester. *M., Tu., W., Th., F., at* 12. Equivalent to two-fifths study for one semester. Assistant Professor CLEMENTS.

Part II. Field Geology. Study of selected areas adjacent to Madison. In different years the work has included a study of the lakes, a study of the Pleistocene deposits, and a study of the Paleozoic rocks. In each of these studies areal maps are made. The particular line of work followed in any given year depends upon the size and character of the class. An excursion of several days' length is taken to study the districts, including the quartzite ranges of Baraboo and the Dales of the Wisconsin. Required of group students in geology. Last 12 weeks of second semester. *F.*, 2-6, *Sat.*, 9-1, *and* 2-6. Equivalent to three-fifths study for the semester. This course may be taken by students having had course 1 as a three-fifths or five-fifths study, although the latter is recommended. Professor VAN HISE.

3. Petrology. The work in petrology is given as a full study throughout a year and naturally follows the general course in mineralogy. The work of the first semester which is devoted to optical mineralogy and the means of distinguishing the rock making minerals may be taken independently if desired. The course includes lectures on the optical properties of minerals and microscopic study of the common rock-making minerals. In the course in petrology is included a course of lectures on the structures and classification of the crystalline rocks but most of the time is devoted to the practical study of rocks

by means of the microscope and its accessories. The study of some problem of crystalline geology is undertaken as thesis work.

Required of group students in geology. *M., Tu., W., Th., F.*, 8-10, during the first semester or at other hours arranged with the instructor. Assistant Professor HOBBS.

4. Systematic Paleontology. Special stress is placed upon invertebrate paleontology. Students will have an opportunity of becoming familiar with the most characteristic fossils, by examination in the lecture room and more detailed study in the laboratory. *First semester; M., W., F. Hours to be determined on consultation.* Assistant Professor CLEMENTS.

5. Physical Geology and Pre-Cambrian Geology. The deformation of rocks, including an analysis of folds, cleavage and fissility, faults, joints, and autoclastic rocks. The metamorphism of rocks so far as it concerns stratigraphy. Stratigraphy, including a discussion of bedding, basal conglomerates, unconformity, structural work in non-fossiliferous rocks, and practical methods of field work. The Archean, including its character, origin, delimitations, and stratigraphy. The Algonkian, including its character, origin, delimitations, and statigraphy. The pre-Cambrian historical geology of North America. Accompanied by seminary and laboratory work. The course runs throughout the year in such a manner as to be equivalent to five times weekly for one semester. Given whenever the course is desired by a sufficient number of students. Professor VAN HISE.

6. Principles of Metamorphism and the Metamorphic Rocks. The forces, agents and general processes of metamorphism. Classification and description of the metamorphic sedimentary and metamorphic igneous rocks. Accompanied by seminary and laboratory work. The course runs through the year in such a manner as to be equivalent to five times weekly for one semester. Given whenever the course is desired by a sufficient number of students. Professor VAN HISE.

7. Systematic Investigation of Individual pre-Cambrian Districts of Wisconsin, leading to reports upon them which shall consider both their stratigraphy and petrology, and be accompanied by detailed geological maps and sec-

tions. Areas being studied in 1895-99, Wausau, Utley, Berlin, Montello, Moundville, and Observatory Hill. *Field and laboratory work. Course continuous throughout the year.* Professor VAN HISE and Assistant Professor HOBBS.

BIOLOGY.

PROFESSOR BIRGE, PROFESSOR BARNES, PROFESSOR RUSSELL, ASSISTANT PROFESSOR MILLER, ASSISTANT PROFESSOR MARSHALL, ASSISTANT PROFESSOR CHENEY, ASSISTANT PROFESSOR TRUE, MR. FROST, AND MR. SMITH.

1. General Biology. Introductory to both botany and zoology, and required as preliminary to all advanced work in either department. Two recitations or lectures and eight hours' laboratory work a week, using as handbooks Arthur, Barnes & Coulter's Plant Dissection and Marshall's The Frog.

   The lectures are given in the afternoon at 3 in the *first semester*, 2 in the *second semester*, *Tu., Th.* Professor BARNES and Professor BIRGE. For laboratory work the class is divided into two or three sections, each meeting for two hours daily. Dr. MARSHALL and Mr. SMITH. Quiz divisions are also required to meet at least once each week. Required of freshmen in General Science course.

   The first semester is devoted to a study of the general principles of biology as illustrated by plants. The chief types of structure in the vegetable kingdom are also examined. The second semester is given to zoology. Students can enter the course in either semester.

2. Vertebrate Anatomy. This course consists of lectures and dissections of typical vertebrates in the laboratory. In the first semester the work will be on the skeleton, muscles, and viscera; in the second semester on the nervous and vascular systems. *Throughout the year;* 11-1. Assistant Professor MILLER.

3. Invertebrate Zoology. A. General course in the morphology and classification of Invertebrates. *First semester; full study.*

   B. Anatomy of Arthropoda and Echinoderma. *Second semester; full study.* Professor BIRGE.

4. Human Physiology. A. Nutrition, respiration, excretion. *First semester; M., W.,. F., at* 8. B. Motion, nervous system, and sense organs. *Second semester; Tu., Th.,* 8. Text-book, Martin's The Human Body. Professor BIRGE.

6. Vertebrate Histology. Instruction in this course is given both by laboratory work and lectures. This course should be preceded by course 2. *Full study; first semester,* 9-11. Assistant Professor MILLER.

7. Vertebrate Embryology. This course follows course 4 and is a full study for the second semester. The development of the chick during the first four days is studied. Laboratory work and lectures. *Full study; second semester,* 9-11. Assistant Professor MILLER.

8. Advanced work in Histology and Embryology. This course is open to graduate students and such undergraduate students as may wish to carry on their work along special lines. Courses 2, 6, and 7 must have been taken in order to enter this course. Modern methods of research and reconstruction methods will receive special attention. Assistant Professor MILLER.

9. Thesis work in Vertebrate Anatomy, Histology, or Embryology. Students who make the course in Vertebrate Anatomy their major study will take course 2 in their sophomore year, and courses 6 and 7 in their junior year, leaving the senior year free for thesis work. The subject of the thesis should be selected during the junior year, and the preliminary work begun. Assistant Professor MILLER.

10. Invertebrate Embryology. Special attention will be given to the segmentation of the egg, and the formation of gastrula in various groups of invertebrates, and to the leading types of metamorphosis of invertebrates. *Second semester; full study.* Assistant Professor MARSHALL.

11. Thesis Work in Invertebrate Zoology. Group students in zoology may take their major subject in invertebrate zoology, following courses 1 and 3 by 10. Work for a thesis and for graduates is offered in the study of lake life, for which the situation of the University affords unusual advantages. During the past year work has been done on the annual variation and the vertical distribution of the pelagic crustacea. Professor BIRGE and Assistant Professor MARSHALL.

Students can take a major line of study in either invertebrate or vertebrate zoology. Persons intending to teach zoology in high schools should take at least the first half of course 3 in addition to course 1.

12. Summer Courses in Zoology. See announcement of Wisconsin Summer School on later pages.

15. General Morphology of Plants. The course is recommended only as a sequel to 1. Its aim is, by a study of the structure of various types of plants, to fill out and complete the student's idea of the forms of vegetable life. To this end such plants will be used as supplement those in course 1. First semester, Thallophyta and Bryophyta; second semester, Pteridophyta and Spermatophyta. In the second semester attention may also be given to collecting and naming such groups of plants as each student may select for his special study. Ten hours a week throughout the year. *Daily*; 2-4 P. M. Professor BARNES.

16. Vegetable Histology. Systematic study of the tissues of phanerogams and ferns. Use of reagents and stains, modes of imbedding, section cutting, and mounting. Ten hours a week, first semester. Laboratory guide: Strasburger's Practical Botany. *Daily; hours on consultation.* Assistant Professor CHENEY.

17. Vegetable Physiology. A course of lectures with demonstrations of the salient points in the life processes of plants, intended for those who have neither the time nor antecedent preparation required for course 18. The course should be preceded by Chemistry 1 and Physics 1, but is open to Juniors and Seniors of all courses. *Second semester, Tu., Th., at* 12. Professor BARNES.

18. Experimental Vegetable Physiology. This will be supplemented by reference readings. Biology 15 or 16, Chemistry 1, and Physics 1 and 2 must precede this, and it is desirable that those taking it should be able to read German readily. The experiments occasionally require extra time and observations at unusual hours, which those taking the course should be willing to give. For graduates and undergraduates. Ten hours a week throughout the year. *First semester*, Physical Physiology; *second semester*, Chemical Physiology. *Daily; hours on consultation.* Professor BARNES.

19. Bryology. The large collections of mosses and of the literature relating to the classification offer unusual facilities for special and original work in the study of the moss flora. The course is offered only to graduates or advanced students who can devote considerable time to its prosecution, and no credit will be given for less than a year's work. *First semester*, determination of general collections. *Second semester*, critical study of assigned group. Ten or fifteen hours a week throughout the year. Manuals: Lesquereux and James' Mosses of North America; Barnes and Heald's Keys to the Genera and Species of Mosses. *Daily; hours on consultation.* Professor BARNES.

20. General Morphology of Plants. An elementary course designed primarily for pharmacy students, but open to others who desire to begin the study of botany. *First semester*, the morphology of fungi, algæ, lichens, mosses, and ferns, illustrated by selected types. *Second semester*, the form and structure of the organs of seed plants, the identification of selected flowering plants and the preparation of an herbarium. The course will be supplemented by botanical excursions, six in the autumn and ten in the spring. *Daily*, 8-10. Excursions on Saturdays. Assistant Professor CHENEY.

21. Trees and their Characteristics. A course designed for those who desire to acquaint themselves with forest trees. It contemplates a study of the vegetative and reproductive structures. The general habit and conditions of growth, the anatomy of the wood, etc. Lectures and laboratory work with occasional excursions. Those who expect to take this course should know how to use a microscope and should have had at least the equivalent of one semester's work in general botany. Twice a week through the year. May be taken either semester or both. Hours to be arranged on consultation. Assistant Professor CHENEY.

22. Advanced Work in Anatomy. Special subjects for original investigation will be assigned to such students as are properly qualified, desiring to do advanced work. Assistant Professor CHENEY.

23. Plant Ecology. A. discussion of effects exerted on plants by the principal factors of their environment. Light; heat, composition and texture of soil, water supply, atmos-

pheric movements, competition with other plants and with animals, struggle with parasites, assistance from plants and animals, etc., are among the topics to be touched upon. The effect of these factors in determining plant distribution will receive some attention.

In order to make discussions concrete, frequent excursions to parts marked by various ecological conditions, are contemplated.

Three lectures per week during second semester. Elective. Assistant Professor TRUE.

25. Physiology of Certain Plant Constituents. In this course certain plant products of economic interest will be discussed from the standpoint of plant physiology. Among them may be mentioned the tannins, volatile oils, resins, sugars, starch, gums, etc. One lecture weekly, *second semester.* Elective. Assistant Professor TRUE.

26. Pharmacognosy for Pre-Medical Students. This course provides for the presentation of the essentials of pharmacognosy. The study of the crude drugs in the laboratory is accompanied by lectures giving descriptions, history, constituents, and uses of the more important drug plants. *First semester; three times a week;* two lectures and two hours' laboratory work per week. Assistant Professor TRUE.

27. Summer Courses in Botany. See announcement of the Wisconsin Summer School on later pages.

30. General Bacteriology. This course considers the bacteria in their general biological aspect. Special emphasis is laid upon the relation of bacteria to their environment and the rôle which they play in nature. Various typical forms are studied with the microscope and in the different culture media.

This course is fundamental and should be regarded as a basis on which further specialization along applied lines can take place, as in medical, sanitary and dairy bacteriology. Applicants must be thoroughly familiar with the compound microscope. *Lectures or equivalent M., W., F., at* 11. *First semester. Full study.* Professor RUSSELL and Mr. FROST.

31. Medical Bacteriology. This course is especially designed for pre-medical students. It includes a detailed study of the most important pathogenic basteria, the methods for their

isolation and rapid diagnosis in both man and animals; also the testing of water filters, antiseptics, disinfectants, etc. Examination of food supplies, soil, water, etc., and the production and standardization of antitoxines. Course 30 is a pre-requisite. *Lectures twice a week, M. and F. at* 11. *Full study, second semester.* Professor RUSSELL and Mr. FROST.

32. Thesis Work in Bacteriology. Students who desire to select their thesis in this department must take course 30 in their junior year or before and select the subject for their thesis before the close of the junior year. Professor RUSSELL and Mr. FROST.

33. Biology of Water Supplies. This course is adapted to the needs of students in Sanitary Engineering. It includes a study of the microscopical plants and animals usually found in water supplies; the isolation and cultivation of water bacteria and their relation to disease; the testing of filters and other methods for the purification of water; and the disposal of sewage. *First semester, full study, lectures and laboratory work.* Required of seniors in Sanitary Engineering. Mr. FROST.

34. Research Work in Bacteriology. Graduates and undergraduates who have had courses 30 and 31 or their equivalent and who desire to carry on research work may arrange for the same by consultation. A reading knowledge of German and French is desirable for this work. Professor RUSSELL and Mr. FROST.

35. Communicable Diseases: Their Cause and Prevention. This course consists of weekly lectures of as non-technical character as possible, and is intended for the general student. It includes a discussion of Bacteria and their mode of growth as agents of disease; the more important infectious diseases, manner of transmission, together with their prevention and treatment by the use of disinfectants, vaccines and antitoxines. These lectures are illustrated by cultures, microscopical preparations, and lantern slides. The course is intended primarily for students in other than the General Science Course. No previous work in science is required. *Second semester, one-fifth study.* Mr. FROST.

The Biological Journal Club meets on Thursdays for reviews of current biological literature, presentation of

original work, and of the theses of students in the departments of botany and zoology.

Those who wish to pursue continuous work in botany for four years can do so by taking the courses in the following order: 1; 15; 17 and 21; 18; or, 1; 15; or 16, 17 and 21; 18; 19; or, 1; 16; 17 and 21; 15; 18.

For those who expect to teach botany in high schools 15 and 17 are the *minimum* preparation recommended; they are advised to take in addition Course 18 if possible.

The course in general biology 1, is to be taken by students in the course system and as one of the basal studies by those making biology a major under the Group System. A major in biology can be made by adding to Course 1 two years' work in either botany or zoology.

In all full year courses work may be begun in the second semester and completed the following year.

MUSIC.

PROFESSOR PARKER AND MR. SLEEPER.

The courses in music are open as electives to students in any department of the University who show sufficient musical ability to pursue them with profit.

For admission to course 1, no previous knowledge of music is required.

Those desiring to take course 2 must be able to read and play simple four-part music. Course 1 will be found useful in strengthening preparation for the courses in Harmony and Counterpoint. Course 1 or its equivalent is required as a preparation for course 6.

Students may be admitted to advanced courses on examination.

Special students may substitute private lessons in piano playing or singing for one or more studies on recommendation of the Professor of Music. The University no longer assumes responsibility for private lessons of any kind. (See the statement of the School of Music on subsequent pages.)

Classes meet in Room 12, Ladies' Hall.

1. Musical Theory and Choral Practice. *Two hours a week. Throughout the year; M., W., at* 5. Professor PARKER.
2. Elementary Harmony. *Two hours a week. Throughout the year; Tu., Th., at* 4. Professor PARKER.

3. Advanced Harmony. *Three hours a week. First semester; M., W., F., at* 11. Professor PARKER.
4. Counterpoint. *Three hours a week. Second semester; M., W., F., at* 11. Professor PARKER.
5. Double Counterpoint and Fugue. *Three hours a week. Throughout the year; M., W., at* 11, *F., at* 10, subject to change. Professor PARKER.
6. Musical Composition. *Two hours a week. Throughout the year;* hours to be arranged. Mr. SLEEPER.
7. History of Music. Lectures. *Two hours a week. Throughout the year; Tu., Th., at* 3. Professor PARKER.
8. Advanced Piano Playing. Senior year only. Hours and credit to be arranged with the instructor and director of the School of Music.

   Students who are competent may join the University Orchestra, receiving a credit of 1-5 for the work. One rehearsal each week. *Throughout the year; Sat.* 11 *to* 1. Professor PARKER.

   Students who desire to become connected with the University Military Band, or any of the student musical organizations, should confer with Mr. Sleeper.

PHYSICAL EDUCATION.

DR. ELSOM, MISS MAYHEW, AND STUDENT ASSISTANTS PETERSON AND DAVIES.

The Armory and Gymnasium is 200 feet in length, 100 feet in width, and three stories in height. On the ground floor are ample accommodations for bathing, such as shower and spray baths, tubs, and a natatorium 80 feet long by twenty feet wide. Lecture-rooms, offices, and locker-rooms are found also on this floor, the latter fitted up with 600 lockers for the use of students. Four bowling alleys, thoroughly equipped, have been placed in an attractive portion of the ground floor. On the main floor, besides the necessary offices, there is an unobstructed hall 165x95 feet in dimension, for the purpose of military drill and gymnastic practice. This room is thoroughly fitted with the most improved and latest scientific developing apparatus. The gymnasium in its equipment is not surpassed by any in the West, and in size it is absolutely the largest in the United States. On the third floor is the padded running track, twelve laps to the mile; a base-ball

cage, 160 feet in length; two rifle ranges, hand-ball, and tennis courts, etc., besides space for general indoor athletic practice.

Each student on entering the department undergoes a thorough physical examination, in order that his physical condition may be known, and suitable exercise prescribed. Various strength tests, and measurements are given; the heart, lungs, and eyes are examined, and the utmost caution used in the advice regarding individual exercise. One examination during each semester is required, the latter demonstrating any improvement or change in the student's physical condition. Anthropometric cards and charts are platted for students when desired.

Systematic class work in gymnastics is required on two days of the week, of all freshmen, sophomores, and special students ranking with these classes. This work consists of vigorous drill with dumb-bells, clubs, bar-bells, etc., besides progressive graded work on the various pieces of gymnastic apparatus, always under the careful direction of competent instructors.

In the scheme of gymnastics, such exercises as are promotive of health, grace, and self-control, are sought for rather than heavy and dangerous athletic performances.

Every facility is provided for track-athletics, base-ball, foot-ball, tennis, aquatics, etc. The Lower Campus, directly in front of the gymnasium, furnishes a large, level area for the practice of all athletic sports. In addition, the University owns the large tract known as Camp Randall, which is fitted up with a large grand stand, a ¼-mile track, and other necessary features.

The University is situated on the shores of Lake Mendota, a beautiful sheet of water, which invites exercise and recreation in boating. The University Boat House Association has erected a boat house at a cost of over $4,000.

During the second semester, a course of lectures on Personal Hygiene, Health Culture, etc., is given the freshman class, illustrated by various physical charts and other apparatus. Attendance at these lectures is required of all freshmen.

Within the last two years, Ladies' Hall has been enlarged and improved, and now contains a finely equipped gymnasium for the use of the young women attending the University. This room is two stories high, has a floor space of 71x40 feet, and is provided with 27 dressing rooms, and 108 lockers. The dressing rooms connect with shower baths supplied with hot and cold water, furnishing ample bathing facilities for those who take gymnastics.

The apparatus is complete, and varied, consisting of chest weights, dumb-bells, wands, bar-bells, etc., besides a complete outfit of Swedish apparatus, and other forms of appliance for development and physical improvement. Music is used in all class drills. The object of the training for women is for the purpose of maintaining and conserving the health, first; and incidentally there are derived benefits of a very valuable character, such as the acquirement of grace, muscular control, self-reliance, and strength.

Each student will undergo a careful physical examination on entering the department, in order that the physical condition may be known, and suitable exercise prescribed for individual cases. A second examination is given during the second semester, in order that the improvements and benefits of the course of exercise may be shown.

The work is required of all freshman and sophomore students, and all special students ranking with them. Excuse may be granted from the required work on account of physical disability.

The costume required consists of divided skirt, and loose waist of dark blue material, and gymnasium shoes.

The Tennis and Cycling Clubs afford ample opportunity for out-door exercise and recreation, when the season and weather permit. Games, such as basket ball, newcombe, basquette, etc., are practiced indoors during the winter season, and several teams organized for work in these games.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT BROOKS, U. S. A.

This department of the University is maintained in accordance with the statutes of the United States and the State. By the regulations of the University, all the able-bodied male students of the freshman and sophomore classes, and of the special courses, for the first two years of such courses, are required to take military drill.

The work of the department embraces a course in drill regulations, a course of lectures on military subjects and practical instruction in the school of the soldier, company, and battalion, target practice, artillery drill and signal drill. The class in drill regulations is organized each year, and may be elected by both

classes. All commissioned officers, the Sergeant-Major, Quartermaster-Sergeant and First Sergeants are required to take the course, which continues through the winter. The study value of drill regulations and the lecture course is that of a two-fifths and one-fifth study respectively.

Freshmen who, prior to their entering the University, have received the equivalent of one year's instruction in the University battalion, may be required to drill during their freshman year only; *provided*, that they furnish certificates from the superintendents of military schools where they have attended, or commanding officers of military companies with which they have served, setting forth in detail the military duty performed; and that they take the full course in drill regulations, maintaining a good class standing.

Drill for both classes begins at the opening of the first semester and is held twice a week throughout the year.

The uniform of the battalion is similar to the army uniform, and can be obtained in Madison at a cost of $12.00 to $15.00.

ORGANIZATION.

The organization is that of a regiment consisting of two battalions of three companies each, a brass band of over twenty pieces, a bugle corps, and a signal company. Students are at liberty to enter any organization except the Signal company. The latter consists of those selected by the Commandant.

The regiment has a full quota of officers. The field officers are selected from the senior class, the captains from the junior class and the lieutenants and non-commissioned officers from the sophomore class.

Upon graduation specially qualified students receive from the Governor of Wisconsin State commissions of honorary second lieutenants.

ROSTER FOR 1897-98.

First Lieut. J. C. W. Brooks, 4th Artillery, U. S. A., Commandant.

Colonel.
Allard Smith.

Lieutenant Colonel,
Rudolph E. Heine.

Adjutant,
Captain Orsamus Cole, Jr.

Quartermaster,
Captain J. H. Stauff.

Sergeant Major, S. B. Gregg.

1st Battalion.

Major Chas. A. Vilas,
Adjutant,
1st Lieut. E. Greverus,
Sergt. Major F. R. Barnes.

Company Officers.

A— Captain F. H. Kurtz,
1st Lieut. B. Palmer,
2d Lieut. D. G. Monohan.
1st Sgt. Charles Collins.

B— Captain H. N. Carter,
1st Lieut. L. E. Moore.
2d Lieut. J. H. McNeel.
1st Sgt. C. G. Stangel.

C— Captain P. Allen,
1st Lieut. C. Gabel.
2d Lieut. S. B. Echlin.
1st Sgt. D. A. Henkes.

2d Battalion.

Major F. A. Schroeder.
Adjutant.
1st Lieut. P. W. Tracy.

Company Officers.

D— Captain S. L. Emery,
1st Lieut. J. W. Dryer.
2d Lieut. H. H. Taylor.
1st Sgt. G. N. Ferris.

E— Capt. C. Hambuechen.
1st Lieut. S. W. Kies,
2d Lieut. T. Cook.
1st Sgt. F. J. Carney.

F— Capt. Hugo F. Mehl.
1st Lieut. P. S. Warner.
2d Lieut. G. F. Ruediger.
1st Sgt. C. J. Alfred.

SCHOOL OF ECONOMICS, POLITICAL SCIENCE, AND HISTORY.

STAFF OF INSTRUCTION.

C. K. Adams, LL. D., President of the University.
R. T. Ely, Ph. D., LL. D., Director, and Professor of Political Economy.
C. H. Haskins, Ph. D., Professor of Institutional History.
J. B. Parkinson, A. M., Professor of Constitutional and International Law.
W. A. Scott, Ph. D., Professor of Economic History and Theory.
F. J. Turner, Ph. D., Professor of American History.
Victor Coffin, Ph. D., Assistant Professor of European History.
F. C. Sharp, Ph. D., Assistant Professor of Philosophy.
E. D. Jones, Ph. D., Instructor in Economics and Statistics.
O. G. Libby, Ph. D., Instructor in History.
B. H. Meyer, Ph. D., Instructor in Sociology.
P. S. Reinsch, A. B., LL. B., Instructor in Political Science.
S. E. Sparling, Ph. D., Assistant in Public Administration.
P. W. Ayres, Ph. D., Special Lecturer on Pauperism.
C. M. Hubbard, Special Lecturer on American Charities.
C. L. Becker, B. L., Fellow in History.
N. A. Westen, B. L., Fellow in Economics.

GENERAL STATEMENT.

The purpose of the School is to afford superior means for systematic and thorough study in economics, political and social science, and history. The courses are graded and arranged so as to meet the wants of students in the various stages of their progress, beginning with elementary and proceeding to the most advanced work. They are also designed to meet the needs of different classes of students; as, for instance, those who wish to enter the public service, the professions of law, journalism, the ministry or teaching, and those who wish to supplement their legal, theological, or other professional studies with courses in

economics, social science, or history. Capable students are encouraged to undertake original investigations, and assistance is given them in the prosecution of such work through seminaries and the personal guidance of instructors. A means for the publication of the results of investigations of merit and importance is provided in the University Bulletins, p. 48.

Courses in other departments may be advantageously combined with those offered in this school. Especial attention is called to the large number of related courses in philosophy and ethics.

The work of the School consists of the following departments:

1. Graduate Seminaries and Classes. These are open to graduates of colleges of good standing who have had the necessary preliminary studies. Graduate students whose training has been defective will be required to make up deficiencies by work in the prerequisite undergraduate courses.

2. The Civic Historical Course. This is designed to afford a liberal course of undergraduate training with emphasis upon the studies especially adapted to the promotion of good citizenship. It is parallel to the other four-year undergraduate courses of the University and leads to the degree of Bachelor of Letters. Students are admitted by examination or after graduation from an accredited school; the requirements for entrance are stated on p. 66. The requirements for graduation in the courses are as follows:

Freshman Year: Latin or German 4; mathematics 3, Greek and Roman history 5, first semester; English history 5, second semester; rhetoric 3; military drill 2; gymnastics 2.

Sophomore Year: German 4 (if not taken in freshman year); French 4; history 3; economics 3 (one semester); political science 3 (one semester); science 5; elective 3 to 5; military drill 2; gymnastics 2. The student may select 15 hours from the foregoing list, postponing the others, which must be taken before graduation.

Junior and Senior Years: The student must select five hours for two years in one department, including a thesis; must complete the studies postponed from the sophomore year, and elect enough to complete the 120 unit-hours of classwork for graduation.

3. Courses in economics, political science, and history offered to students in other departments. The various classes in the School are open to all properly qualified students of the Uni-

versity. In the College of Letters and Science students in Ancient Classical and Modern Classical courses are required to take course 1 in history during the freshman year, and courses 1 and 2 are required of freshmen in the English course; the other studies of the School are elective, and count toward graduation on the same basis as the work of other departments. Course 5 in economics is part of the required work in the Short Course in Agriculture. Several courses in the School are peculiarly suited to the needs of students in the College of Law, and may be taken to advantage in connection with their professional studies.

4. Besides the regular courses of instruction enumerated below there is an Historical and Political Science Association, composed of students of this School.

5. Numerous special lectures are given as occasion offers. During the present year, up to the present, the following addresses have been given in connection with the course on American Charities:

Hon. Clarence Snyder, The Wisconsin State Board of Control.

Mr. C. M. Hubbard, a course of six lectures on Phases of American Charities. 1. Charity Organization; 2. Child Saving; 3. The Care of the Insane; 4. Tenement Houses; 5. The Unemployed; 6. The Church and Charity.

Candidates for the degree of doctor of philosophy in this School are required to present in their principal subject the equivalent of at least 2 full graduate courses during 2 years, in their first subordinate the equivalent of at least one such course during 2 years, and in their second subordinate the equivalent of at least one such course.

Candidates for the master's degree must present in their principal subject the equivalent of at least two full graduate courses during one year, and in their subordinate subject the equivalent of at least one such course.

The other requirements for the master's and doctor's degree may be found on pp. 50-52.

ECONOMICS AND STATISTICS.

PROFESSOR ELY, PROFESSOR SCOTT, DR. JONES, DR. MEYER, AND MR. WESTON.

1. Economic History. A course in the economic history of England. The textbook used is Gibbins' Industry in England. Required of freshmen in the Civic Historic and English Courses, and of all students who are beginning

the subject of Economics. *Repeated each semester, and given in connection with Course 2 in History. Tu., Th., at* 9 *and* 12. Professor SCOTT.

2. The Elements of Economic Science. A study of the nature and leading principles of the science. The object of this course is to present a comprehensive but distinct and systematic account of the science of political economy. Text: Ely's Outlines of Economics (college edition). *Repeated each semester; Tu., Th., S., at* 8 *and* 9. Dr. JONES.

3. Money and Banking. A study of the elements of money and credit operations, and of the history and characteristics of the chief monetary and banking problems. Nicholson's Money and Monetary Problems, Laughlin's History of Bimetallism in the United States, and Dunbar's History and Theory of Banking. *First semester; M., W., F., at* 8. Professor SCOTT.

4. Economic Problems. The work will be opened with the study of socialism, employing as the text-book, Ely's Socialism and Social Reform. This will be followed by lectures and class reports on such topics as economic crises, co-operation, profit-sharing, railroad problems, the sweating system, tenement house problem, the church and social reform, labor organizations, etc. *Second semester; M., W., F., at* 9. Dr. JONES.

5. The Economics of Agriculture. A discussion of those economic topics which are of especial interest and importance to farmers. This course is designed primarily for the students of the College of Agriculture, though any student may be admitted. Lectures followed by class discussion. *Two hours per week from January 1st to April 1st.* Professor SCOTT.

6. Senior Seminary. The Seniors who write theses on economic topics meet in this Semniary for the presentation and discussion of reports on their respective topics. *Second semester; alternate weeks on Wednesday evenings at* 7. Professor SCOTT.

7. Economic Geography. A study of geographical conditions with reference to their influence on the economic life of society. The course will follow the outlines of the subject laid down by Ritter, and will include a discussion of the character of commercial relations, localization of

industry, and such other peculiarities of the economic life of the chief European nations and the United States as can be traced to the influence of the physical environment. *First semester; Tu., Th., at* 10. Dr. JONES.

8. Statistics. This course aims to present a discussion of the nature, advantages and difficulties of the statistical method, considering it as an aid in economic research. The methods of census-taking and tabulation will be discussed, to be followed by a critical analysis of the chief contributions of statistics to economics and the social sciences generally. *Second semester; M., W., F., at* 10. Dr. JONES.

9. The Classical Economists. Adam Smith, Ricardo, and J. S. Mill. Study of charcteristic parts of the works of these authors with lectures and class discussions. *Second semester; M., W., F., at* 8. Professor SCOTT.

10. Railway Transportation. This course is historical, economic, and legal. Among the topics treated are: A general view of the development of the railroads of the world; influence of railroads on natural forces and on the development of exchange; railway systems, charters, rates, competition, pools, associations, control, land grants, receiverships, labor, relief and insurance; and foreign systems of railroads. Lectures and assigned readings. *Second semester; M. and W., at* 2. Dr. MEYER.

11. History of Economic Thought. The principal topics will be the following: The history of economic theories in classical antiquity; their development under the influences of the Christian Era and the Middle Ages to the time of the Mercantilists; the rise and growth of economics as a distinct branch of social science, with a brief discussion of existing schools of economic thought.

This course is designed for undergraduates who have had the elementary work in economics in course 1, and for graduates who have not had a course in the history of economic thought. *Second semester; M., W., at* 3. Professor ELY. (Not given in 1898-9).

12. The Distribution of Wealth. This course deals chiefly with the fundamental institutions in the existing social order and their relation to the present distribution of wealth. The principal topics discussed are: Private property, contract and its conditions, vested interests, custom, com-

petition, monopoly, authority, and the caritative principle. *Throughout the year; Tu., W., Th., at* 3. Open to graduate students and undergraduates who have had suitable preparation. Professor ELY.

13. Theories of Value. History of theories of value down to the present day. Especial attention is given to the writings of the Austrian Economists. The seminary method of instruction is employed, and each student is expected to study critically the writings of the theorists examined. *First semester; Tu., Th., at* 12. Professor SCOTT.

14. Theories of Rent, Wages, Profits, and Interest. A critical study of the history of these theories conducted in the manner described in the previous course. *Throughout the year; Tu., Th., at* 12. Professor SCOTT. (Not given in 1897-8.)

15. Theories of Production and Consumption. Theories of social prosperity as seen in the writings of economists on the subjects of production and consumption. Theories of population and of capital, and the theories which concern the operation of physical forces, and the influence of the consumption of wealth on production and distribution. Special attention is given to the writings of Professor Simon N. Patten on these subjects. *Second semester; Tu., Th., at* 12. Professor SCOTT.

16. Public Finance. A discussion of the revenues and expenditures of government with a sketch of their historical development. Open to graduates and advanced students. *First semester; Tu., W., Th., at* 4. Professor ELY.

17. Taxation and American Public Finance. A discussion of taxation followed by a brief examination of the finances of the Federal government, and a more detailed study of the finances of the American commonwealths, and local political units. Open to graduates and advanced students. *Second semester; Tu., W., Th., at* 4. Professor ELY.

18. Economic Seminary. This is designed primarily for advanced students who wish to carry on special investigations under the guidance which the department affords. Each student, with the consent of the instructors, may select a topic for investigation for himself, or one may be assigned him connected with the subject selected for the main seminary work of the year. The subject for 1898-9 is: Recent Development of Economic Theory.

A subordinate feature of the seminary work is the review of recent books and important articles published in the periodicals. *Tuesday evenings throughout the year from* 8 *to* 10. Professor ELY, Professor SCOTT, Dr. JONES and Dr. MEYER.

ARRANGEMENT OF COURSES.

The courses in the department of economics and statistics are divided into three groups. Courses 1 to 6 inclusive are designed to give a general survey of the field and are regarded as undergraduate courses. Candidates for advanced degrees whose previous preparation has been deficient may be required to take one or more of these courses, but they do not receive any graduate credits for so doing.

Courses 7 to 11 inclusive are advanced courses to which both graduates and undergraduates are admitted.

Courses 12 to 18 inclusive are graduate courses and are designed only for graduate students. By special permission others of suitable preparation and ripeness may be admitted to these courses.

SOCIOLOGY.

PROFESSOR ELY, DR. MEYER, ASSISTANT PROFESSOR SHARP, AND DR. JONES.

1. The Elements of Sociology. In this course an attempt is made to familiarize the student with those notions which will enable him to read sociological literature with discrimination. The following are representive topics: classes of facts to which sociology peculiarly addresses itself; the nature of social laws; general social laws; society, characteristics and definitions; the organic conception of society, its history, uses, and abuses; physical and psychical influences; public opinion; social significance of the family; the individual and society, and the elements of social psychology. Lectures and assigned readings. *First semester; M., T., and W., at* 10. Dr. MEYER.
2. Modern Sociological Thought. In these lectures an attempt is made to present and to discuss critically the leading characteristics of the works of sociological writers from Comte to the present time. *Second semester; M., T., and W., at* 10. Dr. MEYER.

3. The Psychological Sociologists. This course is a continuation of parts of both the preceding courses. It will deal with that group of sociologists who approach the subject from a psychological point of view. Topics and lectures. *First semester; M., and W., at* 8. Dr. MEYER.

4. American Charities and Crime. This is an elementary course designed to stimulate an interest in charitable and correctional work as preparatory for the duties of intelligent citizenship. The text-books are Warner's American Charities and Wines' Punishment and Reformation. An important feature of this course consists in the lectures given by men and women who have devoted special attention to some phase of charitable and correctional work. The class will also make excursions to the more easily accessible state and local institutions for the purpose of practical study. *First semester; M., W., F., at* 9. Dr. JONES.

5. Field Work. Students are encouraged to study charitable and correctional institutions in Madison and vicinity and opportunity is afforded for continuous practical work during the summer months. During past years students from the University of Wisconsin, some of whom have been aided by scholarships, have engaged in field work under the direction of Dr. P. W. Ayers, of New York, formerly of Chicago. Several of these students have taken up work of this kind as a career. Chicago, Cincinnati, and other cities offer opportunities for field work. It is believed that this method of continuous study, followed by continuous field work, yields the best result. It is the aim of this department to furnish secretaries of charity organization societies and other trained workers. At present the demand for such workers is larger than the supply.

6. Social Ethics. The connection between ethics and economics and the ethics of economic relations. *First semester; twice a week. M., W., at* 3. Professor ELY. (Not given in 1898-9.)

7. Social Ethics. *Second semester; Tu., Th., at* 8. Assistant Professor SHARP.

8. Readings in German Social Philosophy. The object of this course is to assist students in learning to read German writers readily and to familiarize them with some of the

more important recent scientific works. At present the class is reading Professor R. von. Ihering's Zweck im Recht. *First semester, Twice a week. Hours and days to be determined later.* Assistant Professor SHARP.

9. Socialism. A critical examination of its nature, strength, and weakness. Text-book, Ely's Socialism and Social Reform. *First semester; twice a week.* Professor ELY. (This course will not be given in 1898-9.)

10. Seminary in Sociology. Designed particularly for graduate students, and others of suitable preparation who wish to pursue the investigation of special subjects. Each member selects or is assigned a topic for special study, upon which he reports in the seminary. The weekly meetings are occupied chiefly with the reading and informal discussion of these papers. *Second semester; once a week.* Dr. JONES and Dr. MEYER.

POLITICAL SCIENCE.

PROFESSOR PARKINSON, DR. REINSCH, AND DR. SPARLING.

1. Elements of Political Science. An introductory course to general political science. The study of the nature and leading principles of political science, followed by a discussion of American political and legislative methods. *First semester; M., W., F., at* 9. *Repeated second semester on same days at* 8. Dr. SPARLING.

2. Elementary Law. A general survey of the field of law. Designed to familiarize the student with its terminology and leading principles and their practical application to every-day life. *Both semesters; Tu., Th., at* 10. Dr. REINSCH.

3. Elements of Administration. An introductory course to the general field of administrative study. The aim of the course is to outline the theoretic and historic development of administration and administrative law, followed with a survey of the chief modern administrative systems. A topical and bibliographical outline will serve the place of a text. *First semester; Tu., Th., at* 11. Dr. SPARLING.

4. Roman Law. The object of this course is to trace the more important steps in the development of the Roman

Law, but to give chief attention to the law in its later form as codified by Justinian. *First semester; Tu., Th., at* 11. Dr. REINSCH.

5. Introduction to the History of European Law. Early Germanic law and its development in France and Germany. The reception of Roman law. The modern codes. Open to students of suitable preparation. *Second semester; Tu., Th., at* 11. Dr. REINSCH.

6. History of English and American Law. The development of legal institutions as an expression of social and political progress. *First semester; M., W., F. at* 12. Dr. REINSCH.

7. Comparative Jurisprudence. A course of lectures on Modern Roman Law. Its relations to, and influence upon, the law of the United States will be discussed. Open to law students and to others who have had an elementary course in law. *Second semester; M., W., at* 12. Dr. REINSCH.

8. History of Political Thought. *First semester;* The development of political philosophy from the Greeks to the beginning of the present century, and its connection with political history. *Second semester;* Recent political thought in Europe. The origin and growth of American political theories. Present state of political philosophy. Followed by an analytical and critical investigation of the concepts and terms of modern political science. Open to advanced students. *Throughout the year; Tu., Th., at* 12. Dr. REINSCH.

9. Seminary in Political Philosophy. In 1898-9 the political philosophy of the 16th and 17th centuries will be studied, and the origin of the modern theory of the state traced in the writings of the Italian, Spanish, French, Dutch, German, and English publicists and philosophers of this period. For graduate students. *Weekly throughout the year; hour fixed on consultation.* Dr. REINSCH.

10. Constitutional Law. A brief outline of the growth of American constitutional law prior to 1787, followed by a study of the constitution of the United States, not simply as a document, but in action, and in the light of the highest judicial interpretation. *First semester; M., W., F., at* 9. Professor PARKINSON.

11. Constitutional Law. Designed to make a closer study of the more important parts of the constitution—the powers of congress, the jurisdiction of the courts, the meaning and

scope of the amendments, and the relation of the commonwealths to the nation. Some emphasis will be given to the unwritten growth of our constitutional law. The study of cases will be made prominent. *Both semesters; Tu., Th, at* 9. Professor PARKINSON.

12. Constitutional Law. A comparative study of the more striking features of the constitutions of England, France, Germany, Switzerland, and the United States, with special attention to the changes at work and the general trend in constitution-making. Lectures, co-operative work, and class discussions. Open to graduates and other advanced students. *Second semester; M., W., F., at* 9. Professor PARKINSON.
13. Municipal Government in Europe and the United States. A comparative study of the methods of municipal organization in the chief states of Europe and of the United States. The essential facts of urban life will be viewed from an administrative and legal point of view. *Second semester; M., W., F., at* 11. Dr. SPARLING.
14. Federal and State Administration. A course designed to outline the federal and state systems of administration and the methods of conducting the business of government. The executive branches of the federal and state governments will be considered in their administrative relations and the methods and types of their organization. The practical and legal phases of the two administrative systems will form the subject matter of the course. *Second semester; Tu., Th., at* 11. Dr. SPARLING.
15. Comparative Administrative Law. The scope of this course is essentially the same as covered in Vol. II., Goodnow's Comparative Administrative Law. The legal relations and duties of public officers, forms and methods of administrative action, checks upon the administration exercised by the courts, legislature and central administration. This course has in view the needs of the legal profession. *First semester; M., W., F., at* 11. Dr. SPARLING.
16. History of Federal Administration. The history of the central administration will be studied from the sources, supplemented with readings from secondary authorities. The genesis of the federal administrative institutions and the growth of federal administrative law from the formation of the Constitution. *Both semesters, 2 hours. Hours and days to be determined later.* Dr. SPARLING.

17. International Law. An inquiry into the nature, sources, and sanctions of international law, and an outline study of its growth, improvement, and present status. *First semester; M., W., F., at* 10. Professor PARKINSON.

18. International Law. Designed to follow course 17, but may be taken independently. More attention will here be given to the subject of diplomacy—including a study of treaties—and to the rights and obligations of neutrals, and to the methods of settling international disputes without resort to war. Important cases will be studied and the topical method of investigation employed. Open to graduates and other advanced students. *Second semesters; M., W., at* 10. Professor PARKINSON.

19. Political Science Seminary. A two hour seminary in public law, administration, and comparative jurisprudence will be conducted fortnightly, during both semesters. Open to advanced students only. Professor PARKINSON, Mr. REINSCH, and Dr. SPARLING.

HISTORY.

PROFESSOR TURNER, PROFESSOR HASKINS, ASSISTANT PROFESSOR COFFIN, DR. LIBBY AND MR. BECKER.

Introductory Courses.

1. Ancient History. A brief outline of Oriental history, and a more particular study of the history of Greece and Rome. (a) for freshmen in the Civic Historical Course. *First semester; M., Tu., W., Th., F., at* 10 and 12. (b) for freshmen in the English Course. *Second semester; M., Tu., W., Th., F., at* 8, 9, *and* 12. Professor HASKINS and Dr. LIBBY.

2. English History. The work is in two divisions:
   a. Political History. *Repeated each semester; M., W., F., at* 9 *and* 12. Special attention is given to the formation and nature of the modern British Empire. Assistant Professor COFFIN and Mr. BECKER.
   b. Economic History. See Course 1 in Economics for a description of this course. *Repeated each semester; Tu., Th., at* 9 *and* 12. Professor SCOTT.

   Both divisions of the course are required of freshmen in the English Course (first semester) and of freshmen in

the Civic Historical Course (second semester); they are open to election either together or separately by other students.

Mediaeval History. A general survey of the history of continental Europe from the barbarian invasions to the close of the fifteenth century. *First semester; M., W., F., at* 11. Required of sophomores in the Civic Historical Course; open to all other students who have had Course 1. Professor HASKINS.

4. Modern European History. A general survey extending from the close of the fifteenth century to the present day. *Second semester; M., W., F., at* 11. Required of sophomores in the Civic Historical Course. Assistant Professor COFFIN.

5. American History. A general survey with emphasis on political history. The course may be elected by separate semesters.
   a. To the close of the War of 1812. *First semester; Tu., Th., at* 11.
   b. From the close of the War of 1812 to the present time. *Second semester; Tu., Th., at* 11. Professor TURNER.

Advanced Courses.

[6. Europe during the later Middle Ages. Special study of the thirteenth, fourteenth, and fifteenth centuries; in the latter part of the course particular attention will be given to the civilization of Italy in the period of the Renaissance. *Throughout the year; Tu., Th., at* 12. Open to all students who have had course 3. Given in 1899-1900. Professor HASKINS.]

[7. Constitutional History of England. *Throughout the year; Tu., Th., at* 11, *F., at* 10. For graduates and properly qualified Seniors. Given in 1898-99. Professor HASKINS.]

8. The French Revolutionary and Napoleonic Periods, 1789-1814. An advanced course, alternating with course 9 and open to those who have had course 4 or its equivalent. *Throughout the year; Tu., Th., at* 10. Assistant Professor COFFIN.

[9. History of Europe in the Nineteenth Century, 1815-1898. While similar in character to course 8, this course necessarily

has a more practical bearing, being designed largely to enable the student to understand current events by showing their connection with recent history. It will pay special attention to the world-wide expansion and conflicting interests of modern European states. Alternating with course 8 and given in 1898-99. *Throughout the year; Tu., Th., at* 10. Assistant Professor COFFIN.]

[10. American Sectionalism. A study of the geographical distribution of political parties with especial reference to votes in congress and in state legislature. *Three times a week for the first semester.* Dr. LIBBY.]

[11. History of the West. Particular attention is paid to the advance of settlement across the continent, and to the results of this movement. The course should be preceded by course 5 or its equivalent. Given in 1898-99. *Throughout the year; M., W., F., at* 12. Professor TURNER.]

12. Economic and Social History of the United States, to 1789. Must be preceded by course 5 or its equivalent. Given in 1897-98. *Throughout the year; M., W., F., at* 12. Professor TURNER.

[13. Economic and Social History of the United States, 1789 to 1850. Must be preceded by course 5 or its equivalent. Given in 1899-1900. *Throughout the year; M., W., F., at* 12. Professor TURNER.]

14. History of Institutions. *First semester;* Selected topics in the early history of institutions; Greek political institutions. *Second semester;* Roman institutions. *Tu., Th., at* 11. Open to graduate students and seniors of suitable preparation. Professor HASKINS.

[15. History of Institutions. *First semester;* Early mediæval institutions from the accession of Diocletian to the treaty of Verdun. *Second semester;* The constitutional history of France to the close of the seventeenth century. *Tu., Th., at* 11, *S., at* 12. Open to graduate students and seniors of suitable preparation. Given in 1899-1900. Professor HASKINS.]

[16. Methods of History Teaching with special reference to the work of secondary schools. For juniors and seniors of suitable preparation. Given in 1898-99. *Weekly during the second semester; F., at* 2. Professors TURNER and HASKINS.]

Graduate Courses.

17. Methods of Research and Criticism. *First semester;* Historical bibliography. *Second semester;* Elements of historical criticism. The course is designed as an introduction to historical research and is accompanied by practical exercises on the part of members of the class. Omitted in 1898-99. *Throughout the year; W., at* 12. Professor HASKINS.

18. (a) Palæography and Diplomatics. (a) Elements of palæography, with practical exercises in the reading of manuscript facsimilies; (b) elementary exercises in diplomatics, with special reference to the documents of the Popes and the French Kings. The first part of the course is identical with the first part of Course 7b in Latin and is arranged for the benefit of advanced students of language as well as for students of history. *Second semester; W.,* 3 *to* 4:30. Professor HASKINS.

19. Seminary in Mediaeval History. During the present year the work is devoted to problems connected with the early history of universities. In 1898-99 the first semester will be given to lectures on the sources of English history, with parallel study of constitutional documents; in the second semester problems in the history of England in the thirteenth and fourteenth centuries will be taken up. *Throughout the year; Tu.,* 2 *to* 4. Professor HASKINS.

20. Seminary in Modern European History. Intended for graduates and specially qualified seniors doing thesis work in this field. In 1898-99 the work will be devoted to aspects of French domestic government 1795-1815. *Weekly throughout the year; S., at* 11. Assistant Professor COFFIN.

21. Seminary in American History. The constitutional and political history of the United States is studied from the sources, combined with lectures and required reading in secondary authorities. In the year 1897-98 the Colonial period is studied. For 1898-99 the work will be chosen in the period 1787 to 1820. *Throughout the year; M., W., F., at* 11. Professor TURNER.

22. Historical Conference. For conference, consideration of papers, and criticism of current historical literature. *Fortnightly throughout the year; F.,* 3 *to* 5.

ARRANGEMENT OF COURSES.

The courses in the Department of History are divided into three groups. Courses 1 to 5 are planned so as to afford an introductory survey of the general field of history. They cannot be counted toward advanced degrees, and graduates are required to have completed them, or a substantial equivalent, before entering on their graduate studies. Courses 6 to 15 are designed to continue the studies begun in the preliminary courses in the direction of greater specialization in the fields of ancient, mediæval, and modern European history, English history, and American history. They are open to undergraduates of sufficient advancement, and are also suited to the early years of graduate study. The remaining courses—except course 16, which is a special course for those intending to teach history in secondary schools—are designed to afford training in original research in representative fields of history; they are open to advanced students under conditions which vary in the different courses.

THE SCHOOL OF EDUCATION.

The School of Education at present embraces three separate organizations:

I. The School of Education proper, composed of the departments of Pedagogy and Philosophy.

II. The University Extension Department.

III. The Wisconsin Summer School and the Summer School of Library Science.

I. THE SCHOOL OF EDUCATION.

Staff of Instruction.

C. K. ADAMS, LL. D., President of the University.

J. W. STEARNS, LL. D., Director and Professor of Philosophy and Pedagogy.

M. V. O'SHEA, B. L., Professor of the Science and Art of Teaching.

JOSEPH JASTROW, Ph. D., Professor of Experimental and Comparative Psychology.

F. C. SHARP, Ph. D., Assistant Professor of Philosophy.

B. H. MEYER, Ph. D., Instructor in Sociology and University Extension and Lecturer in Economics.

W. B. LANE, A. M., Fellow in Philosophy.

GENERAL STATEMENT.

This School aims to afford practical and helpful instruction to students who wish to prepare themselves for teaching in public schools and colleges; to those who wish to become school principals and school superintendents; and to those who desire to pursue studies and investigations in the science of education. Persons looking forward to the profession of journalism, law or the ministry, will find in some of the courses instruction adapted to their needs; while the history and general principles of education form a valuable addition to the courses for general culture. The four main lines of instruction are the history, the philosophy, the science and the practice of education, all of

which present extensive fields for investigation. The history of education very properly occupies a place in courses for general culture, as an important and practical branch of the history of civilization, and it also affords the best introduction to the problems of pedagogy. The science of education is closely connected with philosophy, and especially with psychology in its modern experimental and physiological forms. Beyond the courses which are outlined below, ample opportunity will be given for the study of special problems in the laboratory and in the school room. The seminaries will afford opportunities for critical discussion of teaching work, and of educational problems, and will acquaint the student with the most important current literature of education.

The work of the School naturally falls into the following divisions:

I. Classes for undergraduate students of the university as part of general culture courses. For this purpose courses 1, 5, 10, and 12 are specially suited.

II. Courses for undergraduate students who wish to prepare themselves for teaching in the public schools. Those in regular courses of the University who complete satisfactorily at least twelve (12) unit hours in Philosophy and Pedagogy will be entitled to a certificate from the School of Education. Students who desire this certificate may select their work from the following: In Philosophy, one course, either 1, 2, or 15. In Pedagogy, course 1, and two of the following: 8, 9, 12, 14. In addition candidates will take teachers' courses in the branches in which they expect to teach.

III. Courses for students specializing in education. Those who expect to take their first degree in the Educational group are required (1) to pursue work in the department to the extent of one full study for two years; (2) to prepare a thesis in this department. The courses adapted to serve as introductory to the study of education are: In Philosophy, courses 1, 2, and 15; in Pedagogy courses 1, 8, 9, and 11.

IV. For normal school graduates the Philosophical Course of two years, looking to a more advanced and extended study of the theory and practice of education, has been outlined as follows:

Junior Year: Latin, French or German 4; philosophy 3; advanced pedagogy 3; language, history, English, advanced mathematics, or science 5; electives 3 to 5; *18 hours per week required.*

Senior Year: Continuation of Latin, French, or German 4;

philosophy and advanced pedagogy 5; electives from language, science, history, economics, mathematics, or English 7; also two courses of synoptic lectures and thesis; *18 hours per week.*

V. Graduate students, and those looking to the supervision of large schools or school systems, and to the detailed study of educational problems, will find work suited to their needs in the seminaries and advanced courses of the school.

PHILOSOPHY.

PROFESSOR STEARNS, PROFESSOR JASTROW, AND ASSISTANT PROFESSOR SHARP.

Students who contemplate devoting special attention to philosophy may begin the subject in the sophomore or in the junior year. The courses best adopted to serve as introductory are: 1, 2, 8, 10, 15, 19, and 20.

Requirements for group students: Students who expect to take their first degree in the philosophical group are required (1) to take at least one full study in the department for two years; (2) to prepare a thesis in this department.

Special seminaries will be formed to meet the needs of graduate students and of undergraduates who are specializing in philosophy.

1. General Psychology. James' Outlines of Psychology, lectures, and readings. *First semester; M., W., F., at* 9 and 3. Assistant Professor SHARP.

2. Psychology of the Senses and Nervous System. *First semester;* lectures, readings, etc. *Tu., Th., at* 9 and 3. Professor JASTROW.

3. Experimental Psychology. (a) Lectures and demonstrations covering in a fairly comprehensive and practical manner the field of experimental psychology. *Second semester; M., W., F., at* 9. (b) Laboratory practice course parallel with the lectures. The hours for laboratory work will be arranged by consultation. (a) and (b) together count as a full study. *Second semester; four hours weekly.* Professor JASTROW.

4. Research in Psychology. Special themes are experimentally treated and the appropriate literature critically reviewed under personal supervision. *Throughout the year; hours to be arranged by consultation.* Professor JASTROW.

[5. Comparative Psychology. Lectures and assigned readings, covering the more important topics in animal psychology and the development of the child and of the race. *Second semester; Tu. and Th., at* 10. Professor JASTROW.]

6. Abnormal Psychology. Lectures upon illusions, dreams, hypnotism, insanity, idiocy, deaf-mutism, blindness, diseases of speech, of will, of the emotions, psychic epidemics, and allied topics. *Second semester; Tu. and Th., at* 9. Professor JASTROW.

Note: Courses 5 and 6 are given in alternate years. Course 5 will be given in the collegiate year 1898-99.

8. History of Greek Philosophy; *First semester; M., W., F., at* 10. Professor STEARNS.

9. History of Modern Philosophy. *Second semester; M., W., F., at* 9. Assistant Professor SHARP.

10. Introduction to Philosophy. *Second semester; three times a week at* 8. Professor STEARNS.

11. The Philosophy of Modern Science. Discussion of some of the problems in the philosophy of nature. *First semester; Tu., Th., at* 8. Professor STEARNS.

12. The Theory of Cognition. An outline study of Descartes, Locke, and Berkeley. Hume's Treatise on Human Nature, Book I.; Kant's Critique of Pure Reason; Modern Theories. Special attention will be paid to the bearing upon psychology of the problems considered. *Throughout the year; three times a week.* Assistant Professor SHARP.

13. Readings in German Philosophy. Ihering's Zweck im Recht. *First semester; twice a week, hours and days on consultation.* Assistant Professor SHARP. (Omitted 1898-99.)

15. Systematic Ethics. Mackenzie's Manual of Ethics. *Second semester; M., W., F., at* 8. Assistant Professor SHARP.

16. Problems in Applied Ethics. *Second semester; Tu., Th., at* 8. Assistant Professor SHARP.

17. Advanced Systematic Ethics. Open only to students who have taken course 15. *First Semester; Tu., Th., Sat., at* 9. Assistant Professor SHARP.

18. Æsthetics. (a) Philosophy of Art and Art Criticism. *First semester; M., W., F., at* 8. (b) History of Art. *Second semester; M., W., F., at* 10. Professor STEARNS.

19. Deductive Logic. An elementary course in which Fowler's Logic is used as a text-book, but is considerably supplemented by lectures and discussions, introducing the more recent modes of treating the problems of logic. *First semester; M., W., F., at* 10. Professor JASTROW.

20. Inductive Logic. An elementary course covering the ground of Fowler's Logic, supplemented by discussions on the logic of probabilities, scientific methods, and fallacies. *Second semester; Tu., Th., at* 10. Professor JASTROW.

PEDAGOGY.

PROFESSOR STEARNS, PROFESSOR O'SHEA, AND MR. LANE.

I. HISTORY AND PHILOSOPHY OF EDUCATION.

1. History of Educational Theories and Institutions, Greek, Roman and Modern, lectures, readings and essays. Special attention will be given to the development of modern educational thought. *First semester; M., W., F., at* 9. Professor STEARNS.

2. Modern Educational Systems. A comparative study of education in England, France and Germany for graduate students. *First semester; three times a week.* Professor STEARNS.

3. The Herbartian Pedagogy. Herbart's Science of Education; Rein's Pedagogics; Lange's Apperception. *Second semester; twice a week, at* 8. Professor STEARNS.

4. School Supervision. The making and administration of courses of study; examinations; promotions; inspections, etc. *First semester; Tu., Th., at* 9. Professor STEARNS.

5. The Philosophy of Education. Lectures, readings and discussions on the nature, forms and elements of education. *M., W., F., at* 9. Professor STEARNS.

6. Methods and Management in Grammar and High School Grades. *Second semester; Tu., Th., at* 9. Professor STEARNS.

7. Seminary in Pedagogy, for the discussion of current educational problems. Open to those who have done one year's work in pedagogy. *Once a week throughout the year.* Professor STEARNS.

II. Psychology and Hygiene of Mental Development.

It will be the purpose of this work to consider the most important of the newer problems relating to the development of human beings from birth to maturity, and also to study the factors which make individuals essentially different from one another, so that each may be dealt with as his needs and capacities require. Data will be gathered from the fields of child-study, anthropology, biology, evolution, etc., and their detailed bearings upon education in all its phases in home, school, and university indicated. The evolutionary view of the development of the mind will receive particular consideration, and a mode of training children of all ages will be elaborated from this standpoint, as well as from others. Actual studies upon children of all ages will be carried on by observation and experiment, so far as advisable. The hygiene and economy of mental growth and activity will have a prominent place throughout, and suggestions will be made continually for students' conduct of their own daily lives. The work will be suited to the needs of all students, whether intending to teach, or not. It will be offered in three courses.

8. History of the child-study movement with methods of investigation. The evolutionary view of the development of the mind. The individual and the race. Periods of growth. Adolescence. Suggestion and imitation. Modes of expression. Fatigue, causes, effects, remedies. Results of important studies upon fear, bullying and teasing, games and plays, etc., etc. *First semester, M., W., F., at* 9. Professor O'SHEA.

9. The work of this course will be of a similar nature to that of the preceding, although the problems of individual psychology will be especially emphasized. Detailed study of types of individuals, prominent characteristics of each with predisposing conditions, and modes of treatment. *Second semester, M., W., F., at* 9. Professor O'SHEA.

10. This course will discuss those phases of mental development, economy, and hygiene that are of immediate concern to students in their daily lives. Open to all students. *First semester. One hour per week. Hour to be arranged.* Professor O'SHEA.

III. Educational Psychology.

11. Educational Psychology. It will be the purpose of the course in educational psychology to establish the laws upon which the training of the mind in all phases of educational work must depend, and to indicate in some detail their application to the choice of materials of instruction with methods of presentation in the elementary and high school. The work will be made concrete and practical at every stage by deriving the principles of mental development from a study of actual phenomena seen in daily life and in every schoolroom; and also by incorporating the results of modern physiological and experimental psychology, so far as they relate to the determination of school studies and methods. The biological conception of the mental processes and the modes of their development will be given a prominent place throughout, and it is believed that this will afford a somewhat new view of the materials and methods of education at various stages in the pupil's growth. The hygiene of mental development will receive especial consideration. This work is designed primarily for those giving particular attention to education. *First semester, M., W., F., at* 10. Professor O'SHEA.

IV. Principles and Practice of Teaching.

12. Educational Psychology and Methods of Teaching. This course is designed for those graduate students and members of the junior and senior classes who are not specializing in education, but who desire to make some preparation for teaching either in the grammar or high school, or who wish to gain some acquaintance with the applied aspects of modern psychology as a culture study, and for the aid it will give them in their own methods of study. Apperception and the laws of habit will be considered and applied in detail to methods of study and educational work in the grammar and high school. Practical problems will be chosen from child-study, as fatigue, suggestion, adolescence, etc., and considered in detail with reference to their bearing upon the work of teaching, and upon the conduct of a student's daily

life so as to promote healthful development of intellect and character. *Second semester, M., W., F., at* 12. Professor O'SHEA.

13. Principles of Teaching. It will be the purpose in this work to establish a systematic and somewhat comprehensive view of the appropriate aim, materials, and methods of teaching in all grades of the elementary and high school, based upon the results of modern studies in psychology, biology, and child-study relating to the development of children. Courses of study in our own and other countries will be critically examined, and an effort made to construct a course for the elementary and high school, which, while realizing the aims of education in these schools, will at the same time be adapted to the needs and capacities of children at various stages in their development. Educational values, correlation, the method of conducting a recitation, etc., will be critically discussed. *Second semester, M., W., F., at* 10. Professor O'SHEA.

14. Practice-Teaching. This work will consist of actual observation and teaching under criticism in the school to be provided for this purpose. It is the plan to arrange for this practical work in all grades of the elementary and high school. Here theory will be tested and applied under skilled teachers, and it will be the aim to embody the latest educational thought in practice under conditions similar to those which exist in the average public school. Opportunity will be provided also for original experimentation. The hours for observation and teaching will be arranged with individual pupils to suit their convenience. Professor O'SHEA.

15. Seminary. A model recitation will be held once a week, to be followed by a critical discussion of its merits and demerits. It will be the plan to consider in this concrete way the elements which enter into successful teaching, and to do so in a thoroughly scientific manner. This work will run through the year, and may be taken for either one or two semesters. Professor O'SHEA.

UNIVERSITY EXTENSION DEPARTMENT.

Staff.

CHARLES KENDALL ADAMS, LL. D., President of the University.
J. W. STEARNS, LL. D., Director and Professor of Philosophy and Pedagogy.
BALTHASAR HENRY MEYER, PH. D., Secretary, Lecturer on Economics, and Instructor in Sociology.
M. VINCENT O'SHEA, B. L., Professor of the Science and Art of Teaching.
JOHN C. FREEMAN, LL. D., Professor of English Literature.
GEORGE C. COMSTOCK, PH. B., LL. B., Professor of Astronomy.
CHARLES F. SMITH, PH. D., Professor of Greek and Classical Philology.
HARRY L. RUSSELL, PH. D., Professor of Bacteriology.
JAMES F. A. PYRE, B. L., Instructor in English Literature.
PAUL S. REINSCH, A. B., LL. B., Instructor in History and Political Science.
REUBEN G. THWAITES, University Extension Lecturer in History.
AMOS P. WILDER, PH. D., University Extension Lecturer in Municipal Government.
ERNEST R. BUCKLEY, B. S., Assistant Geologist Wisconsin Geological Survey.

GENERAL INFORMATION.

The University Extension Department of the University of Wisconsin, as at present organized, carries on its work of giving instruction at a distance from the University in two ways: first, by courses of lectures delivered in person by University instructors; and, second, by individual instruction by correspondence.

I. UNIVERSITY EXTENSION LECTURES.

University Extension lectures are lectures delivered by university professors and instructors on subjects which they treat in their regular classes. No special knowledge of the subject is required to enable a person to understand a University Extension lecture.

Under the system adopted by the University of Wisconsin, the University Extension lectures are delivered only in courses of six lectures. Each lecture is a unit in itself and may be intelligently followed by one who has not heard any of the other lectures in the course; but each course is also a unit in itself, for the six lectures treat different parts of the same general subject. The purpose of delivering the lectures in courses is to concentrate attention upon one subject.

The University Extension Department will be glad to hear from any person, committee, church, club, or other organization interested in Extension work. Arrangements can be made for lectures at almost any time, and where desirable the Secretary will visit towns to aid in organizing for the work.

Every University Extension audience is composed of two classes of people: (1) Those who merely attend the lectures and lack the time or inclination for the reading; (2) genuine students who make a systematic study of the subject. The first class are welcome. The second alone realize the full benefits of University Extension. To aid them the following special plan has been devised:

A printed syllabus, free to each student, will give an epitome of the subject considered, an analysis of each lecture, references to the best books on the subject, and other helpful suggestions. This will obviate note taking, assist the student in reviewing, and furnish him, after the lecture course is completed, a guide to further study of the subject.

The class, which is held before or after each lecture, furnishes the student an opportunity to question the lecturer and to have special difficulties explained. In the class, the lecturer will take the opportunity to elaborate his subject or to emphasize its salient features.

The lecturer will hold at the end of the course a written examination which may be taken only by those who have attended the lectures and classes, read the required books and sent in the required papers. To such as comply with these requirements and pass the examination the University of Wisconsin will award a certificate, having a recognized value on the University records and credited accordingly, should the holder ever study at the University.

CIRCUITS.

Whenever possible, two or more centers in the same section should unite in securing the services of the same lecturer on

successive evenings. Such a union of centers is technically called a circuit. This plan reduces the item of traveling expenses very materially, and broadens the field of choice for the local centers by enabling the lecturers to reach remote sections, where they could not go if they were to deliver but a single course.

HOW TO ORGANIZE A LOCAL CENTER.

One person interested in University Extension is sufficient for the nucleus of a local center. He should first take steps to interest two or three persons of public spirit and influence in the community. Usually the superintendent and principals of schools, teachers, clergymen, city librarian, editors, and the leaders in the local literary and social clubs are readily enlisted in the project. Every community has a number of active, public-spirited women who should be called into consultation. After some informal discussion between such persons as may be interested a temporary organization should be formed and a local committee chosen. This committee should be representative of all classes of the community. The effort should be made, by personal canvassing and persuasion, by articles in the local newspapers, notices, and addresses, to arouse the interest and enthusiasm of the whole community. Chautauqua circles, High Schools, Normal Schools, Young Men's Christian Associations, churches, and various societies should be asked to assist in the organization of a local center. The city librarian will frequently aid the cause by purchasing some or all of the required books, and by reserving them for Extension students. He can sometimes furnish a meeting place.

When interest justifies it, a public meeting should be held, at which the aims and methods of University Extension should be presented by some one who has become familiar with the movement. At such a meeting it is well to have the principal address followed by short expressions of interest from a number of representative persons. If desired, the Secretary of the University Extension Department will, in many cases, be able to attend this initial meeting, explain briefly and simply the nature of the work, answer any questions that may arise, and give such advice as may be needed. It is often possible to arrange for a specimen University Extension lecture in connection with this preliminary meeting.

A permanent organization should be effected at this meeting and the local center formed, by the election of a president, secretary, and treasurer. It is often found expedient to continue the local committee as a permanent executive committee. By-laws should be adopted regarding membership, meetings, etc., for the organization should be made permanent.

It is generally found best to entrust the details of management to an Executive Committee, consisting of the officers and two or three others, whose special work it is to attend to all the executive details of the center.

EXPENSES.

The expenses of a course consist of local expenses and the charges of the University. Under the former head are included hall rent, printing, advertising, etc., which are managed by the local center, and which vary, of course, in different towns and circumstances. Often a church or school hall may be obtained for the lectures without expense.

The charges of the University consist of:

1. The lecturer's fee, $100 for a course of six lectures.

2. The lecturer's traveling expenses, including sleeping-car and meals, when necessary. By special arrangement with the railways, the lecturer's railroad fare is only two cents a mile. In the case of a circuit, the lecturer's traveling expenses are divided equally between the centers forming the circuit.

3. The lecturer's hotel bill. Where the lecturer is entertained by members of the local center, this item disappears.

4. If lantern illustrations are given, the actual cost will be paid by the local center.

APPLICATION FOR COURSES.

Local centers are urged to make early application for courses as the time of many lectures is often engaged in advance. In making application, first and second choice of lecturers and evening should be named, and, where possible, third choice.

Applications for courses, and all other correspondence in regard to this work, should be addressed to

UNIVERSITY EXTENSION DEPARTMENT,
Madison, Wis.

COURSES OF LECTURES.

The following is the program of courses for 1898-9:

Professor M. V. O'Shea, Practical Child Study.

Mr. B. H. Meyer: An Introduction to Economic Problems; Some Leading Economists.

Professor Charles Forster Smith: Greek Life; Greek Literature.

Professor John C. Freeman: English Life and Literature; Studies in Shakespeare; Great Epics of the World.

Dr. Paul S. Reinsch: The Constitution and the Founding of the Federal Government; The Statesmen of the Civil War; The Growth of Democracy.

Mr. Reuben G. Thwaites: Men and Manners in Old Colony Days; Exploration and Conquest of the West; The Making of Wisconsin.

Dr. James F. A. Pyre: American Writers and American Culture; Typical English Poems.

Professor George C. Comstock: Astronomy.

Professor Harry L. Russell: General Course in Bacteriology.

Mr. Amos P. Wilder, City Government and City Problems; The Social Issues of the City.

Mr. Ernest R. Buckley: Geographic Geology; Economic Geology, with especial reference to Wisconsin.

II. INSTRUCTION BY CORRESPONDENCE.

The second method employed to extend University teaching is individual instruction by correspondence.

It should be clearly understood that instruction by correspondence is by no means regarded as the equivalent of resident study. It is not so valuable to the student. Experience has shown, however, that earnest students may do good work at a distance from the University when guided by competent instruction by correspondence. There are in every locality teachers, ministers, and men and women of various vocations, who are carrying on the study of certain subjects alone, and who would be glad to avail themselves of the guidance of a University instructor. There are others who would take up and prosecute some line of study if they could have competent guidance, but who do not feel able to carry on any study without guidance. Some are looking forward to a college course and would like to prepare themselves for admission; others would like to do a part of the college work in absence, thereby shortening the time of residence required

for a course. For these various classes of persons and all others who desire to receive guidance in some line of study by correspondence, whether with a view to receiving University credit or not, the University of Wisconsin offers instruction by correspondence according to the following plan:

METHOD OF INSTRUCTION BY CORRESPONDENCE.

The courses offered by correspondence are arranged to cover the same ground as the corresponding courses in the University proper. The University year is divided into two semesters. The average requirement for students doing full work at the University is fifteen nours of recitation weekly, i. e., the equivalent of three full studies. The full study consists of five recitations a week and is known as a five-fifths study. Some courses in the University are five-fifths, in which case the class meets five times a week; others are four-fifths studies, the class meeting four times a week, and still others are three-fifths and two-fifths studies, the classes meeting three and two times a week The same diversity prevails in the courses offered by correspondence. The five-fifths study by correspondence is the equivalent of a study running through one semester, the class meeting five times a week; the four-fifths study by correspondence is the equivalent of a course in the University proper running through one semester, the class meeting four times a week.

The instruction by correspondence is of two kinds, formal and informal.

The formal instruction is carried on by a series of printed instruction and question sheets. In the case of a five-fifths study, the entire course consists of forty of these instruction sheets. Each sheet assigns the student certain work, gives suggestions and explanations and a series of questions, the answers to which the student is to write out after having performed the work assigned. The answers to these questions the student is to mail to the University with any questions or difficulties which have arisen in his mind. This recitation paper will be returned to the student with errors corrected and whatever suggestions the instructor may think necessary.

The instruction by informal correspondence is mainly designed for advanced students. In this work the particular needs of the student are taken into consideration, and his work is arranged to suit his individual needs and abilities. The instructor carefully outlines the course which the student is to pursue, and

satisfactory evidence is given in some way that the student is doing the work properly. In this informal instruction by correspondence the instructor may require several essays or a thesis, or he may be satisfied by his regular correspondence with the student.

Only a few of the courses offered at the University are as yet offered by correspondence. Below is given a list of courses which may be taken by correspondence; of these courses not more than two may be taken by one student at the same time. The student must complete any course chosen within a year from the time he begins it; he may complete it as soon after beginning it as he is able.

Students may begin any course at any time.

If a period of sixty days elapses without any report from a correspondence student, he will be deemed to have dropped the course and will forfeit his right to further instruction.

Students are not required to pass any examination before undertaking any of these courses by correspondence; they are simply required to fill out a blank which will be sent on application. After examining this blank when it has been filled out and returned to the University, the instructor will decide whether the student is probably able to carry the course selected.

UNIVERSITY CREDIT FOR WORK DONE BY CORRESPONDENCE.

1. When a student has completed any course of study by correspondence satisfactorily to the instructor, he will be given a certificate for the work done.

2. If he desires this work to be credited on the books of the University towards a degree, he must pass the regular examination for admission to one of the regular courses of the University prescribed in the University catalogue for all students. He must then pass a special examination at the University on the work done by correspondence for which he wishes credit. In rare and exceptional cases this special examination may be conducted at the student's home by some one from the University or authorized by the University. No correspondence student will be admitted to an examination, however, without the consent of the instructor with whom the work has been done; and such consent will only be given when the instructor is thoroughly satisfied with the quality and quantity of the work, and considers it worthy of University recognition.

3. For the Bachelor's and Master's degree not more than one-half the required work may be performed by correspondence.

4. For the Doctor's degree not more than one-third of the required work may be performed by correspondence.

The University grants no degrees for work done entirely by correspondence or in absence.

For the degrees of B. A., B. S., and B. L., at least two years of resident study is required.

For the degrees M. A., M. S. and M. L., at least one semester of resident study is required.

For the degree of Ph. D. at least two years of resident study is required, one year of which must be spent at the University of Wisconsin.

EXPENSES.

The instruction fees are as follows:

For a five-fifths study (forty lessons), $10.

For a four-fifths study (thirty-two lessons), $8.

For a three-fifths study (twenty-four lessons), $6.

For a two-fifths study (sixteen lessons), $4.

For a one-fifth study (eight lessons), $2.

These fees include the payment for printed lesson sheets, but the student is required to enclose postage with each recitation paper for its return when corrected by the instructor.

All fees are payable in advance.

STUDY CIRCLES.

Whenever possible, it is hoped correspondence students will organize a little circle of friends to study the same subject together. Any study is always much more interesting when several persons are pursuing it together. Meetings of the circle can be held two or three times a week, when the lesson assigned can be gone over together, each student thus profiting by the study and thought of all the others. The instructor can always adapt his instruction by correspondence to these groups of students; and, if circumstances are favorable, can sometimes attend a meeting of the circle in person. The circle can, in any case, elect one of its members as leader, and thus secure many of the advantages of regular class study, Moreover, the expense of purchasing text-books can be very much lessened by this means; for, if necessary to save expense, two or more students can use the same text-book.

COURSES OF INSTRUCTION BY CORRESPONDENCE.

(All courses are by the formal method unless otherwise indicated.)

I. ECONOMICS.

1. Outlines of Economics. Three-fifths.
2. Public Finance. Three-fifths.

II. SOCIOLOGY.

1. Elements of Sociology. Three-fifths.
2. Social Philosophy. Three-fifths.

III. POLITICAL SCIENCE.

1. The Elements of Political Science. Three-fifths.
2. Comparative Constitutional Law. Three-fifths.
3. American Government and Politics. Three-fifths.
4. American Constitutional Law. Three-fifths.
5. The Theory of the State. Three-fifths.
6. The Elements of the Common Law. Three-fifths.
7. Municipal Government. Three-fifths.

IV. HISTORY.

1. The Colonization of America. Three-fifths.
2. The Growth of Nationalism in the United States. Three-fifths.
3. The Slavery Contest in the United States. Three-fifths.
4. Mediæval English History. Three-fifths.
5. Modern English History. Three-fifths.
6. The French Revolution. Two-fifths.
7. Later Nineteenth Century European History. Two-fifths.

V. HEBREW.

1. Hebrew for Beginners. Three-fifths.
2. Review course in Hebrew. Three-fifths.

VI. HEBREW HISTORY AND GEOGRAPHY.

1. History of Israel. One-fifth.
2. Historical Geography of Palestine. One-fifth.

VII. ARABIC.

1. Arabic for Beginners. Three-fifths.

VIII. NEW TESTAMENT GREEK.

1. New Testament Greek for Beginners. Three-fifths.
1. Review course in New Testament Greek. Three-fifths.

IX. GERMAN.

1. German for Beginners. Five-fifths.

X. ENGLISH LITERATURE.

1. General Survey of English Literature. Five-fifths.
2. The Drama,—Shakespeare. Three-fifths.
3. The Novel. Three-fifths.
4. The English Essayists. Four-fifths.

XI. RHETORIC.

1. Rhetoric. Two-fifths.
2. Advanced Rhetoric. Two-fifths.

XII. MATHEMATICS.

1. Algebra. Five-fifths.
2. Teachers' Course in Algebra. Five-fifths.
3. Plane Trigonometry and Logarithms. Four-fifths.
4. Spherical Trigonometry. Two-fifths.
5. Theory of Equations. Four-fifths.
6. Analytic Geometry. Four-fifths.

Professor Van Velzer will give informal instruction in Higher Mathematics.

XIII. ASTRONOMY.

1. General Astronomy,—elementary. Three-fifths.
2. General Astronomy,—advanced. Three-fifths.
3. Elementary Mathematical Astronomy. Three-fifths.

XIV. MATHEMATICAL PHYSICS.

1. General course in Mathematical Physics. Five-fifths.
2. The Electro-magnetic Theory of Light. Five-fifths.

3. The Mathematical Theories of Electricity and Magnetism Five-fifths.

4. Theoretical and Practical Hydro-dynamics. Five-fifths.

5. Analytical Theories of Heat and Elasticity. Five-fifths.

6. Analytical Theories of Light and Sound. Five-fifths.

7. General Relations of Dynamics to all the preceding courses together with the historical development of the various theories of Physics treated in the preceding courses. Five-fifths.

XV. GEOLOGY.

1. Geographic Geology. Three-fifths.

XVI. PHYSIOLOGY.

1. Human Physiology. Five-fifths.

XVII. BOTANY.

1. Comparative Anatomy of Plants. Three-fifths.

XVIII. BACTERIOLOGY.

1. General course in Bacteriology. Three-fifths.

2. Relation of Bacteriology to Practical Agriculture. Two fifths.

XIX. MILITARY SCIENCE.

1. Elementary course.

XX. CIVIL ENGINEERING.

XXI. MUSIC.

1. Elementary Harmony. Four-fifths.
2. Advanced Harmony. Three-fifths.
3. Counterpoint. Three-fifths.
4. History of Music. Four-fifths.

WISCONSIN SUMMER SCHOOL AND SCHOOL OF LIBRARY SCIENCE.

STAFF OF INSTRUCTION.

C. K. ADAMS, LL. D., President of the University.
J. W. STEARNS, LL. D, Director of School.

SPECIAL LECTURERS.

LOUIS H. GALBREATH, B. L., *Professor of Psychology and Child Study, Teachers' College, Buffalo.*

HON. NATHAN C. SCHAEFFER, PH. D., *State Superintendent of Public Instruction, Harrisburg, Pa.*

M. VINCENT O'SHEA, B. L., *Professor of Science and Art of Teaching, University of Wisconsin.*

HON. WILLIAM L. HARRIS, LL. D., *U. S. Commissioner of Education, Washington, D. C.*

STAFF OF INSTRUCTION IN THE GENERAL COURSE.

LOUIS H. GALBREATH, B. L., *Professor of Psychology and Child Study, Teachers' College, Buffalo.*—The Method of the Recitation, The Method of Geography.

CAROLYN M. ROBBINS, *Professor, Mankato Normal School.*—Language Work, Arithmetic, and Model Teaching.

MARY E. TANNER, *Teacher of Drawing, Stevens Point Normal School.*—Drawing.

ABBY S. MAYHEW, *Instructor in Physical Culture, University of Wisconsin.*—Physical Culture.

WILBUR S. JACKMAN, A. B., *Professor of Natural Science, Chicago Normal School.*—Nature Study.

M. V. O'SHEA, B. L., *Professor of the Science and Art of Teaching, University of Wisconsin.*—Applied Psychology and Child Study and Conferences on Model Teaching.

STAFF OF INSTRUCTION IN HIGH SCHOOL AND UNIVERSITY COURSE.

J. W. STEARNS, LL. D., *Professor of Philosophy and Pedagogy,* Director of School—Psychology and Pedagogy.

C. R. BARNES, PH. D., *Professor of Botany.*—Botany.

W. W. DANIELLS, M. S., *Professor of Chemistry.*—Chemistry.

J. C. ELSOM, M. D., *Professor of Physical Culture and Director of the Gymnasium.*—Physical Culture.

J. C. FREEMAN, PH. D., *Professor of English Literature.*—English Literature.

C. DWIGHT MARSH, *Professor of Zoology, Ripon College.*—Physiology and Zoology.

W. S. MILLER, M. D., *Assistant Professor of Vertebrate Anatomy.*—Anatomy and Histology.

F. E. MITCHELL, B. S., *Professor of Geography, Oshkosh Normal School.*—Physical Geography and Geology.

C. S. SLICHTER, M. S., *Professor of Applied Mathematics.*—Mathematics.

B. W. SNOW, PH. D., *Professor of Physics.*—Physics.

HIRAM A. SOBER, *Assistant Professor of Latin, University of Wisconsin.*—Latin.

F. J. TURNER, PH. D., *Professor of American History.*—History.

E. K. J. H. VOSS, PH. D., *Assistant Professor of German Philology.*—German.

STAFF OF INSTRUCTION IN LIBRARY SCHOOL.

CORNELIA MARVIN, Scoville Institute, Oak Park, Ill.—Library Science.

ELIZA J. SKINNER, Assistant in Library School.

The eleventh annual session of the Wisconsin Summer School will be held at the University for six weeks, from July 5 to August 12 inclusive. The charge for tuition will be five dollars, for each of the three weeks' sessions of the General Course, and five dollars for each course of six weeks in the High School and University section. In the sciences laboratory work and lectures may be taken as one course. Each ticket entitles the holder to attend the courses given by the general lecturers.

THE EXPANSION OF THE SCHOOL.

The instruction offered at the Summer School has been considerably expanded this year in the hope of making it attractive and useful to all classes of teachers in our graded schools. In planning this work two ends have been kept especially in view, to promote enthusiasm in the study of the principles of education, and to afford help and guidance to teachers in elementary schools. The first of these ends has been sought in the four courses of lectures, five in each course, to be given by persons of national reputation, one each afternoon during the second, third, fourth, and fifth weeks of the session. All members of the School are admitted to these lectures without additional charge. To secure the second of these ends two general courses of instruction have been provided. Each is complete in itself and may be taken alone, but the second does not repeat the work of the first, so that both may be taken if desired. To facilitate freedom of action in this matter a separate fee is provided for each course, which entitles the one paying it to all the instruction given in the course. In connection with instruction in the method of the recitation, model teaching exercises will be presented, and these will be fully discussed in subsequent conferences. The bases of sound teaching will be further presented in the instruction in applied psychology and child study. Special classes in geography, language work, arithmetic, drawing, nature lessons, and physical culture are also provided. It is believed that elementary teachers of all grades will now find in the school the instruction and help they need for the improvement of their work.

The course of study as it has been maintained in the school is continued this year, and expanded by the addition of Latin, physical geography and geology and physical culture.

While established originally for the assistance of teachers and those preparing to teach in grammar and high school grades, the Summer School is by no means exclusively for such. It is open to any one wishing to pursue any of the branches of study specified in this circular. Those who are anxious to study at home and wish help and guidance as to matter and methods will find them here. *High School graduates* expecting to enter the University will find this School of use to them in supplementing the instruction they have received and making them better prepared for thorough work in their classes. *University students* desiring to extend their course in any of these lines, or to make up deficiencies in them, will find the School a valuable help. *Those*

wishing to do special work during the summer looking to a thesis for graduation can usually make arrangements for such work with the instructors in this school. *Students expecting to teach* after graduation will find the courses especially valuable to them. *Persons intending to take the state examinations* will find here the help and guidance they need in finishing their preparation.

Teachers and principals of high and grammar schools will note the purpose indicated in the several branches to give assistance in the teaching of these branches. What to teach and how to teach it so as to meet the requirements of the University, and so as to secure the best results for average students, will be carefully considered in connection with each of the subjects.

CREDIT AT THE UNIVERSITY.

By consultation with the instructors, arrangements may be made in many of the branches, by which credit will be given in the University for work done in the Summer School. Students desiring such credit must have passed the entrance examinations for one of the University courses, and must expect to pass a satisfactory examination upon the work done in the Summer School. The amount of credit will in all cases be determined by the amount of work done.

LABORATORIES.

The laboratories in botany, chemistry, physics, and zoology will be in charge of tne professor or a competent assistant. The School has aimed to assist its students to acquire laboratory methods and to reach knowledge through laboratory work. The task is not an easy one as the short time at the disposal of the School renders it necessary to reach results at once, but the Faculty feel that they have succeeded quite up to their own expectations, and those of the students. Those who wish to profit most from the School are advised to take not more than two courses in science and one elsewhere. Experience has shown that those students who attempt to cover more ground usually find that their work has been of only moderate value to them, while the best results have been reached by those who have spent several seasons at the School, devoting each session to one or two studies only.

LIBRARIES.

The University Library, containing about 54,000 books and 10,000 pamphlets, will be open for the use of the students of the Summer School. They can also have access to the library of the State Historical Society, which contains 100,000 volumes and 80,000 pamphlets, undoubtedly one of the most complete and valuable collections of historical material to be found in the Northwest. The Madison city library, of over 14,000 volumes, will also be accessible for all the purposes of the School.

EXPENSES.

The rate of tuition for the session is $5.00 for each study pursued in the University and high school course, and five dollars for each series in the general course; each ticket, however, entitles the holder to attend all the four courses of afternoon lectures. In the laboratories payment must be made for material consumed and for breakages. The tuition fee for the Library School, for the six weeks' session, is $15.00.

Board can be obtained in Madison at the rate of $2.50 to $4.00 per week for table board, and $5.00 to $6.00 per week, including room rent.

Furnished rooms can be obtained at from 75c to $1.00 per week, and board in clubs at $2.25 to $2.50 per week. Information regarding rooms and board will be given at the office of the school, room 38, Science Hall, or by correspondence if desired. Usually it is more satisfactory to make these arrangements after arrival in Madison, when all the conditions can be seen by the student.

A. SPECIAL LECTURES IN TEACHING.

Four series of five lectures each will be delivered at the Summer School this year. They will commence Monday, July 11, at 4 o'clock p. m., and will be free to all persons regularly enrolled in the school. The lecturers and subjects are as follows:

I. July 11-15. LOUIS H. GALBRAITH, B. L.

The Principle of Correlation. (Five afternoon lectures.) In these lectures it will be the aim: (1) to set forth the relation of this principle to the idea of method, (2) to give critical exposition of the principle in the light of psychology of the learning mind and the philosophy of the school studies, (3) to summarize and criticise the reasons which advocates have urged in favor of the principle, (4)

to examine proposed schemes for correlation, and (5) to estimate the value of the principle as a guiding idea in the conduct of a recitation, in the development of parallel courses of work, and in the arrangement of a curriculum.

II. July 18-22. NATHAN C. SCHAEFER, PH. D.
Teaching Pupils to Think.
Thinking in Things and in Symbols.
The Science of Pedagogy and the Art of Teaching.
Does Education Pay?
The Great Teacher.

III. July 25-29. M. V. O'SHEA, B. L.
1. Metamorphoses in child development with special reference to adolescence, and the High School Curriculum and Methods of Teaching.
2. Brain fatigue in school pupils,—causes, effects, remedies.
3. Brain fatigue in school pupils,—causes, effects, remedies, (continued.)
4. Types of pupils seen in the school-room,—characteristics of each and modes of treatment.
5. The laws of brain development,—what they contribute to the determination of the materials and methods of education at different periods.

IV. August 1-5. HON. WILLIAM T. HARRIS, LL. D., United States Commissioner of Education.
The Literature of Education.
Problems Peculiar to American Education.
Opposition between Pestalozzi and Herbart as Educational Leaders.
Rousseau and the Return to Nature.
Herbert Spencer and What Knowledge is of Most Worth.

B. GENERAL COURSE.

In arranging a general plan of instruction relating especially to the work of elementary schools it has been thought best to provide two series of studies, each lasting three weeks, with a separate fee for each series, so that one or both may be taken, as teachers may prefer.

The first series, which begins July 5, will consist of the following subjects:

Method in the Recitation.

Method in Geography.
Physical Education.
Language Work.
Drawing.
Model Teaching.

The second series, beginning July 25, will consist of the following:

Nature Study.
Arithmetic.
Child Study.
Model Teaching.
Conferences on Model Teaching.

Programme July 5-22.

I. METHOD IN THE RECITATION.

PROFESSOR GALBREATH.

This will consist of a critical exposition with copious illustrations of some of the chief ideas that should control in the conduct of class work. A few of the more general questions which will be raised are: what is the source of our idea of method; what is method from the standpoint (a) of means, devices, appliances, and the like; (b) of the subject-matter of instruction; (c) of the learning mind; and (d) of the organizing and directing mind? What are the ends of method? What part does experience play in learning and doing? How should observation function in education? How are the general and abstract elements of knowledge to be derived from the more special and concrete? How can acquisition be made to contribute most to the creation of power?

In preparation for this course and in pursuing it, the teachers are asked to read the new book, The Method of the Recitation, by Dr. C. A. and Dr. F. M. McMurry, (Public School Publishing Company, Bloomington, Illinois.)

II. METHOD IN GEOGRAPHY.

PROFESSOR GALBREATH.

In this course will be treated such general topics as: nature of "the new geography"; geography among the studies; significance of method; the idea of distribution and its study; distribution of the sun's rays, (Elements of Mathematical and Astronomical

Geography); home geography; transition to foreign geography, (Elements of Natural and Social Geography); type studies; principles governing the recitation; sequence in topics; correlation to be observed; educative values; the study of children's geographical concepts.

PHYSICAL INSTRUCTION.

MISS MAYHEW.

The objects of this course in Physical Training are: to gain a true knowledge of the value of Physical Education and its relation to Mental Education; to learn to reverence the body, and to care for it, that it may become our greatest help instead of a constant hindrance; to obtain practical suggestions which can be carried out, and exercises which can be practiced in the school room.

To realize this threefold object the hour will be divided into a lesson talk and practical exercises by the class illustrating the talk.

The lessons will include the following subjects:

1. Value of Physical Education and its relation to mental training.
2. Poise in standing.
3. Poise in sitting.
4. Poise in walking.
5. Breathing.
6. Eating.
7. Relaxing and Resting.
8. Sleep—"Nature's sweet restorer."
9. Control and conservation of energy.
10. Dress.
11. Exercise.
12. Bathing.
13. Physical Examination.
14. Corrective Gymnastics.
15. Expression through the body.

The exercises will consist of Swedish and Americanized Delsarte movements which can be taken in the school room or in the home, also one or two free hand drills set to music which can be used in the schoolroom.

LANGUAGE.

MISS ROBBINS.

It is desired to present the subject of language study in its application to the work of all the grades, showing its growth into a true literary spirit, the power of free, forceful expression and such a knowledge of technical grammar as should exist in the higher grades.

A selection of worthy material, a discussion of its adaptation to different ages will be attempted. Finally the presentation of the essential points of technical grammar will be given.

DRAWING.

MISS TANNER.

The general recognition of pictorial expression, as the one means of thought expression universally understood and appreciated by people in all grades of society in all nationalities, has caused prominent educators to believe it not only wise but necessary from a practical as well as ethical standpoint to place drawing regularly in the course of study of the public schools.

To-day most schools of high grade throughout the United States give drawing an equal standing with all other branches of study.

To better enable those who are now endeavoring to forward this movement and who find themselves not qualified, the following courses have been arranged with reference to the practical needs of the teacher. The work will be carried just as far as the capabilities of the classes will permit.

Lectures will be given once a week to pupils in both courses on Correlation of Drawing with Science and Language; Schoolroom Decoration; Practical and Ethical Value of Art Education.

First Course.

Free-hand drawing of plant and nature forms.

Free-hand perspective of manufactured objects.

Interior and buildings.

Blackboard drawing for science and language.

Light and shade sketching.

Second Course.

Light and shade sketching from still life and plant forms.

Out-door sketching.

Figure drawing from life.

Mediums used—pencil, ink, crayon.

If there is a sufficient number of very advanced pupils a third course will be offered of water-color work only.

Programme July 25-Aug. 12.

ARITHMETIC.

MISS ROBBINS.

The subjects of arithmetic which have proven most difficult for teachers to present, as fractions, percentage, proportion, etc., will be selected for discussion. A thorough analysis will be made of both the subject matter and the conditions in the child's mind necessary for its mastery.

Emphasis will be placed upon the especial characteristics of the method applicable to each case and the reasons for its employment.

Model Teaching—Miss Robbins, (as above).

OUTLINE OF NATURE STUDY.

PROFESSOR JACKMAN.

I. The Problem Stated: Analysis of a Nature Picture.
II. Development of a Nature Picture: Subjects of Study.
III. Nature Study adapted to the Seasons:
  (a) Autumn: the season of fruitage and change.
  (b) Winter: the season of rest.
  (c) Spring: the season of nature's revival.
  (d) Summer: the season of work.
IV. The Relation of Nature Study to the Form Studies in the curriculum—writing, number, reading, etc.
V. The Relation of Nature Study to History and Geography.
VI. Nature Study by Grades.
VII. The Moral Aspects of Nature Study.

N. B.—The above studies, conducted somewhat on the Round Table plan, will be illustrated by children's work and will be given with due regard to method and material.

APPLIED PSYCHOLOGY AND CHILD STUDY.

PROFESSOR O'SHEA.

The work in applied psychology and child study will consider some of the most important principles of modern psychology and child study as they bear directly and concretely upon the work of teaching in the elementary and high school. The following among other topics will be discussed: The laws of mental habit and the light they throw upon the methods of teaching in all grades of school work. The guidance they afford also for the arrangement

of the affairs of daily life in the case of both teacher and pupils. Suggestion in the school-room as a most important factor in all teaching and discipline. Modes of expression in childhood with particular consideration of the way in which the child learns language, both the mother tongue and foreign, drawing, writing, music, and similar subjects, indicating how these subjects should be taught. Other topics like these will be considered, and it will be the aim throughout to make the work relate closely to the problems of the school-room. Particular attention will be given to the hygiene of mental training in every stage of school work.

MODEL TEACHING.

MISS ROBBINS.

In connection with the courses offered in the theory of education Miss Robbins will conduct daily classes composed of children doing the ordinary work of the graded schools. The aim will be to apply practically the fundamental principles of method.

These lessons will be open for observation to all students of the University. Criticism and free discussion will follow each exercise.

CONFERENCE ON MODEL TEACHING.

PROFESSOR O'SHEA.

Model lessons will be observed and followed by a critical discussion of their merits and demerits. It will be the plan to consider in this concrete way all the elements which enter into successful teaching, and to do so in a thoroughly scientific manner. Lessons will be given in various subjects, and in the different grades of school work, and teachers will have the privilege of expressing his opinions in the freest way. The theories advanced in the lectures will thus be illustrated and tested in this practical manner.

C. UNIVERSITY AND HIGH SCHOOL COURSE.

July 5—August 13.

PSYCHOLOGY AND PEDAGOGY.

PROFESSOR STEARNS.

1. The general course of Psychology will have especially in view the theory of teaching, and will therefore be directed to those topics which bear most closely upon peda-

gogy. By selecting the topics in this way it is hoped that more time can be given to each one, and the practical bearings of the study can be made more prominent. The special field of work will therefore be cognition, to the general view of which will be added a more detailed study of the reasoning powers. An important feature of the course will be special topics and references for investigation and report by such members of the class as choose to undertake this work. Murray's Handbook of Psychology is especially recommended to those intending to take this course, and it will be found the most convenient manual as a guide to the class work.

2. In Pedagogy the course will review the history of educational theories, following as a guide Quick's Essays on Educational Reformers. The purpose of the course will be to make more clear the origin of the views now held as to the philosophy of teaching. This study has been added to the requirements for the state examination and the course in the Summer School will afford an excellent review in preparation for that.

HISTORY.

PROFESSOR TURNER.

1. The Study of History. Lectures will be given on the meaning of history, the methods of studying and teaching the subject, and the point of view from which to approach ancient, mediæval, and modern history, respectively. The history of England in the seventeenth century, with attention to its European and American relations, will be studied for the purpose of illustration, and of deepening the knowledge of a limited field. The course is designed primarily for teachers. Five times a week throughout the term.

2. The History of American Political Institutions. Selected institutions such as the town, country, state, speakership, nominating convention, etc., will be examined historically and critically. The history of suffrage and representation in America, civil service reform, and similar topics will be considered. The course is designed to aid teachers of civics as well as history. Three times a week throughout the term.

3. The History of the West. Lectures on the spread of settlement across the continent from colonial times to the present. Besides consideration of exploration, conquest of the Indians, frontier life, annexation of territory, etc., attention will be paid to the institutional features of Western history, both economic and political; and to Western characteristics and ideals, in their effect upon the nation as a whole. The physiographic interpretation of the Western movement will be made prominent. Illustrated with lantern slides. Three times a week throughout the term.

ENGLISH LITERATURE.

PROFESSOR FREEMAN.

The courses offered have in view the needs of persons who intend (1) to teach literature in high schools, or (2) to complete their preparation for college, or (3) to prepare for the State Superintendent's examination.

For some of the courses credit may be given as undergraduate work.

1. General Survey of English Literature. Pancoast's Introduction to English Literature, and if time serves, (a) Chaucer's Prologue to the Canterbury Tales, Skeat's Edition (25 cents), (b) Spenser, The Fairy Queen, Book I. Kitchin's Edition (60 cents).
2. The Drama. Shakespeare, Macbeth, As You Like It, and another play selected according to the wishes of the class. Hudson's Edition preferred.
3. The Lyric. Milton's L'Allegro, Il Penseroso, Comus, Lycidas.
4. The Essay. Macaulay's Essays on Milton, Doctor Johnson.
5. The Oration. Burke's Speech on Conciliation with America.
6. Narrative Poetry. Tennyson's Princess.

Three or more of the above courses will be given; choice to be made according to the preferences expressed by those electing the courses.

GERMAN.

ASSISTANT PROFESSOR VOSS.

1. An introduction to the study of German from an historical and comparative point of view. Lectures and recitations. Text-books: Weise, Unsere Muttersprache and Meyer, Einführung in das ältere Neuhochdeutsche.

This course is planned especially to meet the needs of teachers of German in high schools.

2. Narative and Historical German Prose. A rapid reading course with review of grammar. The tests will be selected from the modern writers of fiction and history.
3. Masterpieces of German literature. Critical study of the representive dramas of Lessing, Goethe, Schiller, or the modern dramatists (according to the wishes of the class), with lectures and outside reading. As far as possible, the courses will be conducted in German.

LATIN.

ASSISTANT PROFESSOR SOBER.

1. Caesar and Vergil. This course will deal with the methods and subjects of Latin instruction in secondary schools. Attention will be paid to difficulties of syntax, the Roman pronunciation, and other problems of Latin teaching. The course is intended primarily for teachers and those preparing to teach, and is open only to those who have had the high school course, at least, in Latin or its equivalent.
2. A reading course will be arranged if a sufficient number desire it, to supplement previous reading in Roman literature.

MATHEMATICS.

PROFESSOR SLICHTER.

1. Algebra. A review of the important parts of algebra. The course in algebra is planned with reference to the special needs of high school instructors, and with a view of simplifying and improving instruction in the subject. It is the intention to render the course as helpful as possible to those who are preparing for examination. Wells' Higher Algebra is used.
2. Geometry. A review of the important theorems in plane geometry, and a study of solid geometry. No previous knowledge of solid geometry will be required. The same general plans are followed in this course as in the course in algebra.
3. Plane Trigonometry and Logarithms. No previous knowledge of the subject will be assumed. There is sufficient time to cover the important portions of the subject.

Examinations will be given at the close of the courses. Credit in a University course will be granted for courses 1 and 3. Credit for admission to the University will be granted for courses 1 and 2.

Credit for the mathematics of the freshman year or any of the courses in the College of Letters and Science can be obtained by doing a small amount of work not covered by courses 1 and 3. This extra work may be done at the Summer School or elsewhere.

The instructor in mathematics will be glad to give all the assistance in his power to members of the mathematical classes in addition to the courses outlined above. Correspondence on any point connected with the work is freely invited.

PHYSICS.

PROFESSOR SNOW AND ASSISTANT PROFESSOR AUSTIN.

It is the main object of the department of Physics to give such instruction during the Summer School as will best enable the teacher successfully to conduct his classes in the high school. It will, at the same time, afford a valuable enlargement of knowledge to students who have merely a text-book acquaintance with the subject. A knowledge of an elementary text, such as Carhart and Chute, Gage, or Avery, will be a useful preparation for the course. The following courses will be given for the course. The following courses will be given:

1. General Lectures. A course of lectures will be given daily except Saturday upon the subjects of mechanics and heat, electricity and magnetism, acoustics and optics. Owing to the prominence now occupied by electricity, more attention will be given to the study of this subject than to any of the others. The extensive collection of apparatus in the department makes it possible fully to illustrate these lectures and to give experimental demonstration of all important laws. Throughout the entire course the needs of the teacher will be kept in mind, and experiments will frequently be performed with such simple apparatus as is found in those high schools having only a limited equipment. Carhart and Chute's Physics will be used as a text.
2. Elementary Laboratory Practice. In connection with these lectures there will be offered a course of laboratory practice in which especial attention will be given to

acquainting the teacher with such methods and experiments as will aid him in conducting his own classes in physics. The successful completion of the above two courses will be accepted as the requirement in physics for entrance to the University.

3. Advanced Laboratory Practice. This course is practically identical with the laboratory practice given to the sophomore class in the University, and is open to all students who are prepared to take it. University students who desire to receive credit in physics for work done during the summer may take this course instead of the regular laboratory practice of the sophomore year.

CHEMISTRY.

PROFESSOR DANIELLS.

1. Descriptive Chemistry. A lecture course upon the more commonly occurring elements and their combinations, and upon chemical theory as illustrated by the compounds studied.

   This is illustrated by experiments, and is both for beginners and for those wishing to take a rapid review of the subject.

2. A laboratory course in general chemistry, in which the student will perform his own experiments under the direction of the instructor in charge.

   Courses 1 and 2 supplement each other. It is intended that they shall lead the student to observe facts, and to trace the relation between observed facts and those fundamental laws that are included under the general name of chemical theory. On these accounts it is advisable that both courses be taken together.

3. Qualitative Analysis. This course is for those already familiar with the elementary principles of chemistry. Known compounds containing the more important acids and bases are first analyzed to familiarize the student with methods of work, and to teach him to observe, classify, and record phenomena, after which unknown salts, both simple and mixed, ores, crude metals, minerals, and substances used in the arts will be analysed.

4. Quantitative Chemistry. Two lines of work are here offered, both of which include the use of the balance.

(a) Work in determining the equivalents of elements, confirmation of the law of definite proportions, the synthesis and analysis of gaseous substances, and the determination of the molecular volumes of gases.

(b) Quantitative Analysis. The instruction in this course includes both gravimetric and volumetric methods, and is designed to teach the principles underlying the best methods of practice.

A laboratory fee sufficient to cover the cost of material used by each student will be charged.

BOTANY.

PROFESSOR BARNES.

Two courses are offered:

1. The Morphology of Plants. The course will consist of daily laboratory work and lectures and conferences explanatory of the plants studied in the laboratory, the difficulties encountered and questions raised in their study, with special reference to the employment of the same method in secondary schools.

   Three lectures will be given each week.

   The laboratory work will occupy two hours daily and will be devoted exclusively to the examination of various types of common plants with the same instruments and by the same methods as can be used in ordinary high school courses. Fresh water and marine algæ, moulds, blights, lichens, puff-balls, mushrooms, liverworts, mosses, horse-tails, ferns, and seed plants will be studied. Directions will be given for collecting and preserving material, and excursions for those interested will show where it is to be obtained. This course is intended to show the modern methods of laboratory study, recommended in the high school manual issued by the State Superintendent. It is intended primarily for teachers, but it is open even to those who know nothing of the subject. It is suited to the wants of University students who desire a short course in botany.

   Those taking this course should have Bessey's Botany or at least Bessey's Essentials of Botany, for reference.

2. The Physiology of Plants. This course will consist of lectures and laboratory work.

Three lectures will be given each week, which are open to those not taking the laboratory work, but will be intended primarily for those who do elect it.

The laboratory work will occupy at least two hours. Experiments which can be carried on with very simple apparatus will be selected and such as are adapted to high school work. The more important facts in the nutrition, respiration, and movements of plants will be experimentally demonstrated.

Those taking the course will provide themselves with Oel's Experimental Physiology, translated by MacDougal.

Special Courses, consisting of work for which the student's previous training fits him, may be arranged. For such courses materials and instruments will be provided for a small fee (not exceeding $1.00), but to them only general oversight and direction can be given. Students must expect to work largely alone, consulting with instructor for plan of work and assistance in difficulties.

PHYSIOLOGY AND ZOOLOGY.

PROFESSOR MARSH.

1. Physiology. The aim of the course in physiology is to show the meaning and connection of physiological facts to those students who have already an elementary knowledge of the facts. Such a knowledge of the subject will be expected from the student, and the daily exercise will be given to conversations and recitations on points likely to be misunderstood and on those topics which it is desirable to enforce in teaching. If such a book as Martin's Human Body, briefer course, has been studied before coming to the School the student will be able to get some profit from the lectures without devoting much time to the study outside of the class-room. A careful reading of the larger book of the same series would be a good preparation for the course on the part of more advanced students, especially those who have taught physiology. The course will be illustrated by the Auzoux manikin, by models of eye, ear, heart, and brain, and the human skeleton.

2. Elementary Systematic Zoology. The student who intends to take this course will do well to prepare the classification of some text-book as carefully as possible before coming.

He can then give all of his time to the study of specimens, and to the class work. The University has a good set of glass models of protozoa and cœlenterata, alcoholic specimens from the Naples Zoological Institute, covering the invertebrates, except insects, collections of echinoderms, corals, and mollusks, vertebrate skeletons, etc., so that there is ample material for the illustration of the course. The laboratory is well provided with microscopes, simple and compound, and with other apparatus and specimens for the use of students. This course can be elected by students of the classical courses in the University as a short course in zoology.

PHYSICAL GEOGRAPHY.

PROFESSOR MITCHELL.

The course offered in physical geography is designed to meet the needs of three classes of persons:

(a) Those who intend to teach the subject in High schools.

(b) Those who teach geography in the grades and desire a deeper insight into the basal conditions of all geographical phenomena.

(c) Those who are preparing for the State Superintendent's examination.

To meet the demands of the students that take the course the work has been arranged as follows:

1. Formation, form, and movements of the earth.
2. Those things grown out of form of earth.
3. Those things growing out of rotation of earth.
4. Those things growing out of rotation and revolution taken together.
5. Those things growing out of revolution.
6. Those things growing out of revolution, inclination, and constant parallelism.
7. The Hemispheres. (a) Land and Water. (b) Eastern and Western. (c) Northern and Southern.
8. The Continents. (a) The characteristic features of each, and the geographical significance of these characteristic features.
9. The Air. (a) Position,—How determined. (b) Composition. (c) Effect of heat, cold, moisture, and altitude. (d) The general circulation of the atmosphere, and its effect on the land, the water, plant, animal, and human life.

10. The Water. (a) Oceanic—(1) Physical properties. (2) Movements, waves, tides, and currents. The effect of each on the air, land, and life forms. (b) Continental—(1) Springs, rivers, and lakes. (c) Atmospheric.
11. Life Forms. (a) Plant life—(1) The great plant zones, the characteristic plants of each. (2) Effect of environment. (b) Animal life. Same as for plant life. (c) Human life. (1) The great races of man and their geographical distribution. (2) Effect of environment upon man. (3) Effect of man upon environment.
12. The mutual dependence of earth and man.

Note. Students contemplating taking this course should provide themselves with some good physical geography.

GEOLOGY.

The purpose of this course will be to master some few things definitely rather than to cover superficially the entire range of the subject.

The steps in the work will be as follows:

1. Cosmic Geology. An explanation of the origin and early conditions of the earth.

2. Structural Geology. Dealing with the structure, position, and arrangement of the rock formations in the earth.

3. Dynamical Geology. An exposition of geological changes and the forces that have produced them.

Whenever possible, illustrations will be taken from the geology of Wisconsin, and in this way it is hoped to make the student fairly well acquainted with the most important geological features of the State.

It is intended to make this course meet the requirements of the State teachers' examination. The text used will be Geikie's Classbook of Geology.

HISTOLOLOGY AND ANATOMY.

DR. MILLER.

1. A course in histology which will cover the tissues and organs of the body.

   Teachers who desire to obtain histological preparations to illustrate their work in physiology will find in this course the opportunity of obtaining a valuable accession.

2. A course in mammalian anatomy. This will be especially valuable to teachers of physiology who have not had a

regular course in dissecting. The work will consist of laboratory practice and such outside reading as it will be found necessary to advise.

3. If a sufficient number desire it a course open to teachers of biology will be given, which will consist of practical work in collecting, preparing, and preserving material for class work.

PHYSICAL CULTURE.

DR. J. C. ELSOM, MR. F. B. PETERSON, MR. JOS. DAVIES.

In response to demands from various sources, the Department of Physical Education this year offers for the first time courses in theoretical and practical physical culture.

These courses are intended primarily for those who propose fitting themselves as teachers of physical training in schools, normal schools, and colleges. The courses are also open to all students of the Summer School, and others, who are seeking their own personal improvement by means of a systematic course of bodily training.

The exercises will be conducted in the spacious Armory and Gymnasium, and all of the privileges of the building, including shower and tub-baths, the exercising rooms, and in addition a physical and medical examination, will be given those who pay the fees.

The courses will be divided into theoretical and practical. In the theoretical course, conducted by Dr. Elsom, the following subjects will receive attention:

Personal Hygiene.—Lectures on bathing, sleep, exercise, ventilation, diet, clothing, and other matters pertaining to health culture.

Physical Training.—Lectures on the theory and practice of physical training, history of the various systems of gymnastics, and the methods employed in different institutions.

First Aid to the Injured.—Lectures and demonstrations, with use of anatomical charts, and diagrams; practical methods of bandaging, what to do in emergencies, antidotes to poisons, etc.

Anthropometry.—Lectures on history, growth and importance of anthropometric work; various methods of measuring, testing special senses, to determine exact physical condi-

tion. The prescription of exercise to correct certain physical deficiencies and deformities; instruments used in anthropometry.

In the Practical Course under Dr. Elsom, Mr. Peterson, and Mr. Davies, will be given

Light Gymnastics.—Instruction and practice in various gymnastic drills, in free movements, and with dumb-bells, wands, and Indian clubs; methods of conducting classes, setting up exercises, and all forms of the lighter gymnastics.

Heavy Gymnastics.—Horizontal and vaulting bars; horses; bucks; parallel bars; flying and travelling rings; tumbling, simple and advanced; jumping, etc.

Track and Field Athletics.—Methods of starting, and training for sprinting, and long distance running; practice in field games, and all athletic sports.

Rowing and Swimming.—The situation of the Gymnasium on the shores of Lake Mendota renders it possible to give special instruction in all kinds of aquatics, and in addition the University Natatorium will be kept open during the Summer School.

Fees.—The fee of $2.50 for the use of the Gymnasium will be charged all who use the building. Fees for the practical and theoretical courses in physical culture, $5.00 each.

For full information, and further particulars, address Dr. J. C. Elsom, Director.

D. SUMMER SCHOOL OF LIBRARY SCIENCE.

The fourth annual session of the Summer School of Library Science will be held at Madison, Wis., as a department of the University of Wisconsin Summer School, beginning July 5 and closing August 13, 1898—a six weeks' term.

This Summer School for Librarians was first held during the summers of 1895 and 1896. It was intended as an experiment and the expenses were defrayed by Hon. J. H. Stout, of Menomonie, Wis. Arrangements were then made to make the School a permanent institution. The School has shown that in six weeks of careful instruction intelligent young women can be given so much elementary knowledge of the modern methods of conducting small libraries as will enable them to do much more efficient work as librarians, and to pursue independently definite plans of self-education in their profession. It imbues them with a professional spirit which influences all their daily work.

An isolated public library under inexperienced management loses most of its opportunities for good through ignorance of methods and facts that may be comparatively easily learned.

DIRECTOR.

The course will be under the direction of Miss Cornelia Marvin, of Scoville Institute, Oak Park, Ill., formerly Instructor in Reference Work and Bibliography in the Department of Library Science, Armour Institute of Technology, Chicago, Ill.

INSTRUCTION.

The course is intended for librarians of the smaller libraries, assistants, and teachers. The instruction, for example, will follow the treatment of a book in logical order through all processes in the library, from the time it is added to the accession or invoice book, until it has been classified, cataloged, loaned to reader, repaired, and rebound.

CLASSIFICATION AND CATALOGING.

Special attention will be given to instruction in the principles underlying classification and cataloging. No text-books will be used; instruction will be entirely by lecture, demonstration, and laboratory work. For example, one principle of the card catalogue will be explained in class by means of the blackboard and samples, then a number of books illustrating this principle will be assigned for independent work, and the result when handed in will be carefully revised and returned to the student. Thus, at the end of the course, each student will have a full set of samples used in each department of the work.

In classification, the principles will be taught by actually classifying books, and students will be given practice with the notation of both the Dewey Decimal classification, and the Cutter Expansive classification, as these two systems are most widely used.

PROGRAM.

The following outline will show the scope of the course in the different departments of library work:

ACCESSION.

Selecting and buying books. Care of serials, duplicates, and gifts; plating, pocketing, embossing; accessioning.

SHELF.

Arrangement; book numbers; shelf and book labels; care of public documents, pamphlets, and clippings; shelf list and inventory.

CATALOGUE.

Catalogue supplies; dictionary cataloging (four weeks); preparation of a printed finding list.

CLASSIFICATION.

The Dewey and the Cutter classifications are studied, twelve lessons being given in each. The student has practical work in classifying in the system chosen for study during the last three weeks of the course.

LOAN.

General talks are given on principles and supplies, and special systems for public and school libraries are discussed.

BINDING.

Materials; preparation of books for the bindery; repairing. The students learn the processes of binding by visits to the binderies of Madison.

REFERENCE.

Talks are given on the use of reference books—indexes, special encyclopædias, handbooks, etc.—and methods of reference work are discussed.

GENERAL LIBRARY TOPICS.

Shelving; furniture and fittings; library publications; library schools; library associations and commissions; traveling and home libraries; children's reading; the library and the schools; school libraries; librarian's report; library service.

LIBRARIES.

The University Library, containing about 54,000 books and 14,000 pamphlets, will be open for the use of the students of the Summer School. They can also have access to the library of the State Historical Society, which contains 100,000 volumes and 90,000 pamphlets, one of the most complete and valuable collections to be found in the Northwest. The Madison City Library, of 16,000 volumes, will also be accessible for all the purposes of the School.

EXHIBITS.

The Library Bureau will make an exhibit of modern library appliances, and the material collected at the office of the Wisconsin Free Library Commission will be used for the study of forms and methods.

TUITION.

The uniform rate of tuition is $15.00 for the term.

BOARD.

Board can be obtained in Madison at the rate of $2.50 to $4.00 per week for table board, or $5.00 to $6.00 per week including room rent.

Furnished rooms can be obtained at from 75c to $1.00 per week, and board in clubs at $2.25 to $2.50 per week. Information regarding rooms and board will be given at the office of the School, Room 38, Science Hall, or by correspondence if desired. Usually, it is more satisfactory to make these arrangements after arrival at Madison, when all the conditions can be seen by the student.

For further information, address Miss Cornelia Marvin, Scoville Institute, Oak Park, Ill., F. A. Hutchins, Secretary Wisconsin Free Library Commission, Madison, Wis., or Dr. E. A. Birge, Madison, Wis.

WASHBURN OBSERVATORY.

STAFF.

C. K. Adams, LL. D., President of the University.
G. C. Comstock, Ph. B., LL. B., Director and Professor of Astronomy.
A. S. Flint, M. A., Assistant Astronomer.
C. M. Smith, Student Assistant, Time Service.
H. A. Harding, Student Assistant, Meteorology.
J. F. Nicholson, Student Assistant, Meteorology.
Clifford Older, Student, Clerk.
John Doescher, Janitor.

The Washburn Observatory was established in the year 1878 through the munificence of the late Gov. C. C. Washburn. Although its obligations and opportunities as a branch of a teaching university have not been ignored, the energies of its staff from the beginning have been directed mainly to astronomical research. Among the lines of research which have been cultivated may be specified the measurement of the positions and motions of the heavenly bodies, the discovery and measurement of double stars, the investigation of variable stars, the study of changes of latitude and of the amount and character of the atmospheric refraction, the determination of the amount of the aberration of light, and a systematic investigation of the parallaxes of all acessible stars which have large proper motions. The Observatory also maintains a tri-daily meteorological service.

The principal instruments of the Observatory are:

An equatorially mounted telescope of 15½ inches aperture, constructed by Alvan Clark and Sons, and provided with graduated circles, driving clock, a filar micrometer, double image micrometer by Steinheil, a spectroscope, astro-photometer, and a very complete set of eye-pieces; a meridian circle, by A. Repsold & Sons, of Hamburg, with collimators, transit micrometer, and the usual accessories of such an instrument. This instrument is figured in the last edition of the Encyclopædia Britannica as

the type of its class. The objective of the instrument was made by the Clarks, and has an aperture of 4.8 inches and a focal length of 58 inches. The circle is graduated to 2 minutes of arc. For the past three years this instrument has been employed for an extensive series of determination of stellar parallax. A floating mirror has been added to it as an auxiliary for the determination of its horizontal points and flexures. There are also a sidereal clock by Höhwü, of Amsterdam, two mean-time clocks by Howard, of Boston, all excellent time-pieces, and a chronograph, by Fauth & Co., of Washington.

In the Student's Observatory are mounted a six-inch equatorial telescope, by Alvan Clark & Sons, a combined transit and zenith telescope, by Fauth & Co., and a transit instrument of the broken telescope type, by Bamberg. These instruments, while primarily intended for instruction, are well adapted to and are employed for certain classes of original work. In particular, the equatorial telescope has been provided with reflecting prisms (Loewy), and employed as one of the principal instruments of the Observatory in an investigation of the refraction and the constant of aberration, and the Bamberg instrument is used for latitude determinations by the Talcott method and for the time service of the Observatory. The Observatory also possesses a considerable number of subsidiary instruments, such as chronometers, sextants, an engineer's transit, an altazimuth, a universal instrument of the German type, a spherometer caliper, seismoscopes, and a complete set of meteorological instruments.

The Woodman Astronomical Library, established in connection with the Observatory, and supported from the income of a fund given by the late Cyrus Woodman, Esq., possesses a large and valuable collection of works upon astronomy and kindred subjects.

By provision of law the results of important investigations conducted at the Washburn Observatory are published by the State, and under this provision ten volumes, representing the more important work done at the Observatory, have been issued.

Students of sufficient technical attainments are admitted to the Observatory and take part in the investigations in progress. Meritorious original work of such students may be included in the Publications of the Observatory, or in the Bulletins of the University. The courses of instruction in astronomy are stated upon pages 107 and 168.

College of Mechanics and Engineering.

STAFF OF INSTRUCTION.

C. K. Adams, LL. D., President of the University.
Storm Bull, M. E., Professor of Steam Engineering.
J. E. Davies, A. M., M. D., LL. D., Professor of Electricity and Magnetism, and Mathematical Physics.
S. B. Fortenbaugh, M. M. E., Assistant Professor of Electrical Engineering.
D. C. Jackson, C. E., Professor of Electrical Engineering.
F. R. Jones, M. E., Professor of Machine Design.
C. I. King, Professor of Mechanical Practice.
J. G. D. Mack, M. E., Assistant Professor of Machine Design.
E. R. Maurer, B. C. E., Assistant Professor of Pure and Applied Mechanics.
A. W. Richter, M. E., Assistant Professor of Experimental Engineering.
L. S. Smith, C. E., Assistant Professor of Topographical Engineering.
F. E. Turneaure, C. E., Professor of Bridge and Hydraulic Engineering.
N. O. Whitney, C. E., Professor of Railway Engineering.
W. Alexander, B. S., Instructor in Steam Engineering.
C. F. Burgess, B. S., Instructor in Electrical Engineering.
W. H. Kratsch, B. S., Instructor in Engineering.
M. C. Beebe, B. S., Assistant in Electrical Engineering.
Michael Bonn, Foreman of Foundry.
William Lottes, Foreman of Blacksmith Shop.
Irving Mutchler, Assistant in Wood Shop.
R. W. Hargrave, Student Assistant in Machine Shop.

L. W. Austin, Ph. D., Assistant Professor of Physics.
J. C. W. Brooks, Professor of Military Science and Tactics.
G. C. Comstock, Ph. B. LL. B., Professor of Astronomy.
W. W. Daniells, M. S., Professor of Chemistry.
D. B. Frankenburger, A. M., Professor of Rhetoric.
H. W. Hillyer, Ph. D., Assistant Professor of Organic Chemistry.

W. H. HOBBS, PH. D., Assistant Professor of Mineralogy and Petrology.
J. M. CLEMENTS, PH. D., Assistant Professor of Geology.
E. T. OWEN, A. B., Professor of French.
W. H. ROSENSTENGEL, A. M., Professor of German.
E. B. SKINNER, A. B., Assistant Professor of Mathematics.
C. S. SLICHTER, M. S., Professor of Applied Mathematics.
B. F. SNOW, PH. D., Professor of Physics.
C. R. VAN HISE, PH. D., Professor of Geology.
ARTHUR BEATTY, PH. D., Instructor in Rhetoric.
W. B. CAIRNS, PH. D., Instructor in Rhetoric.
W. D. FROST, M. S., Assistant in Bacteriology.
LUCY M. GAY, B. L., Instructor in French.
LOUIS KAHLENBERG, PH. D., Instructor in Chemistry.
F. WILLIAM MEISNEST, B. S., Instructor in German.
THEODORE RUNNING, M. S., Instructor in Mathematics.

SPECIAL LECTURERS.

ONWARD BATES, C. E., Engineer and Superintendent of Bridges and Buildings, C. M. & St. P. Railway, Chicago, Ill.
The Superintendent of Bridges and Buildings.

W. E. BAKER, Gen'l Manager Metropolitan West Side Elevated Railway, Chicago, Ill.
Electrical Equipments for Elevated Railways.

C. C. BROWN, C. E., Consulting Engineer, Bloomington, Ill.
Engineering Ethics.

OCTAVE CHANUTE, C. E., Consulting Engineer, Chicago, Ill.
Aerial Navigation.

A. S. HIBBARD, General Manager Chicago Telephone Company, Chicago, Ill.
The Modern Telephone Exchange.

T. T. JOHNSTONE, C. E., Assistant Chief Engineer, Chicago Sanitary District, Chicago, Ill.
The Use of Concrete on the Drainage Canal.

W. H. MERRILL, JR., Chief Engineer of the Electrical Bureau of the National Board of Underwriters. Chicago, Ill.
Electrical Fire Risks.

J. H. PATTERSON, President National Cash Register Co., Dayton, Ohio.
Factory Organization as Illustrated in the Cash Register and Its Manufacture.

C. W. WASON, President Cleveland, Painesville and Eastern Railway, Cleveland, O.
Interurban Electric Railways.

ORGANIZATION OF THE COLLEGE.

The College of Engineering is organized in the belief that thorough-going fundamental training is the first essential to a successful engineer, but that this fundamental training may be best secured in connection with a certain amount of study of the practical applications of the principles involved, and not solely by theoretical study. It is further a leading thought that after the fundamental principles have been mastered, a certain measure of specialization in the main lines of engineering is advisable, because of the great development of engineering in recent years, and the various phases which it is rapidly assuming. It is the endeavor of this institution to combine a prudent amount of specialization in the closing years with a thorough grounding in the fundamentals in the earlier portion of its courses; and in carrying out this plan, it endeavors to make the mathematical and theoretical courses strong in the earlier years, and the applied courses strong in the later years, while the draughting and shop courses continue progressively from the beginning to the end. It also introduces sufficient foreign language to enable its graduates to read the professional German or French literature, and aims to give so much of the mastery of the English language as to enable its graduates to present professional subjects with ease, clearness, and effectiveness.

Especial encouragement is given to those who can afford the time to graduate in a collegiate course before entering the course in engineering. By electing the mathematics required of engineers during the collegiate course, the degree in engineering can be obtained in two additional years. Greater satisfaction and profit is gained from the study of engineering when the student has already acquired a broad and thorough general training. Engineers are often called upon to fill the highest positions in the community, demanding breadth of view and wide general training. The opportunities for acquiring this breadth of education, as it is given by a complete collegiate course, are few, after the student has begun the active practice of his profession.

The College of Mechanics and Engineering offers four systematic courses, as follows:

Two courses in Civil Engineering, including:

A General Course in CIVIL ENGINEERING.

A Course in MUNICIPAL and SANITARY ENGINEERING.

A Course in MECHANICAL ENGINEERING.

A Course in ELECTRICAL ENGINEERING.

To those students who desire a course in METALLURGICAL ENGINEERING, elections are offered for advanced work in geology, mineralogy, commercial assaying, and chemistry, and the general engineering courses in metallurgy, treatment of ores, electrometallurgy, and mining surveying.

REQUIREMENTS FOR ADMISSION.

There are two methods of admission to the University.

I. By examination at the University.

II. By certificates from accredited schools.

I. Examinations at the University.

The regular examinations of the University are two in number; one in June and one in September. For the current year the earlier examination will be held on Thursday and Friday, June 16 and 17, beginning at 9 a. m. The later examination will be held on Tuesday and Wednesday, September 27 and 28, beginning at 9 a. m. Examinations will also be held on the opening day of the second semester. Candidates must be present at the first examination of the first day. The examinations for admission to the freshman class in any of the engineering courses will cover the following subjects:

GEOGRAPHY, political and physical.

HISTORY OF THE UNITED STATES: Montgomery's or Johnson's History of the United States.

ARITHMETIC.

ALGEBRA: Addition, subtraction, multiplication, division, equations of the first degree with one unknown number, simultaneous equations of the first degree, factors, highest common factor, lowest common multiple, quadratic equations, simultaneous equations above the first degree, theory of indices (positive, negative, fractional, and zero), and radicals.

GEOMETRY: Plane and solid geometry. In solid geometry, special attention should be given to the geometry of the sphere.

ENGLISH: 1. An analysis of short extracts from prose and poetry, as to forms and meaning of words, structure of sentences, paragraphing and figures of speech.

2. Each candidate will be required to write a short essay on a subject to be announced at the time of the examination. The essay will be taken as a test of a candidate's knowledge of spelling, punctuation, use of capital letters, grammar, structure of sentences, and paragraphs.

GERMAN: Correct pronunciation, the essentials of grammar (Collar-Eysenbach's, Joynes-Meissner's, Whitney's, etc.), and the ability to apply them (two terms' work in high school); acquisition of a vocabulary sufficient to enable students to read and translate sixty reading lessons in any standard reader correctly and understandingly; practice in the oral use of German in connection with the reading lessons, and the memorizing of from nine to twelve German poems (two terms' work), and the careful study of at least two plays, as Minna von Barnhelm, Der Neffe als Onkel, Die Journalisten, etc. (two terms' work.)

FRENCH: Instead of German, an equivalent amount of French may be offered.

PHYSICS: Carhart and Chute, Gage, or Avery, with laboratory work.

PHYSIOLOGY: Martin's The Human Body (briefer course).

BOTANY: Two terms' study required, of which at least 60 hours shall be laboratory work devoted to the anatomy and physiology of plants. It is urged that part of this time be given to a study of cryptogams. For entrance in 1898-99 and thereafter a knowledge of the main groups of cryptogams will be required.

ADAPTIVE WORK; amounting to one daily recitation for two years.

This may consist of various subjects. The University advises:

1. Two years' daily work in French or Latin; or
2. One year's work in history and one year's work in English literature.

If these studies cannot be taken, a selection from the following studies may be offered:

3. Rhetoric, civil government, mental science, theory and art of teaching, zoology, astronomy, or other science. No subject can be offered which has been pursued in high school for a shorter time than twelve weeks, or which is less in amount than a standard high school text-book on the subject. The total amount offered must be equivalent of a daily recitation for two years. The two years' work may be made up of these studies in any combinations, under the conditions stated above.

Real equivalents will be accepted for the requirements given above. Students desiring admission into any course must present those requirements which are essential to the work of the course.

Conditions in entrance examinations will be limited to those cases in which the Board of Examiners think that the maturity and strength of the student will allow him to carry the regular work of his course and make up the conditions.

Admission of Special Students.

Candidates under twenty-one years of age desiring to take special courses will be required to present the same qualifications as candidates for one of the regular courses of the University.

Persons twenty-one years of age, who are not candidates for a degree, and who wish to take special studies, will be permitted to do so upon giving satisfactory evidence that they are prepared to take the desired studies advantageously. If they subsequently desire to become candidates for a degree, or to take a regular course, they must pass the required entrance examinations.

II. Admission Upon Certificates.

Graduates of schools which have been accredited to the University for the General Science and Engineering courses will be admitted to any one of the Engineering courses upon presentation of a certificate from the principal of the school.

Preparation in Algebra for the Engineering Courses.

Thorough preparation in mathematics is of the greatest importance to students entering the engineering courses of the University; and it is therefore advised that such students carefully review algebra either during the last term of their high school course or during the summer preceding their entrance into the University. The University faculty consider it advisable that the review be made wherever practicable, during the last term of the high school course.

DEGREES.

The University confers upon the graduates in the Engineering courses the degrees of Bachelor of Science in Civil, Mechanical, or Electrical Engineering.

The degrees of Civil Engineer, Mechanical Engineer, and Electrical Engineer are conferred as second degrees upon Bachelors of Science in the Civil, Mechanical, and Electrical Engineering courses respectively, (1) who pursue advanced professional study at the University for one year, and present a satisfactory

project or thesis; or (2) who present suitable evidence of three years of professional work, of which one must be in a position of responsibility, and a satisfactory thesis.

University Fellowships.

For the purpose of promoting higher scholarship and more extended original study than the academic courses afford, the Board of Regents has established ten University Fellowships of $400 each, conditioned upon proper qualifications and upon a prescribed amount of instruction rendered in the University.

QUARTERS AND EQUIPMENT.

Much of the laboratory, draughting, experimental, and class work of the College of Mechanics and Engineering is provided for upon the two lower floors of Science Hall, one of the best educational structures in this country. Shop work and additional laboratory work is carried on in a well-equipped building exclusively devoted to the purpose, which, through the generosity of the legislature of 1893, has been largely extended; the chemistry, assaying, and metallurgical work are carried on in the Chemical Laboratory, a fine structure built especially for the purpose. The work in physics, mineralogy, geology, etc., is carried on in other parts of Science Hall; the practical astronomy at the Students' Observatory; the language and mathematical studies in the literary halls of the University. The advantages of association with students seeking general and literary culture are thus secured. All laboratories and courses of study in the University are open to the students in engineering for elective work.

Libraries.

The library facilities of the University are very great. Besides the University library, containing more than 54,000 volumes, of which a good share are books pertaining to the engineering profession, there are the library of the State Historical Society (150,000 volumes) and the City free library (15,000 volumes) to which the students have free access. The College of Mechanics and Engineering subscribes for eighty-five technical periodicals, and these are kept in the engineering reading-room in Science Hall in order to facilitate the frequent use of them by the engineering students. The files of technical periodicals in the library are unusually complete, and additions are made every year.

Laboratories and Apparatus.

The engineering laboratories are well equipped for purposes of instruction and investigation.

The Testing Laboratory has recently been moved to its new quarters, a large room having been provided for the purpose in the new extension of the machine shop. The University has also recently purchased a one-hundred-thousand-pound Riehle automatic and autographic testing machine, permitting the testing of materials of the larger sizes used in practice. In addition to this there are also other Riehle machines, also Olson and Thurston machines for making tests in tension, compression, bending, and torsion. These machines are supplied with extensometers, clamps, devices for autographic records, and other special devices.

The Cement Laboratory contains a full supply of necessary apparatus for making tests according to the American Society of Civil Engineers' standard; baths, self-recording thermometer, Boehme hammer complete, 1,000-lb Riehle testing machine, a new electric-power stone saw, and grinding and polishing wheels. The machines in the Testing Laboratory are also used for testing brick, stone, and cement.

The Hydraulic Laboratory contains high and low level tanks fitted for experimenting upon the flow of water through orifices, nozzles, pipes, and over weirs. In the laboratory are several water motors, water meters, current meters, lines of pipe, etc., all available for experimental work. There is also a convenient supply of gauges and other apparatus required in accurate hydraulic experiments.

The Steam Engineering Laboratory contains a hot-air engine, a gas engine, a ten horse-power gasoline engine, and several steam engines of various types. The most important experimental engine is a fifty horse-power quarter-crank compound engine, so arranged that either cylinder can be supplied with live steam from the boilers and run as a single cylinder engine. The condenser and pumps can also be disconnected so that the engine may be run as a non-condensing one. Both cylinders and the receiver are provided with steam jackets, which may be used at will. By means of a Proell governor, the number of revolutions may be varied from 50 to 125. The cylinders each have four poppet valves, and the cut-off of the steam is automatically controlled by the governor and may vary between zero and nine-tenths of the stroke. A fifty horse-power Root boiler furnishes the steam for this engine exclusively. The laboratory is supplied

with friction brakes, transmitting dynamometers, mercury column, and other means for testing steam, water, vacuum, and other gauges, and various devices for special tests; there are also the necessary tanks, weighing apparatus, pyrometers, calorimeters, indicators, etc., for making complete tests of the economy and capacity of boilers and engines; with a variety of minor and accessory apparatus. The laboratory contains a large model of Stephenson's link motion, in connection with the piston, cross-head, connecting-rod, and crank of the engine. A 5-ton ammonia refrigerating plant has just been added to the equipment of the laboratory. It has been arranged in such a manner that a great many useful and interesting experiments and tests may be performed with it. All the necessary smaller apparatus for such tests are on hand. It is believed that a large field for original investigations has been opened up by the acquisition of this plant.

The Electrical Laboratories are well supplied with exact scientific and commercial instruments, and are arranged for instruction and investigation. With the additional space and apparatus which is allowed through the generosity of past legislatures, the equipment has been made unusually complete in the lines of continuous current, and single and multiphase alternating current generation and distribution, and commercial electrochemistry.

The dynamo collection consists of a large number of continuous-current and alternating-current generators and motors of various types, which are specially installed for the purposes of instruction and experiment. These are arranged in a large special room, with a special engine of exceedingly close speed regulation. For use in testing dynamos all necessary apparatus is supplied, including large lamp banks, transformer banks, and water rheostats for loading generators, special prony brakes, etc., for loading motors, cradle dynamometer, and accurate electrical instruments of all useful types. A transformer bank for use in instruction and testing, which represents nearly all American and some foreign products, and an equally complete bank of recording electric meters, are also located in this room.

Another large room is occupied by the appliances and apparatus required for instruction and experiments relating to electric batteries, electrolysis, electroplating, and electrometallurgy. The equipment for this laboratory consists of dynamos and tanks for depositing metals and for other electrolytic processes; apparatus for cleaning, polishing, and burnishing; three electric furnaces for electrometallurgical processes requiring the intense

heat of the electric arc; and proper measuring instruments. The equipment is one of the first and most complete of its kind.

A great number of amperemeters, voltmeters, wattmeters, wheatstone bridges, variable self-inductance and mutual-inductance boxes, condensers, galvanometers, electrodynamometers, electric balances, 100,000 ohm and megohm resistances, Clark cells and other apparatus are supplied for general use, while standard apparatus for determining the adjustments of the general instruments is at hand. Special means are provided for the important functions of insulation testing, testing the magnetic qualities of metals (including a Ewing hysteresis tester, a Ewing magnetic bridge, and an improved bridge designed at the University), for photometry of arc and incandescent lamps, measuring the distribution of illumination, etc. Apparatus is also provided for class room demonstration, such as Thordarson's apparatus for demonstrating the phenomena of polyphase current transformation and polyphase motors, a fine set of models (made at the University) illustrating the different forms of armature windings, etc.

An electric welder, located in the dynamo room, gives an opportunity for instruction upon the electrical working of metals. Alternating currents of the ordinary frequencies are on tap at the switchboards, and other frequencies may be generated at will by means of rotary transformers. Continuous currents of any desired value up to 400 amperes and pressures up to 1000 volts can be had at will.

The Bridge Engineering Department has recently purchased a set of Fraenkel's autographic apparatus for the testing of bridges under moving train loads. This includes two extensometers for measuring strains in members and a deflectometer for measuring vertical and lateral deflections. The department also possesses several large size models of bridge joints and a large collection of drawings and photographs to which additions are constantly being made.

The Assay Laboratory, situated in the south part of the basement of the Chemical Laboratory, is one of the largest and best equipped laboratories of its kind in the country. It has separate rooms for furnaces, tables, wet assaying, and balances. The furnace room is supplied with eleven crucible and three muffle furnaces, as well as a small gas plant. It has steam power, a Sturtevant blower, bullion rolls, a Blake ore crusher, and other pulverizers. The table room has space for twenty-four students,

and is well supplied with ordinary balances. In the balance room are first-class quantitative balances by Becker, and an Oertling gold balance.

The Machine Shop affords excellent facilities for mechanical practice. It embraces a main machine room properly equipped; a carpenter shop supplied with wood-working machines; a forge room, provided with forges and their equipment, with blast and exhaust fan; a foundry room whose equipment consists of a cupola, brass furnace, and core oven, with the necessary small tools; a wood-work room supplied with benches, carpenter tools, and wood-turning lathes; and a pattern room furnished with the requisite tools. The shop is supplied with convenient lockers, closets, and washroom with hot and cold water. The space and equipment of the shop has lately been increased nearly three-fold to provide for the rapid increase in the number of students entering the classes of the College of Engineering. New lathes, forges, drills, and benches have been added with the increase of space until 150 students may be instructed in the different branches of the work at one time.

The Engineering Museum contains a complete set of Schroeder's models for descriptive geometry, including shades, shadows, and perspective; also a small collection of Schroeder's kinematic models, besides a number of smaller models, made by students, illustrating problems in kinematics. An excellent industrial collection is in process of development.

The draughting rooms contain a large and varied collection of general working and detail drawings illustrating a great variety of engineering structures and machines.

The Surveying Laboratory. By an agreement with the director of Washburn Observatory, the surveying laboratory shares in the free use of the extensive apparatus belonging to that observatory, and including, in addition to the large equatorial telescope and meridian circle, collimators, transit micrometers, chronograph, sidereal and meantime clocks, zenith telescopes, a transit instrument of the broken type, chronometers, an altazimuth, a universal instrument of the German type, spherometer calipers, and complete set of meteorological instruments.

In addition to this equipment the surveying laboratory contains all the portable, astronomical, and field instruments needed for an extensive triangulation and topographic and hydrographic surveys, including two theodolites by Buff and Berger and Fauth, reading to ten seconds, an altazimuth by Hyde reading to six

seconds, a tidal gauge, six heliotropes, a complete precise level outfit by Kern, a sounding apparatus, a base line apparatus, ten engineer's transits of various designs, one complete mining transit with auxiliary side and top telescope and lamp targets by Buff and Berger, four solar transits and compasses, an ample number of wye, dumpy, and architects' levels, plane tables, telemeter, level rods, surveyors' compasses, and such special instruments as planimeters, pantographs, trignometers, sextants, computing machines, aneroid barometers, odometers, pedometers, clinometers, binocular telescopes, telescopic hand levels, etc., etc.

The standards of weights and measures belonging to the State are kept in the Civil Engineering Department, and all official comparisons are made here.

INSPECTION TOURS.

An inspection tour by the members of the junior class is provided for just previous to the Easter recess. In this tour visits are made to the great manufacturing establishments and to other important private and public engineering works of Chicago, Milwaukee, and elsewhere. Similar tours by sections of the senior class are provided for in the fall or just before commencement. These tours are made under the guidance of the professors and are deemed an important part of the student's work.

EXPENSES.

Tuition for residents of the State of Wisconsin, . . .	FREE.
Tuition for non-resident students—per semester, . . .	$9.00
General fee—first semester, ...	6.00
General fee—second semester, ...	6.00
Engineering and periodical fee for the year, ...	1.50

A laboratory fee of $1.50 per semester, for each two hours' work per week, is charged in all engineering laboratories.

Students working in any of the other laboratories of the University are also required to pay a fee or to make a deposit to cover the cost of the materials and repairs of instruments used by them. For a list of these fees, see p. 75.

Rooms, furnished and unfurnished, can be obtained in the city at reasonable rates. The cost of board in clubs is from $2.25 to $3.00 per week; in private families from $2.50 to $3.50 per week.

COURSES OF STUDY.

The attention of students who propose to pursue an engineering course is specially called to the opportunity which is presented for them to complete a general University course, and by taking advantage of the elections advised below to complete the technical course in two additional years. All students who can afford the time are strongly advised to pursue this plan.

CIVIL ENGINEERING COURSE.

Freshman Year.

FIRST SEMESTER.—French, 3, (5)†, or German, 5, (5); Rhetoric, 2, (3); Mathematics, 1, (5); Topographical Engineering, 1, (3½); Mathematics, 7, (5).

SECOND SEMESTER.—French, 3, (5); or German, 5, (5); Rhetoric, 2, (3); Mathematics, 2 and 3, (5); Shop-work, 1, 3, 7, (5); Topographical Engineering, 2a, (3).

Sophomore Year.

FIRST SEMESTER.—Mathematics, 3, 4, 5, (6½); Physics, 1, 2, (5); Chemistry, 1, (5); Mineralogy, 1, (2); Topographical Engineering, 2b, (2½).

SECOND SEMESTER.—Mathematics, 4, (3½); Physics, 1, 2, (4); Chemistry, 2, (2); Mechanics, 1, 2, (8); Topographical Engineering, 3, (3½); 5, two weeks (120 hours).

Junior Year.

FIRST SEMESTER.—Mechanics, 3b, 4b, (9); Steam Engineering, 7, 9, (3); Structural Engineering, 1, 2a, (4); Railway Engineering, 1, 2, (5).

SECOND SEMESTER.—Mechanics, 5, (1½); Astronomy, 5, 6, (4); Structural Engineering, 2b, 5a, 7a, (8½); Railway Engineering, 3, (2); Topographical Engineering, 4, (2); Machine Design, 4, (3); Topographical Engineering, 5, two weeks (120 hours).

Senior Year.

FIRST SEMESTER.—Structural Engineering, 3, 4, 5b, 6, 7b, (9); Railway Engineering, 4, (2); Geology, 1, (5); Municipal Engineering 1, (3); Elective (2), in Railway, Structural, Geodetic, Topographic, or Municipal Engineering.

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†The figure in parentheses denotes the number of hours per week. For descriptions of the various courses see subsequent pages.

SECOND SEMESTER.—Structural Engineering, 4, (3); Railway Engineering, 6, (2); Rivers and Canals, 1, (1½); Municipal Engineering, 2, 4, (4½); Geology, 5, (2); Geodesy, 6, (1); Laws of Corporations and Contracts, (1); Elective, (4), in Railway, Structural, Geodetic, Topographic, or Municipal Engineering; Thesis.

MUNICIPAL AND SANITARY ENGINEERING COURSE.

To civil engineering students entering the junior year, the option of two courses is offered. One of these courses is a general course in civil engineering as outlined above, the other is a course in which more stress is laid on those studies pertaining to municipal and sanitary engineering. The studies prescribed for this course are given below:

Junior Year.

FIRST SEMESTER.—Mechanics, 3b, 4b, (9); Steam Engineering, 7, 9, (3); Structural Engineering, 1, 2a, (4); Railway Engineering, 1, 2, (5).

SECOND SEMESTER.—Mechanics, 5, (1½); Structural Engineering, 2b, 5a, 7a, (7½); Railway Engineering, 3, (2); Chemistry, 3, (5); Topographical Engineering, 4, (2); Machine Designs, 4, (3); Topographical Engineering, 5, two weeks (120 hours).

Senior Year.

FIRST SEMESTER.—Structural Engineering, 3, 4, 6, 7b, (6); Geology, 1, (5); Biology, 3, (5); Municipal Engineering, 1, 3, (5).

SECOND SEMESTER.—Structural Engineering, 4, (3); Railway Engineering, 6, (2); Rivers and Canals, 1, (1½); Municipal Engineering, 2, 3, 4, 5, (7½); Geology, 5, (2); Laws of Contracts, (1); Geodesy, 6, (1). Thesis

Graduate Courses.

For graduate students and students desiring to specialize, opportunity is afforded in the elective courses and in courses arranged on consultaion with the instructors, for advanced study in railway, structural, municipal, topographic or geodetic engineering, and for special laboratory investigations.

MECHANICAL ENGINEERING COURSE.

Freshman Year.

FIRST SEMESTER.—Mathematics, 1 (5); Mathematics, 7, (5); German, 5, (5), or French, 3, (5); Rhetoric, 2, (3); Shop-work, 1, 2, (2½).

SECOND SEMESTER.—Mathematics, 2 and 3, (5); Mathematics, 7, (2½); German, 5, (5), or French, 3, (5); Rhetoric, 2, (3); Shop-work, 2, 3, 4, 5, 6, (5).

Sophomore Year.

FIRST SEMESTER.—Mathematics, 3, 4, (5); Physics, 1, 2, (5); Chemistry, 1, (5); Machine Design, 1, (3); Shop-work, 7, 8, (3).

SECOND SEMESTER.—Mathematics, 4, 6, (5); Physics, 1, 2, (5); Mechanics, 1, (5); Chemistry, 2, (3); Machine Design, 2, (3).

Junior Year.

FIRST SEMESTER.—Mechanics, 3a, 4a, 5, (6½); Steam Engineering, 1, 2, 8, (5); Machine Design, 3, (6); Shop-work, 9, 10, (3½).

SECOND SEMESTER.—Steam Engineering, 2, 4, 8, (8); Machine Design, 4, 5, (10); Shop-work, 11, (3); Contracts, (1).

Senior Year.

FIRST SEMESTER.—Steam Engineering, 4, 8, (6); Machine Design, 6, (7); Electrical Engineering, 1, (5); Shop-work, 12, (3).

SECOND SEMESTER.—Hydraulic Engineering, 1, 2, (4); Machine Design, 6, (7), for eight weeks; Steam Engineering, 4, 8, (5); Shop-work, 13, (5), Thesis.

Graduate Courses.

Graduate students will be received in the Department of Mechanical Engineering, and opportunity for advanced study in machine design and steam engineering will be given by the professors in charge.

ELECTRICAL ENGINEERING COURSE.

Freshman Year.

The same as the Mechanical Engineering Course.

Sophomore Year.

FIRST SEMESTER.—Mathematics, 3, 4, (5); Physics, 1, 2, (5); Chemistry, 1, (5); Machine Design, 1, (3); Shop-work, 7, 8, (3).

SECOND SEMESTER.—Mathematics, 4, 6, (5); Mechanics, 1, (5); Physics, 1, 2, (4); Chemistry, 2, (4); Machine Design, 2, (3).

Junior Year.

FIRST SEMESTER.—Mechanics, 3a, 4a, (5); Physics, 5, (3), Electrical Engineering, 1, (5); Machine Design, 3, (6); Shop-work, 9, 10, (2½).

SECOND SEMESTER.—Mechanics, 5, (1½); Steam Engineering, 5, 8, (5); Electrical Engineering, 1, 3, (5); Machine Design, 4, 5, (10).

Senior Year.

FIRST SEMESTER.—Steam Engineering, 6, 8, (5); Electrical Engineering, 2, 4, 6b, (11); Machine Design, 6, (6).

SECOND SEMESTER.—Hydraulic Engineering, 1, 2, (4); Electrical Engineering, 4, 5, 6a, 6c, (11); Contracts, (1); Thesis.

Graduate Courses.

Graduates and advanced students are offered instruction in advanced design and experimental investigations relating to electrical engineering as is more fully explained in later pages under Departments of Instruction, and also under Department of Graduate Study.

ELECTIONS FOR STUDENTS IN GENERAL UNIVERSITY COURSES.

Students who plan to graduate in engineering, after taking a degree in any other college of the University, should aim to make the following elections during their undergraduate course, in order that the engineering course may be completed in two additional years:

Freshman Year.

Mathematics, all courses; Topographical Engineering, 1 and 2a, or Machine Design, 1.

Sophomore Year.

Mathematics, all courses; Physics, 1 and 2; Topographical Engineering, 2 and 3, or Machine Design, 2, 3, and 4; Pure and Applied Mechanics, 1.

Graduates in any of the Engineering courses may graduate in any other Engineering course after one year of additional study. Students who contemplate doing this should, however, make their elections, especially in the senior year, with this end in view.

DEPARTMENTS OF INSTRUCTION.

The number of hours given is the actual number of hours of instruction. Class-room work and lectures require outside preparation, draughting room and laboratory work do not.

FRENCH.

PROFESSOR OWEN, ASSISTANT PROFESSOR GIESE, MISS GAY, AND MR. SEYMOUR.

3. Special Elementary Course for Engineers, essentially as follows: Roman d'un Jeune Homme Pauvre, La Petite Fadette (the former read mainly and the latter altogether independently of the classroom), Le Cid, Le Misanthrope, *Throughout the year; M., T., W., Th., F., at* 11. Mr. SEYMOUR.

4 Composition, etc. Written translation into French of the English exercises in Otto's Grammar, oral translation into French of Howard's Aids to French Composition. *Throughout the year; two hours a week.* Miss GAY.

5. Continuation of Course 4. *Throughout the year; two hours a week.* Assistant Professor GIESE.

12. A general course of lectures on French Literature, XVI.—XIX. centuries, with collateral reading. *Throughout the year; M. & W., at* 12. Assistant Professor GIESE.

GERMAN.

PROFESSOR ROSENSTENGEL AND MR. MEISNEST.

5. Dippold's Science Reader, Rosenthal's Elektrische Erscheinungen, and Siemen's Elektrische Telegraphie. Required of Freshmen in Engineering. *M., Tu., W., Th., F., at* 11. Mr. MEISNEST.

The aim of this course is to impart a reading knowledge of scientific German, thus enabling students to read German scientific works in connection with their special line of study.

RHETORIC AND ORATORY.

DR. BEATTY, DR. CAIRNS, AND MR. CASKEY.

2. Rhetoric and Composition. Text-books: Abbott's How to Write Clearly, and Cairns' Form and Discourse. *Throughout the year; M., W., F., at* 11 and 12. Dr. BEATTY and Dr. CAIRNS.

Required of freshmen in Engineering.

15. Elocution. Voice training and plain reading and speaking. *First semester; three times a week.* Mr. CASKEY.

Elective for Engineers.

PHYSICS.

PROFESSOR SNOW, ASSISTANT PROFESSOR AUSTIN, MR. WOOD, MR. SMITH, MR. WILDER, AND MR. SHEDD.

1. General Lectures and Introductory Laboratory Practice. Lectures daily at 12 o'clock. Professor SNOW. One recitation by the class in smaller sections at hours to be assigned. Professor SNOW, Mr. WOOD, and Mr. SMITH. Laboratory practice twice a week. *First semester: Tu., Th.,* 9-1. *Second semester: W., F.,* 2-4. Assistant Professor AUSTIN, Mr. WOOD, Mr. SMITH, and Mr. WILDER.

The Introductory Physical Laboratory is open daily, except Saturday, in the afternoon. Students may therefore make other arrangements as to time, if more convenient.

Required of sophomores in Engineering.

4. Precision of Measurements. An advanced laboratory course in Electrical and Magnetic Measurements. Testing and calibration of electrical instruments, and determination of constants. *Three times a week for first semester; M., W.,* 2-5. Mr. SHEDD.

Required of juniors in Electrical Engineering.

CHEMISTRY.

PROFESSOR DANIELLS, ASSISTANT PROFESSOR HILLYER, MR. LINCOLN, AND MR. BASSETT.

1. Descriptive Inorganic Chemistry and Qualitative Analysis. Lectures and laboratory work. *First semester; M., Tu., W., Th., F.,* 2-4.

Second semester: C. E., *first eight weeks, M.*, 2-4; *Tu., Th.*, 11-1, *and* 2-4; M. E., *first ten weeks, Tu., Th.*, 11-1; *Tu.*, 2-4; E. E., *first thirteen weeks, M., Th.*, 2-4; *F.*, 2-6.

Required of sophomores in Engineering.

MINERALOGY.

ASSISTANT PROFESSOR HOBBS.

2. Mineralogy. A short course adapted to the needs of Engineering students, taken mainly in the laboratory, when with the use of the blow-pipe and study of the physical characters the student is taught to identify minerals. The minerals of economic importance and the common rock builders are the ones given particular attention. *First semester.*

Required of sophomores in Civil Engineering.

GEOLOGY.

PROFESSOR VAN HISE AND ASSISTANT PROFESSOR CLEMENTS.

1. Part I. General Geology. The geological forces and the work they accomplish; the physiography of North America; rocks and their original and secondary structures. Numerous short excursions. First semester to holiday recess. *M., Tu., W., Th., F., or M., W., F., at* 12. Professor VAN HISE.

Part II. Historical Geology. Special emphasis is given to the history of the North American Continent, including both its physical and life development. Lecture room and laboratory work. First semester from holiday recess. *M., Tu., W., Th., F., or M., W., F., at* 12. Assistant Professor CLEMENTS.

Required of seniors in Civil Engineering. This course is so arranged that it can be taken as a three-fifths or five-fifths study for the first semester.

2. Applied Geology. Treats of potable waters, structural materials, soils, mineral fertilizers, mineral fuels and iron ores. Must be preceded by course 1. Required of seniors in civil engineering. First six weeks of second semester. *M., Tu., W., Th., F., at* 12. Assistant Professor CLEMENTS.

MATHEMATICS.

PROFESSOR SLICHTER, ASSISTANT PROFESSORS SKINNER, MACK, SMITH, AND MESSRS. RUNNING AND ALEXANDER.

1. Algebra. This course includes progressions, arrangements and groups, binomial theorem, the theory of limits, undetermined coefficients, logarithms, imaginaries, and rational integral functions of one variable. Text-book: Van Velzer and Slichter's University Algebra. *First semester; M., Tu., W., Th., F., at* 10 (90 *hours in class room*). Professor SLICHTER, Assistant Professor SKINNER, and Mr. RUNNING.

   Required of freshmen in Engineering.

2. Plane Trigonometry. *Part of second semester; M., Tu., W., Th., F., at* 10 (36 *hours in class room*). Professor SLICHTER and Assistant Professor SKINNER.

   Required of freshmen in Engineering.

3. Analytic Geometry. Straight line, conic sections, and introduction to geometry of three dimensions (74 hours in class-room). *Part of second semester; M., Tu., W., Th., F., at* 10. Required of freshmen in Engineering. *Part of first semester; M., Tu., W., Th., F., at* 8 *and* 9. Required of sophomores in Engineering. Professor SLICHTER and Assistant Professor SKINNER.

4. Calculus. *Part of first semester, and second semester, M., Tu., W., Th., F., two sections, at* 8 *and* 9 (136 *hours in class room*). Professor SLICHTER, Assistant Professor SKINNER, and Mr. RUNNING.

   Required of sophomores in Engineering.

5. Spherical Trigonometry. *Part of first semester; Tu., Th., S., at* 10 (30 *hours in class room*). Mr. RUNNING.

   Required of sophomores in Civil Engineering.

6. Differential Equations. *Part of second semester; M., Tu., W., Th., F., at* 8 *or* 9 (24 *hours in class room*). Professor SLICHTER, Assistant Professor SKINNER, and Mr. RUNNING.

   Required of sophomores in Mechanical and Electrical Engineering.

7. Descriptive Geometry. Projection of lines, planes, surfaces, and solids; intersections, tangents to curves and surfaces; problems in warped surfaces; shades and shadows; linear perspective and isometric projection. The class-

room exercises are accompanied by work in the draughting room. Text-books: Watson's Descriptive Geometry for the Mechanical and Electrical Engineering courses, and Faunce's Descriptive Geometry for the Civil Engineering Course. Assistant Professors MACK and SMITH, and Mr. ALEXANDER.

FIRST SEMESTER.

Section I. *Tu., Th.*, 11; *F.*, 8-10; *S.*, 9-1.

Section II. *M., W., F.*, 2-4; *Tu., Th.*, 2 *and* 3.

Civil Engr'g Section. *M., W.*, 8; *Tu., Th., F.*, 8-10.

SECOND SEMESTER.

Section I. *Tu., Th.*, 8; *M., W., F.*, 8-10. First nine weeks.

Section II. *M., Tu., W., Th., F.*, 2-4; First nine weeks.

Required of freshmen in Mechanical and Electrical Engineering.

Civil Engr'g Section. *M., Tu., W., Th., F.*, 8-10; First four weeks. Elective.

ASTRONOMY.

PROFESSOR COMSTOCK.

6. Astronomical Practice. This course gives training in the theory and use of instruments of precision, and teaches the more important practical applications of astronomy, such as the determination of time, latitude, longitude, and the direction of the meridian. Attention is paid to methods of computation and the numerical treatment of observed data.

7. Method of Least Squares. The subject is treated from the empirical side, and stress is laid upon the application of principles rather than upon the purely mathematical problems which accompany them. *Second semester; M., Tu., W., F.*, 2-4.

Required of juniors in Civil Engineering.

BIOLOGY OF WATER SUPPLIES.

MR. FROST.

1. Biology of Water Supplies. This course is adapted to the needs of students in Sanitary Engineering. It includes a study of the microscopical plants and animals usually found in water supplies; the isolation and cultivation of

water bacteria and their relation to disease; the testing of filters and other methods for the purification of waters; and the disposition of sewage by means of sand filtration. *First semester. Full study.* Lectures and Laboratory work. Required of seniors in Sanitary Engineering. Mr. Frost.

APPLIED MECHANICS.

ASSISTANT PROFESSOR MAURER AND ASSISTANT PROFESSOR RICHTER.

1. Analytic Mechanics. Shaped with special reference to the practical requirements of engineers. Principles rather than formulas are emphasized. Deals with statics, kinematics, kinetics, energetics, centre of gravity, moment of inertia, friction, and units and dimensions of mechanical quantities. *Second semester* (90 *hours in class room*): *M., Tu., W., Th., F., at* 8 *and* 9. Assistant Professor Maurer. Required of sophomores in Engineering.

2. Graphic Statics. Covers the following general subjects: (1) General theory of graphic statics, being a development from first principles, by graphic methods, of the main principles of statics of complanar forces. (2) Application to the determination of stresses in framed structures under fixed loads, of shear and bending moment in simple beams under fixed and moving loads, and of the centriod and moment of inertia of any plane area. The work consists mainly of draughting, as part of which the student is required to make, graphically, the computations which form the basis of problems in roof design to be completed later. *Second semester* (108 *hours in draughting room*); *M., W., F.,* 10-12. Assistant Professor Maurer. Required of sophomores in Civil Engineering.

3. Strength of Materials.

   (a) The elastic properties of the most important materials of construction from a theoretic standpoint. Applications of theory to practical problems in beams, columns, shafts, riveting, springs, etc. *First semester* (70 *hours in class room*); *M., Tu., W., Th., F., at* 11. Assistant Professor Maurer.

   Required of juniors in Mechanical and Electrical Engineering.

   (b) Consists of 3a with 20 hours additional devoted to further study of combined stresses, column formulas, and

the theorem of three moments. *First semester* (90 *hours in class room*); *M., Tu., W., Th., F., at* 10. Assistant Professor MAURER.

Required of juniors in Civil Engineering.

4. Hydraulics.

(a) Hydrostatic pressure, theory of fluid motion, hydrodynamic pressure; theoretical and experimental formulas for flow through orifices and pipes, over weirs, and in conduits, canals, and streams. *First semester* (20 *hours in class room*); *M., Tu., W., Th., F., at* 11. Assistant Professor MAURER.

Required of juniors in Mechanical and Electrical Engineering.

(b) Same as 4a with the following additional: measurement of water power, short study of hydraulic motors, and laboratory work. *First semester* (3 *hours per week in class room*); *M., W., F., at* 9; 36 *hours in laboratory*), hours to be assigned. Assistant Professor MAURER.

Required of juniors in Civil Engineering.

5. Testing of Materials of Construction. Each student is required to make a definite series of tests of wrought iron, cast iron, steel, and wood in tension, compression, bending, and torsion. (54 *hours in laboratory*), *first semester; Tu., Th.*, 2-5. Required of juniors in Mechanical and Civil Engineering. *Second semester; Tu., Th.*, 8-10; *M.*, 2-5. Required of juniors in Electrical Engineering. Assistant Professor RICHTER.

6. [Graphics. The application of graphic methods of analysis in various departments of mechanics. *Second semester, twice a week;* hours to be assigned. Assistant Professor MAURER. Open to graduate students and to students who have completed 1, 2, 3a, or 3b.]

7. Testing Materials. An advanced course will be offered, the special line of work to be agreed upon after consultation with the professor in charge. *M., W.*, hours to be assigned. Assistant Professor RICHTER. Open to graduate students and to those students who have completed course 5.

8. Advanced Strength of Materials. The mathematical theory of elasticity with special reference to its application to the constructive materials. *First semester; twice a week.* Assistant Professor MAURER.

TOPOGRAPHIC AND GEODETIC ENGINEERING.

ASSISTANT PROFESSOR SMITH.

1. Elementary Drawing. Consists of lectures on the care and use of drafting instruments, followed by practical instruction in the free hand lettering of working drawings. Use is made of selected titles from drawings prepared in several of the larger bridge and railroad offices. This work is followed by pen and colored topography and the conventional signs used in map drawing. Text-books: Smith's Topographical Drawing, Smith's Freehand Lettering. *First semester; M., Tu., W., Th.*, 2-4. Required of freshmen in Civil Engineering.

2. Elementary Surveying. (a) The different kinds of chains, tapes, and the construction and adjustments of the compass and level are studied. Areas are measured by pacing, by chaining, and by use of chain and compass. This is followed by field work in differential and profile leveling. *Second semester; M., W., F.*, 8-10.

Required of freshmen in Civil Engineering.

Elective for students in Mechanical and Electrical Engineering.

(b) The construction and adjustments of the transit, sextant, and plane table are first studied; after which practical problems in land surveying are worked. For this purpose an area has been specially prepared in which the difficulties of plane surveying are presented to the beginner as he is able to meet them, and where he is taught practical methods of overcoming them. All possible distances, directions, areas, and elevations are accurately known; and hence the instructor knows beforehand the precise result which the student should obtain. This is an incentive to the student and enables the teacher to show him the degree of accuracy obtained and also to point out errors. Text, Raymond's Plane Surveying. Taught partially in the lecture room, drawing room, and in the field. *First semester; first nine weeks; recitations, M., W., F., at 9.* *Field work, first nine weeks;* { Section I, *M., W.*, 10-12. Section II, *T., F.*, 10-12.

Required of sophomores in Civil Engineering.

Elective for students in Mechanical and Electrical Engineering.

3. Advanced Surveying. This course is a continuation of course 2b, and includes a study of the higher instruments of precision, and their use in topographic, hydrographic, city, and mining surveying. Each student executes the necessary field work and prepares a map of a topographic or hydrographic survey, also U. S. land surveys, including the re-establishment of lost section corners and practice in the use of the various instruments and methods for determining the meridian and for running parallels of latitude.

Second semester; { *T., Th., at* 10. / *Field work* { Section I, *Tu., Th.*, 11-1, *and* 2-6. / " II, *Sat.*, 8-1, *and F.*, 2-4. } *Last eight weeks.*

Required of sophomores in Civil Engineering.

4. Elementary Geodesy. A general treatment of the subject by texts and assigned readings, including the figure of the earth, the apparatus and methods used in measuring base lines; the construction of stations; the method of measuring angles and adjusting triangulation; the principles of projecting maps and a study of the instruments and methods used in spirit and trigonometrical leveling. Texts, Merriman's Figure of the Earth, and Johnson's Surveying. *Second semester; M., W., at* 10; *F., at* 9; for first twelve weeks.

Required of juniors in Civil Engineering.

5. Trigonometrical Survey. This course furnishes the necessary field work for illustrating course 4. Each year a portion of the neighboring lake region will be covered by an accurate triangulation, and also by a topographic and hydrographic survey. The past year the triangulation was connected with the triangulation of the U. S. Coast and Geodetic Survey. The equipment available for this field work includes one alt-azimuth instrument reading to six seconds, three theodolites reading to ten seconds; six heliotropes; one Kern precise level outfit; one base line apparatus, one sounding apparatus, one tidal gauge, and other instruments needed in such work. Survey begins the Monday preceding commencement and continues for two weeks (120 hours.) Professors SMITH, WHITNEY, TURNEAURE, and DAVIES.

Required of sophomores and juniors in Civil Engineering.

6. Advanced Geodesy. Includes the preparation of a map and necesary computations from the field notes of course 5. *Second semester;* 34 hours in the drafting room.
Required of seniors in Civil Engineering.

7. Advanced Geodesy. A general study of the economics of geodesy, also a study of the computations and adjustments (using methods of least squares where desirable) of some of the important triangles of the United States Coast and Geodetic Survey, Taught partly by lectures, assigned readings, and in the field. Text-book, Wright's Adjustment of Observations. *First semester. Two hours per week.*
Elective for seniors in Civil Engineering and for graduates who have had courses 2, 3, 4, and 5, or their equivalents.

8. Advanced Geodesy. An elaboration of courses 4 and 6. Formulæ for computing geographical positions, the theory of the figure of the earth, station error, measurements of gravity, the results of precise leveling considered in connection with warped equipotential surfaces, etc., are studied in detail. Taught by lectures, assigned readings, and in the field. *Second semester. Two hours per week.*
Elective for seniors in Civil Engineering and for graduates who have taken courses 2, 3, 4, and 5 or their equivalents.

9. Rapid Topography. This course is designed for training topographers for the U. S. Geological Survey, and for any others who may wish to familiarize themselves with approximate methods of taking topography for small scale maps. It includes a study of origin of topographic forms; analysis of surface lines; personal units as aids in sketching; theory and use of aneroid barometer, prismatic compass, hand level, odometer, pedometer, clinometer, plane table, etc. Comparative study of scales, and practice in field sketching by ranging and pacing; by traversing; with plane table and vertical angles or stadia. *Second semester. Two hours per week.*
Elective for seniors in Civil Engineering and for others who have had course 2.

10. Mining Surveys. This course will consist of the necessary field and office work of an underground survey of the various University tunnels, aggregating over 3,000 feet in length, including the preparation of a complete map and profile of same. It is believed that the conditions

and obstacles to be met and overcome on such a survey will furnish a good substitute for an actual mine survey. An excellent mining transit, recently purchased by the University from Buff & Berger, will be used in this work. *Second semester.* [60 *field hours.*]

Elective for students who have had Topographic Engineering 2a and 2b.

RAILWAY ENGINEERING.

PROFESSOR WHITNEY.

1. Railway Surveying. A preliminary line about three miles in length is laid out, topography taken adjacent thereto, and platted. Each member of the class, given certain limits as to grades and curves, makes an independent projection for final location. Approximate estimates of the cost are made, and the best line is located on the ground. All necessary field and office work required to survey and construct such a line is performed. *First semester; F.*, 2-6; *S.*, 8-12; 144 *hours in field and office.*

   Required of juniors in Civil Engineering.

2. Preliminary and Location Surveys. Construction. Classroom work to accompany course 1. A good field book is studied part of the time. Lectures and recitations on construction, including rock-work, explosives, tunneling, dredging, and docking. *First semester; T., at* 8, 18 *hours in the class room.*

   Required of juniors in Civil Engineering.

3. Maintenance of Way. Lectures and recitations on track-work in general, including street railways; freight and passenger yard construction; and standard structures. The various signal and interlocking systems are studied. *Second semester; Tu., Th., at* 11; 32 *hours in the class room.*

   Required of juniors in Civil Engineering.

4. Railway Economics. A study of the sources of income; operating expenses; relative values of distance, gradient, and curvature, and their influence upon net receipts; classification of locomotives, and their relative power; rolling-stock; and train resistance. Text-book: Wellington's Economic Theory of Railway Location. *First semester; M., F., at* 9; 36 *hours in the class room.*

   Required of seniors in Civil Engineering.

5. Railway Standards. Continuation of courses 3 and 4. It is intended to give the student some degree of familiarity with designing various railway standards. The work is carried on in the draughting room, aided by careful study of numerous blue prints of the standards of the best railways. *First semester; W.*, 2-6; 72 *hours in the draughting room.*

Elective for seniors in Civil Engineering.

6. Tunneling and Substructures. The various methods of tunneling, shaft-sinking, ordinary and deep-foundation work are studied, principally from reports of the engineers in charge as contained in the transactions of engineering societies and technical journals. The best of such reports are selected for the students to study and report upon. References: Drinker's Tunneling and Patton's Foundations. *Second semester; W., F., at* 8; 32 *hours in the class room.*

Required of seniors in Civil Engineering.

7. Municipal Railways. A course of lectures and assigned readings on the location, construction, maintenance, operation, and traffic of elevated, surface, and underground lines of railway. *Second semester; M., at* 2; 16 *hours in class room.*

Elective for seniors and graduates in Civil Engineering.

For course in railway transportation, course 10 in Economics, see p. 137.

This course on the historical, economic, and legal aspects of the subject is offered as an elective to seniors and graduates in Civil Engineering.

RIVERS AND CANALS.

1. River and Harbor Improvement and Canal Construction. Lectures and assigned readings on the artificial improvements of rivers and harbors for navigation and protection, and on the construction, operation, and traffic of canals in the United States and abroad. *Second semester; M., W., and F., at* 11 *for the last half of the semester;* 24 *hours in the class room.*

Required of seniors in Civil Engineering.

HYDRAULIC ENGINEERING.

PROFESSOR BULL AND ASSISTANT PROFESSOR RICHTER.

1. Hydraulic Motors and Pumping Machinery. The theory of the various kinds of turbines is first given, followed by rules for their design, based upon both theory and practice. The course concludes with a short study of pumping machinery. *Second semester; M., Tu., W., Th., at* 12, for the first nine weeks; *M., F., at* 12, for the last nine weeks (54 *hours in class room*). Professor BULL.
   Required of seniors in Mechanical and Electrical Engineering.

2. Hydraulic Laboratory. Special attention is given to the testing of turbine wheels, water meters, and other hydraulic machinery, in connection with the determination of the coefficients of the flow of water through pipes, orifices, and over weirs. Last nine weeks of the *second semester; M.*, 2-6. Assistant Professor RICHTER.
   Required of seniors in Mechanical and Electrical Engineering.

STEAM ENGINEERING.

PROFESSOR BULL, ASSISTANT PROFESSOR RICHTER, AND MR. ALEXANDER.

1. Thermodynamics. This course covers those principles of the mechanical theory of heat which are preliminary to the study of the various kinds of heat engines. The course is intended to be very thorough, especially with reference to steam. Text-book: Peabody's Thermodynamics of the Steam Engine. *First semester; first twelve weeks; M., Tu., W., Th., F., at* 12 (60 *hours in class room*). Professor BULL.
   Required of juniors in Mechanical Engineering.

2. Theory of Heat Engines. In this study, practical yet scientifically correct formulas for computing the diameter and stroke of the steam engine are deduced. The influence of clearance, jacketing, cylinder condensation, wet and superheated steam are considered. The theory of the compound and triple engines are given, as well as the results from practice in this direction. At the end of the course the subject of compressed air and of refrigerating machinery are taken up. The study is partly given by lectures; for part of the work Peabody's Thermodynamics

is used as a text-book. *First semester; last six weeks; M., W., F., at* 12. *Second semester; first nine weeks; daily at* 9 (75 *hours in class room*). Professor BULL.

Required of juniors in Mechanical Engineering.

3. Steam Boilers. The general subject of combustion and its application to steam boilers is studied, the theoretical and practical efficiency of those is developed, and rules for the design of boilers, chimneys, etc., are given. Text-book: Peabody and Miller's Steam Boilers, but the study is partly taught by lectures. *Second semester; M., W., F., at* (54 *hours in class room*). Professor BULL.

Elective; open to all who have had either course 1 or 5.

4. Design of the Steam Engine. In this course the diameter, stroke, and number of revolutions of the engine are assumed to be known, as well as the steam pressure, cut-off, compression, etc., and from these data the other dimensions are either computed or deduced according to practice. Special attention is given to the various kinds of valve gears, to the fly-wheel, governor, and reciprocating parts, and their relation to each other. The study is taught principally by lectures, although Peabody's Valve Gears for Steam Engines is used as a text-book for part of the time. The work in the class room is supplemented by the work in the draughting room, where each student is required to work out a complete problem. Class work: *Second semester, junior year; last* 9 *weeks; M., W., F., at* 9; *first semester, senior year; Tu., Th., at* 10; *second semester, senior year; M., W., F., at* 10 (120 *hours in class room*). Draughting: *Second semester, junior year; last* 9 *weeks; Tu., Th., S.,* 8-10; *first semester, senior year; Tu., Th.,* 8-10 (126 *hours in draughting room*). Professor BULL.

Required of juniors and seniors in Mechanical Engineering.

5. Short courses in Thermodynamics and the Theory of the Steam Engine and Boiler. Only the fundamental principles of thermodynamics can be touched upon in this course, but to sufficient degree to enable the student to study the steam engine and boiler intelligently. The theory of the steam engine is given to the exclusion of all other heat engines. The text-book used is Peabody's Thermodynamics, but a part of the study is given by

lectures. *Second semester; Tu., Th., first ten weeks, at* 10, *M., W., F., at* 8, 74 *hours.* Assistant Professor RICHTER.
Required of juniors in Electrical Engineering.

6. Short Course in Steam Engine Design. The course is intended for electrical engineering students, and in it only the most important parts of the modern steam-engine as applied in the service of electricity, such as the valve gear, fly-wheel, governor, etc., will be touched upon. Most of the work will be done in the class-room, but occasionally exercises will be conducted in the draughting-room. *First semester;* (54 *hours in class room.*) Professor BULL.
Required of seniors in Electrical Engineering.

7. Course in Steam Engineering for Civil Engineers. In this course the stress will be laid on the steam engine and boiler, and but very little time will be spent on thermodynamics. It will be the aim of the course to impart sufficient knowledge to the students that they may understand the working of the steam engine thoroughly, and also be able to make a good selection of an engine and boiler for specified purposes. *First semester; first* 12 *weeks, M., W., F., at* 11; 36 *hours.* Mr ALEXANDER.
Required of juniors in Civil Engineering.

8. Long Laboratory Course. For this study the compound experimental engine of the laboratory and the fifty-horse power Root boiler, besides the various other smaller engines and the gas and hot air engines owned by the department, are used with all the necessary appliances for making complete tests of engines and boilers. Stress is laid upon the necessary calibration of all instruments used in the test, for which work the department has all the necessary appliances. Each student is required to perform all of the various operations necessary for conducting an accurate trial. At the end of the course, the class makes a complete twenty-four hour test of a large power plant not connected with the University. The department also owns a large number of injectors, pumps, and other boiler appliances, of which accurate tests are made. The methods are explained in connection with the class work of thermodynamics. *Four hours per week.* Assistant Professor RICHTER.

The study begins with the 13th week of the first semester, junior year, and ends with the 10th week of the second semester of the senior year.

Required of Mechanical Engineers. Also required of Electrical Engineers from the 11th week of the second semester, junior year, to the end of the first semester, senior year.

9. Short Laboratory Course. This course is intended for civil engineering students, and is more elementary than the long course in boiler and engine testing. The student will however, learn enough to conduct an ordinary commercial test of a pumping engine. *Six hours per week during the last six weeks of the first semester; M., W., F.*, 11-1. Assistant Professor RICHTER.

Required of juniors in Civil Engineering.

10. Advanced Course in Steam Engineering. Thurston's Handbooks on the Steam Engine and on the Steam Boiler will be used in this course; but the study will be prosecuted principally by means of lectures and assigned readings of the various works on steam engineering. *First and second semester; M., W., F.*, the hours to be assigned after consultation. Professor BULL. Open to graduate students and to those students who have completed the courses 1, 2, 3, and 7 in Steam Engineering.

11. Advanced Course in Laboratory Work. An advanced course will be offered in any of the different lines of experimental work, to conform with the special line of work the student wishes to follow. Stress will be laid on original research and investigation. *Tu., Th.;* the hours to be assigned. Assistant Professor RICHTER.

Open to graduate students and to those students who have completed the required courses in the line they wish to follow.

ELECTRICAL ENGINEERING.

PROFESSOR JACKSON, ASSISTANT PROFESSOR FORTENBAUGH, MR. BURGESS, AND MR. BEEBE.

1. Electromagnets and Dynamos. A discussion of the simple forms of electromagnets; the development of the laws of magnetization by electric currents; the laws of simple magnetic circuits and the windings of electromagnets;

the practical design, construction, and testing of dynamos. Jackson's Electromagnetism and the Construction of Continuous-Current Dynamos.

First semester; *M., W., F., at* 10; *M., Tu., Th.*, 2-6.

Second semester; *S., at* 12; *M., Tu., Th.*, 2-5; *S.*, 8-12 (90 *hours in class room and* 90 *hours in laboratory and draughting room*). Assistant Professor FORTENBAUGH and Mr. BEEBE.

Required of juniors in Electrical Engineering.

Required of seniors in Mechanical Engineering during the first semester.

2.* Applied Electrochemistry.

(a) Primary and Secondary Batteries. Batteries as a source of electricity; theory, construction, and working of primary and secondary batteries and their commercial use.

(b) Electrolysis and Electrometallurgy. The theory and application of electrolysis and electrometallurgy. Industrial electrochemistry, the treatment of ores, electrolytic separation and refining of metals, electrotyping, and electroplating.

Must be preceded by courses in chemistry.

First semester; M., W., F., at 12, *in class room, and M., W., F.*, 2-6, *in laboratory* (54 *hours in class room and* 72 *hours in laboratory*). Mr. BURGESS.

Elective for seniors and graduate students in Electrical Engineering.

3. Electrical Testing. Treats of the construction, testing, maintenance, and operation of lines and appliances, used in telephony, telegraphy, and electric signalling. *Second semester. M., at* 10; *M., Tu., Th.*, 2-5 (18 *hours in class room and* 54 *hours in laboratory*). Mr. BURGESS.

Required of juniors in Electrical Engineering.

4. Theory and Application of Alternating Currents. The theory of the generation and utilization of alternating electric currents; the design and construction of alternating current dynamos, transformers, and motors; and methods for testing alternating current machinery. Jackson's

* Courses 2, 5, and 6 are intended exclusively for students who expect to enter the field of practice in electrical engineering and construction. The instruction is thorough and practical. Students desiring to enter the field of teaching, or, for other reasons, desiring a further theoretical training, may substitute elective courses in Mathematics and Mathematical Physics or Theoretical Chemistry. These electives should be chosen at the beginning of the senior year or earlier.

Alternating Currents and Alternating Current Machinery. *First semester; M., W., F., at* 9; *F.*, 2-6; *S.*, 8-12. *Second semester; first nine weeks: M., W., F., at* 9; *F., S.*, 8-12. (87 *hours in class room and* 96 *in laboratory and draughting room.* Professor JACKSON and Mr. BEEBE.

Required of seniors and elective for graduate students in Electrical Engineering.

5. Electric Light and Transmission of Power. A study of the manufacture and use of arc and incandescent lamps; selection and arrangement of electrical machinery for generating plants; location, erection, and cost of distributing lines; and application of electric motors to the general purpose of power distribution. *Second semester; M., Tu., Th.*, 10 (54 *hours in class room*). Mr. BURGESS.

Elective for seniors and graduate students in Electrical Engineering.

6. *Electricity in Engineering Operations.

(a) Electric Railways. The road-bed, rolling-stock, electric circuits, and power plants for city, town, and suburban railways; the location and construction of street railways in cities and towns; track foundation and types of rail; selection of cars and motors to be used under different conditions; methods of conveying the electric current from the generator to the motors, and the best methods for meeting the severe conditions imposed on electric railway power plants. Lectures based on notes by the professor. *Second semester; M., W., F., at* 12 (54 *hours in class room*). Assistant Professor FORTENBAUGH.

(b) Electricity in Mining and Quarrying. A discussion of the practice in mining and quarrying where electricity can be satisfactorily applied and the advantages and limiting conditions of long-distance transmission of power by electricity from water power to mines. Lectures. *First semester; M., at* 8. (18 *hours in class room*). Professor JACKSON.

(c) Station Management and Estimates. The effect on operating expenses of the arrangement of power and generating plants and circuits, and the use of meters. Estimating costs of power and generating plants, and the cost of lines and weights of copper. Lectures. *Second*

*See foot note on page 228.

semester; M., W., F., at 10 (54 *hours in class room*). Professor JACKSON.

Elective for seniors and graduate students in Electrical Engineering.

7. Elementary Polyphase Currents. Following the treatment in Jackson's Alternating Currents and Alternating Current Machinery. *Second semester; last nine weeks; M., W., F., at* 9, *with such laboratory work as may be elected.* Professor JACKSON.

Elective for students who have completed Electrical Engineering Course 4.

8. Inspection Tours. An inspection tour is made at the Easter recess and another at the end of the second semester. Each student is expected to accompany at least two of the parties during the last two years of his course. The tours comprise visits to Chicago, Milwaukee, and other manufacturing centers, for the purpose of inspecting manufacturing plants and great engineering works under operation or construction.

9. Graduate Work. Advanced work as assigned after consultation. Professor JACKSON, Assistant Professor FORTENBAUGH, and Mr. BURGESS.

The courses admitted as graduate study which will be offered during the college year 1898-99 are courses 2, 4, 5, 6 and 7 described above; a two hour course continuing through the year by Professor Jackson on Polyphase Currents, Polyphase Current Machinery and the Electric Transmission of Power; and two three-hour courses, each continuing for one semester, by Professor Fortenbaugh, on Dynamo Designing and on the Application of Electric Traction to Elevated Railways and Feeders of Trunk Lines.

10. Graduate Conference. A conference or seminary for the detailed study of engineering problems.

Laboratory Work. All laboratory instruction is made to conform with, and illustrate, the class room instruction. Of the total number of hours given to instruction in the electrical engineering courses, about one-half is devoted to work in the laboratories. Students are advised to use their extra time in additional work in the shops and laboratories. An opportunity is afforded students to take surveying as an elective study.

STRUCTURAL ENGINEERING.

PROFESSOR TURNEAURE AND PROFESSOR WHITNEY.

1. Structural Details. The student is first required to make detail drawings of various parts of some existing structure from his own measurements and sketches, thus famililiarizing himself with the various forms used in structural work and the methods of correctly representing them on paper. Designs are then made of the simpler forms of members and of joints in wood and iron, special attention being paid to the strength and design of riveted joints. The work is completed by a design of a wooden roof or bridge truss. *First semester*; *Tu., Th.*, 11-1. Professor TURNEAURE.

   Required of juniors in Civil Engineering.

2. Masonry Construction and Testing of Materials.

   (a) Preparing and using the materials; foundations; theory governing the design of masonry structures, as dams, retaining walls, piers, and abutments. Text-book: Baker's Masonry Construction. *First semester*; *Tu., Th., at* 9; 36 *hours in class room.* Professor WHITNEY.

   Required of juniors in Civil Engineering.

   (b) Testing of Portland and Rosendale cements, bricks, and stone. *Second semester*; *Th.*, 2-5; 48 *hours in the laboratory.* Professor WHITNEY.

   Required of juniors in Civil Engineering.

3. Engineering Architecture. Treats of those principles of artistic design applicable to engineering structures, especially those of masonry. *First semester*; *four lectures in connection with course* 4.

4. Masonry, Arches, Dams, and Stereotomy.

   (a) Arches. A discussion of the theory of the stability of masonry arches, both right and oblique, is followed by the complete design of an arch. Specifications and estimates of cost are furnished. Most of the time is spent in the draughting room. *First semester*; *Tu.*, 2-5; *Th.*, 2-4.

   (b) Dams; Stereotomy. A design for a high masonry dam is made, followed by several problems in stereotomy. Reference is made to the works of Krantz, Rankine, Wegmann, and Warren. *Second semester*; *Tu., Th.*, 9-12; *principally in the draughting room.* Professor WHITNEY.

   Required of seniors in Civil Engineering.

5. Bridge Stresses. The instruction in this subject is given by text-book, together with the working of numerous problems. Text-book: Johnson, Bryan, and Turneaure's Modern Framed Structures.

(a) Simple Bridge Trusses. Determination of stresses by both graphical and analytical methods in the modern types of trusses for uniform, and for concentrated moving loads. *Second semester*; *M., W., F., at* 11. 48 *hours in class room.* Professor TURNEAURE

Required of juniors in Civil Engineering.

(b) Suspension Swing, Cantilever, and Arch Bridges. Theory of stresses and problems. *First semester*; *Tu., Th.*, 10; 36 *hours in class room.* Professor TURNEAURE.

Required of seniors in Civil Engineering.

6. Bridge Design. Location and economic length of span, formulæ for working stresses, design of individual truss members, combined and secondary stresses, deflection formulæ and stresses in redundant numbers, and questions relating to the designing of details. *First semester*; *W., at* 9; *F., at* 10. 36 *hours in class room.* Professor TURNEAURE.

Required of seniors in Civil Engineering.

7. Designs and Estimates. In this course each student makes a complete design of one structure of each class mentioned below in accordance with some standard specifications, prepares detail drawings and makes an estimate of the quantity of material and cost; complete working drawings are made of at least one structure. Stiffness as well as strength is aimed at, and special attention is given to the proper distribution of stress into members at joints and to questions relating to economy of manufacture. Constant use is made of the large collection of drawings belonging to the department.

(a) Roof Trusses and Plate Girders. *Second semester*; *M., Tu., W., Th.*, 8-10; 128 *hours in draughting room.* Professor TURNEAURE.

Required of juniors in Civil Engineering.

(b) Riveted and Pin-Connected Trusses. *First semester*; *M., W.*, 10-12; 72 *hours in draughting room.* Professor TURNEAURE.

Required of seniors in Civil Engineering.

(c) Swing Bridges. Design of truss and turn-table with specifications for material and manufacture and for the operating machinery. *First semester*; 72 *hours in the draughting room.* Professor TURNEAURE.

Elective for seniors and graduates in Civil Engineering.

8. Bridge Specifications, Construction, and Testing. The first part of this course is devoted to a critical study of specifications for bridge structures, results and methods of testing of material and of full-sized bridge members and complete structures. A brief study is then made of bridge construction, including mill-work, shop-work, inspection and erection. The last four weeks of the course are spent in making actual tests on bridges under moving train loads by means of the Fraenkel apparatus. The members of the class are assigned various parts of the bridge and the results of the experiments are worked up and the observed stresses compared with the computed. *Second semester*; *Tu., Th., at* 11; *two-fifths study.* Professor TURNEAURE.

Elective for seniors and graduates in Civil Engineering.

MUNICIPAL ENGINEERING.

PROFESSOR TURNEAURE AND PROFESSOR WHITNEY.

1. Water Supply Engineering. Sources of supply, collection, and storage of water; interpretation of chemical and biological analyses; purification and distribution of water, including the study and design of filtering plants, reservoirs, standpipes, pumping stations, and distributing systems. Lectures, problems, and assigned reading. *First semester*; *M., W., F., at* 8; 54 *hours in class room.* Professor TURNEAURE.

Required of seniors in Civil Engineering.

2. Sanitary Engineering. Design and construction of sewerage and drainage systems; house drainage; street cleaning; sewage and garbage disposal, and the design of disposal works. Lectures, recitations, and designs. *Second semester; M., W., F., at* 10; 48 *hours in class room.* Professor TURNEAURE.

Required of seniors in Civil Egineering.

3. Designs of Water Supply and Sewerage Systems. Complete designs and estimates of water supply and sewerage sys-

tems, and purification plants. *First semester and last* 10 *weeks of second semester;* 112 *hours in draughting room.* Professor TURNEAURE.

Elective for seniors and graduates in Civil Engineering.

4. Roads and Pavements. Lectures and assigned readings are given on the construction and maintenance of country roads and city pavements; and on the laying out of roads, towns, subdivisions, and parks. *Second semester; M., W., and F., at* 11; 27 *hours in the class room for first half of the semester.* Professor WHITNEY.

Required of seniors in Civil Engineering.

For course in Biology of Water Supplies see page 216; and for course in Municipal Railways see page 223.

These courses are elective for seniors and graduates in Civil Engineering.

MACHINE DESIGN.

PROFESSOR JONES AND ASSISTANT PROFESSOR MACK.

1. Elements of Drawing. The use of drawing instruments and plain lettering are first taught, followed by sketching of machine parts; from the sketches complete working drawings are made. The sketches are from parts of machines of practical utility, having correct proportions and outlines. The various methods of arranging the positions of the plan and elevations, relatively to each other on the paper, are discussed with regard to clearness and ease of reading drawings. *First semester;* (108 *hours draughting*). Professor JONES and Assistant Professor MACK.

Required of sophomores in Mechanical and Electrical Engineering.

2. Draughting, Tracing, and Blue Printing. During this course drawings are made from machines, models, and plates, the object being to give the student a general idea of the forms of machine parts, and the methods of putting them together. When plates are used they are as far as possible duplicates of drawings in use for construction in the best machine building establishments of the present time. Standard plates are used to illustrate combinations not shown by the above methods. Finally, an entire machine of moderate complexity is taken as a model, from

which complete working drawings are made. Line shading, tracing, and blue printing are taught during this course. *Second semester.* Assistant Professor MACK.

Required of sophomores in Mechanical and Electrical Engineering.

3. Kinematics. This is a study of the relative motions of machine parts, including belting, toothed gears, cams, and linkages. The method of finding the velocity and direction of motion of any point in a mechanism at any instant, by means of instantaneous or virtual centres, is studied and applied to such machines as shapers, and to the determination of correct forms of gear teeth. Cams and belting are studied with regard to their practical conditions of working. The class room work is supplemented by a parallel course of draughting. *First semester;* class *Tu., Th., at* 10; draughting, *Tu., W., Th., F.,* 8-10. Professor JONES and Assistant Professor MACK.

Required of juniors in Mechanical and Electrical Engineering.

4. Constructive Materials of Engineering. The object of this study is to give a knowledge of the metallurgical processes of producing the materials that are more commonly used in machines and structures, together with the effect upon their physical properties, of change of chemical composition, mechanical working, and heat treatment. Methods of testing, interpretation of results, and specifications for materials, are included in the work. In the latter part of the course the manufacture of special forms, such as drop forgings, drawn work, seamless and welded tubing, balls for bearings, etc., is taken up as a means of illustrating how commercial forms are changed into specialties. *Second semester;* Lectures, *M., W., at* 11; Recitation, *Th., at* 11, *or F., at* 11 *or* 12. Professor JONES.

Required of juniors in Engineering.

5. Graphic Statics of Mechanisms and Machine Elements. An application of graphic statics to finding the external forces acting on machine members, together with a study of the outline and sectional forms best adapted to resist the forces. The elementary parts of machines, such as screw fastenings, riveted joints, journals, bearings, sliding surfaces, etc., are studied in the class room, together with a parallel course in draughting. *Second semester;*

class *W., F., at* 10; draughting, *M., Tu., W., Th., F.*, 11-1. Professor JONES and Assistant Professor MACK.

Required of juniors in Mechanical and Electrical Engineering.

6. Complete Machines. During the first part of the work, the proportioning of machine frames of complicated forms is studied in both the class room and draughting room. A complete machine is then designed by the student. This machine may be selected by the student, provided he present satisfactory evidence of his familiarity with the principles involved in its design, within two weeks after the opening of the first semester. If such a selection is not made, one of the more common forms of machine tools will be assigned by the instructor. It is advantageous to the student, however, that he make a tentative selection during his junior year, and gain information regarding it, by observation during the summer vacation. After the class room work relating to machine frames has been completed, subjects relating to machine construction are assigned to the student, together with references to the technical journals for reading, and a digest of the matter given by him before the class. Lectures and general discussions accompany the journal reading. Professor JONES.

Required of seniors in Mechanical and Electrical Engineering.

Second semester; class, *Tu., Th., at* 11, and draughting *M., Tu., W., Th., F.*, 8-10, *for* 8 *weeks.* Professor JONES.

Required of seniors in Mechanical Engineering.

7. Patent Office Drawing. A course giving practice in the preparation of drawings as required by the United States Patent Office. Open to all who have had courses 1 and 2. *Second semester; M.*, 2-4. Assistant Professor MACK.

8. Advanced Machine Design. This consists of a study of irregular, intermittent, and variable motion mechanisms, such as are applied to printing presses, paper mill machinery, weaving looms, etc., and an advanced study of machinery for the transmission of motion and power. The mechanisms and devices taken up are those used in practice to a considerable extent, although not so commonly as those studied earlier in the course. Hours arranged as deemed advisable. For graduate students. Professor JONES.

SHOP-WORK.

PROFESSOR KING, MR. KRATSCH, MR. MUTCHLER, MR. HARGRAVE, MR. LOTTES, AND MR. BONN.

1. Bench and Machine Work in Wood. (a) A systematic course in the use of the plane, saw, gouge, bit, and kindred tools. This covers the principles of joining and joint work involved in building construction. Lectures each day precede new operations. Exercises in free-hand sketching are required three times a week.

   (b) Systematic training at the lathe in the use of the gouge and chisel in plain and ornamental turning in hard and soft wood. Lectures and sketching as before. (90 *hours.*) *First semester; M., W., F.,* 8-10; *and W., Th., F.,* 2-4. Professor KING and Mr. MUTCHLER.

   Required of freshmen in Mechanical and Electrical Engineering.

   Second semester; M., Tu., W., Th., F., 2-4.

   Required of freshmen in Civil Engineering.

2. Foundry Work. Practice in pattern making and moulding. The patterns chosen are those giving the best illustration of the principles involved in their construction and in the methods of moulding. Lectures on these subjects and on the methods of core making and core work are given with this course. Free-hand sketching is required. *Second semester;* M. E.; *M., F.,* 2-4; *Tu., Th.,* 8-10; *S.,* 11-1; E. E.; *W., F.,* 8-10; *S.,* 8-1 (20 *hours*). Professor KING and Mr. BONN.

   Required of freshmen in Mechanical and Electrical Engineering.

3. Bench Work in Iron. Embraces practice in wrought and cast iron with the hammer, chisel, and file at the vise. *Second semester;* M. E.; *M., F.,* 2-4; *Tu., Th.,* 8-10; *S.,* 11-1; E. E.; *W., F.,* 8-10; *S.,* 8-1; (30 *hours*). Professor KING, Mr. KRATSCH, and Mr. HARGRAVE.

   Required of freshmen in Mechanical and Electrical Engineering. Required of freshmen in Civil Engineering. *Second semester, daily,* 2-4 (20 *hours*).

4. Production of Flat Surfaces and Straight Edges. Training in the use of file and scraper on surfaces of large area. Lectures treating of the lathe and milling machine. *Second semester; M., F.,* 2-4; *Tu., Th.,* 8-10; *S.,* 11-1; E. E.;

W., F., 8-10; *S.*, 8-1 (20 *hours*). Professor KING, Mr. KRATSCH, and Mr. HARGRAVE.

Required of freshmen in Mechanical and Electrical Engineering.

5. Machine Work in Iron. Practice on the engine lathe, in connection with which are taught the elementary features of boring, turning, and screw cutting. Lectures on these subjects weekly. *Second semester;* M. E., *M., F.*, 2-4; *Tu., Th.*, 8-10; *S.*, 11-1; E. E.; *W., F.*, 8-10; *S.*, 8-1; (40 *hours*). Professor KING, Mr. KRATSCH, and Mr. HARGRAVE.

Required of freshmen in Mechanical and Electrical Engineering.

6. Practice on the Planing and Milling Machines. Gives some knowledge of the variety of work which may be done on these machines and a comparison of the time required for the same work on the two machines. *First semester;* M. E., *M., F.*, 2-4; *Tu., Th.*, 8-10; *S.*, 11-1; E. E.; *W., F.*, 8-10; *S.*, 8-1; (68 *hours*). Required of freshmen in Mechanical and Electrical Engineering. Professor KING, Mr. KRATSCH, and Mr. HARGRAVE.

7. Forge Work. Training in the fundamental features of forge practice, as drawing, upsetting, bending, welding, tool making, and tempering. *First semester;* M. E.; *M., F.*, 9-12; E. E.; *F.*, 9-11; *S.*, 8-12; (50 *hours*). Required of sophomores in Mechanical Engineering. Required of sophomores in Electrical Engineering (40 *hours*). *Second semester; M., Tu., W., Th., F.*, 2-4 (80 *hours*). Required of freshmen in Civil Engineering. Professor KING and Mr. LOTTES.

8. Practice at the Lathe and Milling Machine. This includes instruction in the methods of determining the diameter of blanks for spur, bevel, spiral, and tangent wheels on the lathe, and in cutting the teeth with the milling machine. *First semester*, M. E., *M., F.*, 9-12; (58 *hours*). Required of sophomores in Mechanical Engineering. E. E.; *T.*, 9-11; *S.*, 8-12; (68 *hours*). Required of sophomores in Electrical Engineering. Professor KING and Mr. KRATSCH.

9. Tool making. The methods of making taps and dies for cutting screw threads are the prominent features. Some instruction in brass work is also given. *First semester; W., F.*, 2-5:30, *and M.*, 8-10; *S.*, 9-1. (68 *hours*). Required

of juniors in Mechanical Engineering. Required of juniors in Electrical Engineering (20 *hours*). Professor KING Mr. KRATSCH, and Mr. HARGRAVE.

10. Machine Construction. Attention is given to the cost of production. *First semester;* M. E.; *W., F.,* 2-5:30; E. E.; *M.,* 8-10; *S.,* 9-1; (58 *hours*). Required of juniors in Mechanical Engineering. (70 *hours*). Required of juniors in Electrical Engineering. Professor KING and Mr. KRATSCH.

11. Machine Construction. Attention is given to the cost of production. *Second semester; W.,* 2-4; *F.,* 2-6; (108 *hours*). Required of juniors in Mechanical Engineering. Professor KING and Mr. KRATSCH.

12. Construction and Pattern Work. Practice in pattern work, and fitting together machine parts. This will require also some moulding and forge work, including tool dressing and tempering. *First semester; M., W.,* 2-5 (108 *hours*). Professor KING, Mr. KRATSCH, and Mr. LOTTES.
Required of seniors in Mechanical Engineering.

13. This course is similar to course 10, but to it will be added practice in the erection of line shafting and machinery. Lectures on the last two subjects and Mechanical Practice in the development of the Locomotive. *Second semester; Th.,* 2-6; *F.,* 11-1 *and* 2-6 (180 *hours*). Professor KING and Mr. KRATSCH.
Required of seniors in Mechanical Engineering. Elective for seniors in Electrical Engineering.

COLLEGE OF AGRICULTURE.

STAFF OF INSTRUCTION AND RESEARCH.

C. K. ADAMS, LL. D., President of the University.
W. A. HENRY, AGR. B., DEAN, Professor of Agriculture.
S. M. BABCOCK, PH. D., Professor of Agricultural Chemistry.
W. L. CARLYLE, B. S. A., Professor of Animal Husbandry.
E. S. GOFF, Professor of Horticulture and Economic Entomology.
F. H. KING, Professor of Agricultural Physics.
F. W. WOLL, M. S., Assistant Professor of Agricultural Chemistry.
H. L. RUSSELL, PH. D., Professor of Bacteriology.
E. H. FARRINGTON, M. S., Associate Professor of Dairy Husbandry.
J. A. JEFFERY, B. S., Assistant Professor of Agriculture.
GEORGE MCKERROW, Superintendent of Farmers' Institutes.
R. A. MOORE, Assistant to Dean. In charge of Short Course.
J. W. DECKER, AGR. B., Instructor in Cheesemaking.
ALFRED VIVIAN, PH. G., Assistant Instructor of Agricultural Chemistry.
SIMON BEATTIE, D. V. S., Instructor in Veterinary Science.

C. R. BARNES, PH. D., Professor of Botany.
E. A. BIRGE, PH. D., SC. D., Professor of Zoology.
J. C. W. BROOKS, Professor of Military Science and Tactics.
W. W. DANIELLS, M. S., Professor of Chemistry.
D. B. FRANKENBURGER, A. M., Professor of Rhetoric.
H. W. HILLYER, PH. D., Assistant Professor of Organic Chemistry.
C. I. KING, Professor of Practical Mechanics.
A. W. RICHTER, M. E., Assistant Professor of Experimental Engineering.
W. H. ROSENSTENGEL, A. M., Professor of German.
W. A. SCOTT, PH. D., Professor of Economic History and Theory.
B. F. SNOW, PH. D., Professor of Physics.
C. R. VAN HISE, PH D., Professor of Geology.
C. A. VAN VELZER, PH. D., Professor of Mathematics.

F. B. FULMER, Instructor in Milk Testing.

GRANT ROHN, Instructor at Butter-Worker.
HENRY VAN LEEUWEN, Instructor at Separators.
ROSS PAULSON, Instructor at Separators.
U. S. BAER, Instructor in Cheese Making.
JULIUS BERG, Instructor in Cheese Making.
MARK SMITH, Instructor in Pasteurizing.
FRANK DEWHIRST, Instructor in Farm Dairying.
ERNEST WYATT, Assistant Instructor in Farm Dairying.
FREDERICK CRANEFIELD, Instructor in Green House Practice.
T. F. MCCONNELL, Instructor in Stock Judging.

OFFICERS OF THE EXPERIMENT STATION.

W. A. HENRY, Director.
S. M. BABCOCK, Chief Chemist.
F. H. KING, Agricultural Physicist.
E. S. GOFF, Horticulturist and Entomologist.
W. L. CARLYLE, Animal Husbandry.
F. W. WOLL, Chemist.
H. L. RUSSELL, Bacteriologist.
E. H. FARRINGTON, Dairy Husbandry.
J. A. JEFFERY, Assistant Physicist.
FREDERIC CRANEFIELD, Assistant in Horticulture.
J. W. DECKER, Dairying.
ALFRED VIVIAN, Assistant Chemist.
LESLIE H. ADAMS, Farm Superintendent.
MISS IDA HERFURTH, Clerk and Stenographer.
MISS E. M. CLOSE, Librarian and Stenographer.

STAFF OF THE FARMERS' INSTITUTES.

GEO. MCKERROW, Superintendent.
MISS HARRIET V. STOUT, Clerk and Stenographer.

Institute Conductors.

Corps No. 1—THOS. CONVEY, Ridgeway.
Corps No. 2—C. H. EVERETT, Beloit.
Corps No. 3—H. A. BRIGGS, Elkhorn.
Corps No. 4—ALEX. A. ARNOLD, Galesville.
Corps No. 5—GEO. C. HILL, Rosendale.

Regular Assistants.

C. P. GOODRICH, Ft. Atkinson (Dairy Expert).
ALEX. GALBRAITH, Janesville (Horse Expert).
GEORGE WYLIE, Leeds (Swine Expert).
R. J. COE, Ft. Atkinson.
W. C. BRADLEY, Hudson.
CHAS. THORP, Burnett.
L. E. SCOTT, Neenah.
F. H. MERRELL, Portage.

Occasional Assistants, in Order of Work Performed.

KENNEDY SCOTT, Rio.
T. B. CLOSS, Cambria.
C. E. TOBEY, Sparta.
G. J. KELLOGG, Janesville.
A. J. EDWARDS, Ft. Atkinson.
F. C. EDWARDS, Ft. Atkinson.
M. T. ALLEN, Waupaca.
A. SELLE, Mequon
W. D. BOYNTON, Shiocton.
E. C. ALSMEYER, De Forest.
E. J. SCOFIELD, Hanover.
MRS. JENNIE A. JAMISON, Neenah (Cooking School Teacher).
C. L. HILL, Rosendale.
J. R. WATSON, Sussex.
C. E. MATTESON, Pewaukee.
N. E. FRANCE, Platteville.
A. G. JUDD, Dixon, Ill.
J. W. DECKER, Madison.
H. L. RUSSELL, Madison.
J. S. COOPER, Chicago, Ill
R. P. STERICKER, Springfield, Ill.

GENERAL INFORMATION.

Three of the University buildings are wholly devoted to agricultural instruction and investigation. Agricultural Hall is a stone building, 120 feet in length by 42 feet in width, four stories in height. It contains two large lecture rooms, offices for the several instructors and investigators, library rooms, chemical and bacteriological laboratories.

Hiram Smith Hall is devoted entirely to dairying. This structure of brick and stone has a frontage of 95 feet by 48 feet in depth, and is three stories in height. It contains an office, lecture room, reading room, dairy laboratory, and rooms devoted to creamery practice, cheese making, farm dairying, pasteurizing, cheese curing, etc.

The Horticulture-Agricultural Physics building, completed in 1896, has a frontage of 78 feet by 60 feet in depth, three stories in height; at the rear are glass houses covering a space of 88x75 feet. The right wing of the building with its green houses is devoted to plant life and horticulture. The left wing with its large glass house is devoted to instruction and investigation in the physics and mechanics of the farm.

At the Experiment Station Farm are the fields, barns, and livestock. Here, as elsewhere, all arrangements have in view investigation and instruction.

By its association with amply equipped laboratories of science and the practical arts, with departments in which are taught all the foreign languages that contain much reliable agricultural literature, with an active Experiment Station, equipped with special laboratories and library, and with an Experimental Farm where practical tests are carried on, guided by experienced talent, the College of Agriculture affords exceptional opportunities to those who desire to become agricultural experts.

Besides these facilities the College of Agriculture has at its command, for the use of the students, the general laboratory facilities of the University, so far as they relate to general chemistry, physics, practical mechanics, biology, geology, etc. See pages 27-31; 202-206.

LIBRARIES.

The Agricultural Library contains 4,000 volumes relating to agriculture and several hundred pamphlets, all of which are available for the use of students. They have access also to the various other libraries of the University and the city. See page 25.

SOCIETIES.

Two societies are maintained, one by the students of the several agricultural courses, and one by those of the course in dairying. These organizations afford valuable opportunities for discussions of the many professional and practical questions concerning agriculture and dairying.

MEDALS.

Citizens of our state, desiring to express their interest and appreciation of the Short Course instruction, have kindly offered the following medals to be awarded to second-year students for the 1898 term:

The Ogilvie Gold Medal.—For the highest average in judging all classes of live stock; awarded by R. B. Ogilvie, Madison, Wis.

The Hoven Gold Medal.—For the highest average in judging all classes of fat stock; awarded by M. J. Hoven, Madison, Wis.

The Hoven Silver Medal.—For the second highest average in judging all classes of fat stock.

The Briggs Silver Medal.—For the greatest proficiency in judging horses; awarded by H. A. Briggs, Elkhorn, Wis.

The Hoard's Dairyman Silver Medal.—For the greatest proficiency in judging dairy cows; given by Hoard's Dairyman, Fort Atkinson, Wis.

The Everett Silver Medal.—For the greatest proficiency in judging beef cattle; given by Chas. E. Everett, Beloit, Wis.

The McKerrow Silver Medal.—For the greatest proficiency in judging sheep; given by George McKerrow, Sussex, Wis.

The Jones Silver Medal.—For the greatest proficiency in judging swine; given by W. A. Jones, Mineral Point, Wis.

OTHER PRIZES.

Several additional prizes of various kinds have been announced for proficiency in various parts of the Short Course instruction.

FEES AND EXPENSES.

I. Graduate Course and Long Course.

Tuition for residents of the State of Wisconsin, ...	FREE
Tuition for non-resident students, per semester, ...	$9 00
Incidental fee, payable by all students, per semester, . .	6 00

II. Short Course in Agriculture.

Tuition for residents of the State of Wisconsin, ...	FREE
Tuition for non-resident students, per term, ...	$6 00
Incidental fee, for non-resident students, per term, . .	10 00

III. Dairy Course.

Tuition for residents of the State of Wisconsin, ...	FREE
Tuition for non-resident students, including lectureship fee,	$32 00
Incidental fee, for resident students, for term, ...	6 00

The expenses of students in the Graduate and Long Courses are practically the same as for those pursuing regular University courses.

Expenses of the student pursuing the Short Course in Agriculture will vary from $50.00 to $60.00 for the term for room, board, washing, and necessary books.

The expenses of the Dairy students will vary from $50.00 to $65.00 for the term.

PLAN OF AGRICULTURAL EDUCATION.

The system of education adopted by the College of Agriculture has three aims:

First, to develop agricultural science through investigation and experiment, and to disseminate the same through bulletins and reports;

Second, to give instruction in agriculture at the University;

Third, to disseminate agricultural knowledge among the farmers of the state by means of institutes and popular publications.

THE AGRICULTURAL EXPERIMENT STATION.

The purpose of the Experiment Station is the promotion of agricultural science by investigation and experimentation. In the choice of subjects it endeavors to select those which possess the greatest importance to the farmers of Wisconsin, so far as

the facilities at hand permit. At all times there is an earnest effort to give the investigation a careful fundamental character in order that the results may be real contributions to agricultural science. The Station is also a means of disseminating general and miscellaneous information on agricultural topics, and its staff cheerfully devotes the necessary time to private and public correspondence and to personal interviews.

The offices and laboratories of the station are in Agricultural Hall, on the University grounds. The Dairy Building lies midway between the general group of college buildings and the University farm. The Horticulture-Agricultural Physics Building is located near the Dairy Building. The farm, with its buildings and the experimental grounds, adjoins the campus on the west.

By direction of the general government, which supplies a large portion of the funds for maintaining the Experimental Station, there are issued an annual report and frequent bulletins. Fourteen reports and sixty-four bulletins have been issued to date. Fifteen thousand copies of the report are printed annually, and the edition of the bulletins generally comprises twelve thousand copies. These bulletins and reports are free to all residents of the State upon application. The Station mailing list now embraces about nine thousand names of farmers and others to whom the reports and bulletins are regularly sent.

INSTRUCTION AT THE UNIVERSITY.

Systematic courses in agriculture have been arranged to meet the wants of students having different purposes in view.

The *Graduate Course* offers to advanced students opportunities for professional training and original investigation, made possible through a well-equipped and active Experiment Station, associated with numerous, amply furnished scientific laboratories. The special lines of study will be left largely to the selection of the students, subject to the approval of the Agricultural Faculty. It will be practicable to a large extent for such students to participate in experiments in progress and, after suitable experience, to conduct independent investigations. When contributions to knowledge of permanent value are made they will be published through bulletins of the Experiment Station under the name of the contributor.

The *Long Course* offers a liberal and scientific training along agricultural lines; it opens an avenue to a professional mastery

of agricultural chemistry, agricultural physics, horticulture, animal husbandry, dairying, and other special phases of the subject. Besides the strictly professional branches it embraces chemistry, physics, botany, zoology, geology, bacteriology, and similar branches which have an agricultural bearing. The field is so broad, however, that it is impossible for the students in four years to pursue all the courses offered, in addition to acquiring the necessary fundamental studies, and hence a large liberty of selection is allowed.

The *Short Course* is adapted to those who can devote only a short time to study, and who wish to return at once to the active operations of the farm, and therefore desire the greatest amount of available and directly useful knowledge that can be acquired in the brief time allowed.

The *Dairy Course* is designed to meet the wants of those who intend to operate creameries and cheese factories.

TERMS OF ADMISSION.

Graduate Course in Agriculture. Graduates of this University and of other colleges and universities in good standing are admitted to this course without examination.

Long Course in Agriculture. The following branches are required: English grammar, including sentential analysis and orthography; arithmetic, algebra through quadratics, and plane and solid geometry; political and physical geography; history of the United States; physics; physiology and botany. Students from accredited schools will be admitted on the same basis as required for the General Science or English courses.

Short Course in Agriculture. Students in this course must be at least sixteen years of age, and have a good common school education. No entrance examinations are required, but those who come poorly prepared cannot expect the full benefits of the course.

Course in Dairying. The terms of admission to this course will be the same as for the Short Course, excepting that the candidate must have had four months' experience in a creamery or cheese factory before entering the course.

Special Students in Agriculture. As many of the youth of the farming communities are not within reach of schools giving instruction in all the branches required for admission to the Long Course, limited concessions will be made to young men of exceptional strength and maturity by which they will be permitted to enter the University as special students in agriculture.

DEGREES.

The degree of Bachelor of Science in Agriculture is conferred on students who successfully complete the Long Course in Agriculture. The degree of Master of Science in Agriculture is conferred on Bachelors of Science in Agriculture who complete one year advanced study at the University and present an acceptable thesis on a topic approved by the Faculty.

LONG COURSE IN AGRICULTURE.

Freshman Year.

Biology, full study for the year.
Mathematics, algebra and trigonometry, four-fifths study for the year.
German, four-fifths study for the year.
Rhetoric, two-fifths study for the year.
Military Drill and Gymnastics.

Sophomore Year.

Chemistry, full study for the year.
Physics, full study for the year.
German, four-fifths study for the year.
Rhetoric, two-fifths study for the year.
Military Drill and Gymnastics.

Junior and Senior Years.

Two years in Agricultural Chemistry, Agricultural Physics, Animal Husbandry, or Horticulture, as a major subject.
One year in one of the above-named subjects to be assigned by the professor in charge of the major subject.
One term in Veterinary Science.
Elective studies enough to make twenty-four semesters' work.

SHORT COURSE IN AGRICULTURE.

This course covers two terms of fourteen weeks each, beginning the first of December each year.

First Year.

Twenty-eight lectures on Feeds and Feeding by Prof. Henry.
Twenty-eight lectures on the Breeds of Live Stock with score card practice additional in stock judging, by Prof. Carlyle.

Forty-nine lectures with 70 hours' laboratory practice in Agricultural Physics by Prof. King.

Forty-nine lectures on Plant Life with laboratory practice additional, by Prof. Goff.

Twenty-four lectures on Veterinary Science by Dr. Beattie.

Twelve lectures on Dairying by Dr. Babcock.

Seventy-two hours' practice in Farm Dairying and Dairy laboratory by Mr. Dewhirst.

A course in Farm Bookkeeping by Mr. Moore.

Second Year.

Twenty-eight lectures or equivalent in essay writing, on Animal Nutrition, by Prof. Henry.

Twenty-eight lectures on the Breeds of Live Stock, with seventy-two hours' practice in stock judging, by Prof. Carlyle.

Fifty-two lectures on Agricultural Physics and Meteorology with 52 hours' laboratory practice, by Prof. King.

Twenty-eight lectures on Horticulture with laboratory and greenhouse practice additional, by Prof. Goff.

Thirty-five lectures and recitations in Elementary Agricultural Chemistry.

Twenty-four lectures with demonstrations on Veterinary Science by Dr. Beattie.

One hundred and twenty hours at work bench and forge by Prof. C. I. King.

Twelve lectures on Agricultural Economics by Prof. Scott.

Fourteen lectures in Bacteriology as applied to agricultural conditions by Dr. Russell.

Students completing the studies of this course in a satisfactory manner are granted a Short Course Certificate.

An illustrated circular describing the Short Course in detail will be sent on application to R. A. Moore, Assistant to Dean, College of Agriculture, Madison, Wis.

COURSE IN DAIRYING.

The instruction in dairying is divided into four courses. The dairy class is divided into three sections, one of which is assigned daily to the laboratory, a second to the creamery, and a third to the cheese factory. The sections alternate so that each student receives instructions twice a week in each of the three departments. The courses are arranged as follows:

1. Lectures and Class-room Work.

(1) Twenty-four lectures by Dr. Babcock on the constitution of milk, the conditions which affect creaming and churning, methods of milk testing, the preservation of milk, etc.

(2) Sixteen lectures with demonstrations by Dr. Russell on the influence of bacteria in the dairy.

(3) Eight lectures by Professor King on heating, ventilation, and other physical problems directly connected with dairy practice.

(4) Ten lectures and demonstrations by Assistant Professor Richter on the care and management of the boiler and engine.

(5) Ten lectures by Dr. Beattie on the common diseases of the dairy cow.

(6) Eight lectures by Professor Henry on the feeding and management of dairy stock.

(7) Eight lectures by Professor Carlyle on breeding and selection of dairy stock.

(8) Twelve lectures by Professor Farrington on creamery management and accounts.

2. Milk Testing. This embraces instruction in the laboratory by Professor Farrington and Mr. Fulmer in estimating the fat in milk, butter, and cheese by methods adapted to the factory and factory operators. Six hours per week.

3. Butter Making. Instruction in this course is given by Professor Farrington, with assistants. Butter making is carried on daily on the creamery plan. The student learns to operate the several forms of power centrifugal separators on the market. They attend to the ripening of the cream, churning and packing butter, carrying on all the operations as they would be conducted in a creamery. Twelve hours per week.

4. Cheese Making. In this course, Mr. Decker, with assistants, gives daily instructions in the manufacture of cheddar cheese, the operations being carried on as in the regular factory, the students being required to take careful notes and make reports of the process. Sixteen hours per week.

ADVANCED DAIRY WORK.

Being desirous of securing pupils who have had much experience in factory work before joining us, we offer the following inducements:

Such as can pass satisfactory examinations in the practical work of the creamery or cheese factory will be advanced early in the term to the experimental dairy section, where problems connected with this branch will be studied.

Advanced dairy instruction will consist of the following courses:

1. Instruction by Dr. Babcock on Milk and its Products.
2. Experimental investigations in Butter making by Professor Farrington.
3. Investigations in Cheese Production by Mr. Decker.
4. Studies in Bacteriology by Dr. Russell. This work will include two lines:
   a. A special course in the preservation of milk and cream for commercial purposes;
   b. Students familiar with the use of the microscope will be admitted to the bacteriological laboratory for experimental work in dairy bacteriology.

EXAMINATIONS AND CERTIFICATES.

To secure a dairy certificate a student must have spent a full term in the Dairy School, and have two seasons' experience in a creamery or cheese factory, one of which must follow the period spent in the Dairy School. During the second season the candidate will report the operations of his factory monthly on blanks, and have his work inspected by an authorized agent of the University.

Additional information concerning the Dairy Course will be sent on application to Prof. E. H. Farrington, Madison, Wis.

This course opens the first of December each year and lasts twelve weeks.

DEPARTMENTS OF INSTRUCTION.

AGRICULTURAL CHEMISTRY.

PROFESSOR BABCOCK, ASSISTANT PROFESSOR WOLL, AND MR. VIVIAN.

1. The origin, composition, and classification of soils. The composition of air and the amount of plant food which it supplies. The elements necessary for plant development. The proximate composition of plants. The exhaustion of soils by different crops; the rotation of crops. The nitrogen problem. Classification of feeding stuffs; relative value of different systems of preserving forage crops. The silo and its losses. Manures, their classification, composition, sources, and relative value. Manurial value of fodders. Artificial fertilizers. Preservation and application of manures. The composition of the animal body. Animal nutrition. Digestibility of foods. *Lectures and recitations twice a week; first semester.* Assistant Professor WOLL.
2. Analysis of Fodders, Dairy Products, and Fertilizers. *Laboratory work during the year; three times a week.* Assistant Professor WOLL and Mr. VIVIAN.
3. The Chemistry of the Dairy; the composition and physical properties of milk and its manufactured products; the principles involved in modern dairy practice. Detection of adulteration, etc. *Lectures and laboratory practice; first semester; five times a week.* Professor BABCOCK.
4. Advanced and Original Work. Ash analysis. Chemical examination of soils. Estimation of sugars, starch, etc. Original investigations in the chemical laboratory. *Laboratory work during the year; five times a week.* Professor BABCOCK, Assistant Professor WOLL, and Mr. VIVIAN.

AGRICULTURAL PHYSICS.

POFESSOR KING AND ASSISTANT PROFESSOR JEFFERY.

1. Meteorology. The aim of this course is, first, to cover the general principles of the subject and familiarize the student with meteorological methods and instruments, and second, to deal specially with the agricultural and horticultural phases of the subject. *Lectures and laboratory work; three times a week; first semester.*

2. Farm Engineering. Farm drainage and irrigation, the construction and maintenance of country roads, and the construction of farm buildings. *Twice a week; first semester.*
3. Soil Physics. Physical characteristics, origin, and classification of soils; needs and methods of soil aeration; storage capacity of soils for water; movements of soil water as affected by texture, composition, fertilizers, and temperature; principles governing and the methods of determining soil temperatures; principles, methods, and implements of tillage. *Full study; second semester.*
4. Original investigations in the physical laboratory and field. *Full study; throughout the year.*

ANIMAL HUSBANDRY.

PROFESSOR HENRY AND PROFESSOR CARLYLE.

1. The Breeds of Live-Stock. Students taking this course are trained in judging live-stock by the use of typical animals, skeletons, charts, models, and score cards. As aids to the work, use will be made of the stock on the University Farm and on farms in the vicinity of Madison; also many photographic slides projected with the electric lantern. The agricultural library now embraces over 600 volumes of stud books, herd books, and flock registers. *Full study; first semester.* Professor CARLYLE.
2. Breeding. Principles of breeding (heredity, fecundity, etc.), methods of breeding (line-breeding, inter-breeding, cross-breeding, etc.), and the practice of breeding (horse, cattle, sheep, and swine breeding), taught by lectures, text-book work, and study of the practices of breeders as shown by the various stock registries. The text-books for this course are Darwin's Animals and Plants under Domestication, and Miles' Stock Breeding. *Full study; second semester.* Professor CARLYLE.
3. Feeds and Feeding. Chemical constituents of feeding materials, amount, combination, and form of these necessary to give the best results with the various kinds of live-stock. The student will familiarize himself with German feeding tables, the feeding trials conducted at our own Station and the experimental work now in progress. Armsby's Manual of Cattle Feeding and Henry's Feeds and Feeding will be used as text-books. *Full study; first semester.* Professor HENRY.

4. Advanced Work in Feeding and Breeding. Having completed the previous courses the student is in position to carry on investigations through a study of the work of the experiment stations of this country and the old world. Further he will assist in conducting feeding trials at our own Station. *Full study; one year.* Professor HENRY and Professor CARLYLE.

HORTICULTURE.

PROFESSOR GOFF.

1. General Principles of Horticulture. Propagation, planting, cultivating, pruning, and breeding of economic plants. Lectures, recitations, and laboratory work. *Full study; first semester.*

2. Economic Horticulture. Special instructions in growing, harvesting, marketing, and preserving the principal fruits and vegetables of our climate, and on the leading injurious insects and diseases that prey upon these, and the best methods of preventing their ravages. Lectures, recitations, and laboratory work. *Three times a week; second semester.*

3. Æsthetic Horticulture. The principles of ornamental planting and of laying out gardens and pleasure-grounds, with the formation and management of lawns, and the adaptation of decorative plants. Lectures and recitations. *Twice a week; second semester.*

4. Special Investigation in subjects relating to the propagation and rearing of economic plants, including the suppression of injurious insects and diseases. Field and laboratory work. *Full study; throughout the year.*

THE ECONOMICS OF AGRICULTURE.

PROFESSOR SCOTT.

The object of this course is to furnish students of agriculture with an opportunity for acquaintance with the social aspects of their subject. The farmer is profoundly affected by general industrial conditions, and a knowledge of the forces which determine and modify these conditions is essential to an intelligent prosecution of his business. This course will consist of one lecture each week during the short course term to second year

students, and will embrace such topics as: The mutual relations of agriculture and other industries; value and prices with especial reference to land and agricultural products; money, its functions and varieties; banks and their functions; industrial and monetary crises and panics; systems of land tenure, etc. After each lecture an hour will be devoted to discussion, quiz, and questions asked by the students.

BACTERIOLOGY.

PROFESSOR RUSSELL AND MR. FROST.

The rapid development of bacteriology along agricultural lines necessitates a thorough understanding of the general principles of this science by those students that desire to keep abreast of the progress of the day. The University has now a fully equipped laboratory for the prosecution of class and research work along these lines.

1. Agricultural Bacteriology. Students will be taught the relation of bacteria to various natural processes that are of utmost importance to the agriculturist, such as the fertilization and restoration of soils by the nitrifying bacteria and by the bacteria resident in legumes, the germ theory of disease in man, domestic animals, and plants; the general principles of fermentation and decomposition, and their application to practical agriculture. Students who are not thoroughly familiar with bacteriological methods will take such work with the general class and will specialize along agricultural lines as far as time permits. *Laboratory work; full study; first semester.*
2. Dairy Bacteriology. This course is limited to the relation of bacteria to dairy problems, and will include not only laboratory work but the practical application of the pure culture system in butter making and a thorough study of the normal fermentations which occur in milk, as well as the abnormal fermentations that are such a source of loss in the dairy industry. *Laboratory work; full study; first semester.*

The above courses can only be taken advantageously by the student who is familiar with the use of the compound microscope and has had general work in biology.

FARMERS' INSTITUTES.

The third division of work of the College of Agriculture is the instruction of farmers who are unable to come to the University for study. This is made possible through generous legislative provisions, by which a carefully supervised system of farmers' institutes is maintained. The institutes are in immediate charge of a Superintendent, who elaborates and controls the organization and execution of the institutes. He is aided by special conductors, who assist in perfecting the details and carrying the whole into effect. Members of the agricultural faculty render as much assistance as is consistent with their other duties. Experts in different departments are engaged to present special important themes. Lecturers are often brought from other states to treat on specific topics in which they are recognized authorities. Local talent is used to some extent and not the least of the educational benefits is the development of latent ability in writing, speaking and experimenting which has followed as a natural result of the interest awakened by this important stimulus.

During the institute season of 1897-8 institutes lasting two days each were held at the places named below:

List of Institutes Held During the Season 1897-8.

Place.	County.
Adams	Plainville.
Barron	Cameron Jct.
Brown	Flintville.
Buffalo	Mondovi.
Burnett	Trade Lake.
Calumet	Hilbert.
Chippewa	Albertville, Boyd, Chippewa Falls.
Clark	Granton.
Columbia	Pardeeville.
Crawford	Gays Mills, Steuben, Soldiers Grove.
Dane	De Forest, Sun Prairie.
Dodge	Beaver Dam, Neosho.
Dunn	Downing, Downsville.
Eau Claire	Brackett, Fairchild.
Fond du Lac	Mt.Calvary, Cambellsport, Rosendale, Waupun
Grant	Glen Haven.
Green	Brodhead, Browntown, Monticello.
Green Lake	Markesan, Princeton.

Place.	County.
Iowa	Rewey, Ridgeway.
Jackson	Irving, North Bend, Taylor, Alma Center.
Jefferson	Johnson's Creek, Rome, Waterloo, Watertown.
Juneau	Camp Douglas, Wonewoc.
Kenosha	Silver Lake.
Kewaunee	Euren, Kewaunee.
La Crosse	Bangor, Onalaska.
La Fayette	Argyle, Belmont, Shullsburg, South Wayne.
Langlade	Antigo.
Lincoln	Merrill, Tomahawk.
Manitowoc	Clarks Mills, Greenstreet, Meeme.
Marathon	Spencer.
Marquette	Montello, Oxford.
Monroe	Cataract, Kendall, Tomah, Warrens.
Oconto	Stiles.
Outagamie	Seymour.
Pepin	Arkansaw, Pepin.
Pierce	Ellsworth, Rock Elm, Spring Valley.
Polk	Balsam Lake, Clear Lake.
Portage	Almond, Amherst.
Price	Phillips.
Racine	Kansasville, North Cape, Western Union Jct.
Richland	Excelsior, Richland Center, Viola.
Rock	Janesville, (Closing Institute).
St. Croix	New Richmond, Wilson.
Sauk	Reedsburg.
Shawano	Wittenberg, Birnamwood.
Sheboygan	Franklin, Oostburg, Plymouth.
Taylor	Medford.
Trempealeau	Ettrick.
Vernon	Viroqua.
Walworth	Delavan, Genoa Jct.
Washington	Kohlsville.
Waukesha	Sussex.
Waupaca	Clintonville, New London, Ogdensburg.
Waushara	Auroraville.
Winnebago	Omro.
Wood	Grand Rapids.

In addition to the regular institute work cooking schools of two lectures each were held in connection with the institutes, at the following points:

New Richmond	Glen Haven,
Amherst	Onalaska,
Beaver Dam	Tomahawk,
Rosendale	Grand Rapids.
Delavan.	
Waterloo.	
Janesville.	

Institutes are placed for the most part in localities which show the greatest interest in this movement. Applications for institutes will be received by the superintendent and presented to the agricultural committee by Sept. 30th. The committee goes over the list and carefully considers the needs and interests of each locality, and places the institutes where, in its judgment, they will prove the most helpful. Generally there have been far more applications for institutes than it was possible to supply. Applications should be received before Sept. 15, each year.

The Farmers' Institute Bulletin.

To disseminate still more widely a representative portion of the matter presented and discussed at the institutes, and to give it permanency for its own sake and for its historical value, a system of publication in the form of bulletins has been begun by the superintendent. Bulletin No. 11, the last issued, contains a stenographic report of the closing institute held at Appleton in March, 1897. Sixty thousand copies of this Bulletin have been issued. Eight thousand cloth-bound copies have been placed in the school district libraries of the state, thirty-five thousand have been given to the farmers in attendance at the institutes, and the remainder distributed through cheese factories, creameries, etc. Copies will be sent to all applicants living within the state upon receipt of 10 cts., to pay postage and mailing, for paper covers, and 25 cts. for cloth bound covers. To those outside of Wisconsin 25 cts. for paper covers and 40 cts. for cloth bound copies will be charged, to cover mailing and cost of publication.

COLLEGE OF LAW.

STAFF OF INSTRUCTION.

C. K. Adams, LL. D., President.

E. E. Bryant, Dean of the Law Faculty, Professor of Elementary Law, Practice and Pleading, Equity, Railway Law, and the Law of Public Offices and Officers.

C. N. Gregory, A. M., LL. B., Associate Dean of the Law Faculty, and Professor of Criminal Law, the Law of Contracts, of Sales, and of Probate Law.

J. B. Cassoday, LL. D., Chief Jusice of the Supreme Court of Wisconsin, Professor of Constitutional Law.

J. H. Carpenter, LL. D., Jackson Professor of Partnership.

B. W. Jones, A. M., LL. B., Professor of the Law of Evidence, Public Corporations, and Domestic Relations.

J. M. Olin, A. M., LL. B., Professor of the Law of Real Property, Wills, and Torts.

R. M. Bashford, A. M., LL. B., Professor of the Law of Private Corporations, and Commercial Law.

W. L. Drew, B. S., LL. B., Assistant Professor of the Law of Agency, Analysis of Cases, Damages, and Carriers.

J. B. Parkinson, A. M., Professor of Constitutional Law and International Law.

R. T. Ely, Ph. D., LL. D., Professor of Political Economy.

F. J. Turner, Ph. D., Professor of American History.

C. H. Haskins, Ph. D., Professor of Institutional History.

W. A. Scott, Ph. D., Professor of Economic History and Theory.

D. B. Frankenburger, A. M. Professor of Rhetoric and Oratory.

Special Lecturer.

Hon. Wm. F. Vilas, LL. D., Special Lecturer on Jurisdiction.

GENERAL STATEMENT.

The superior advantages of professional schools, for the training of students in the elementary principles of law and fitting them to enter upon the practice, are now quite generally acknowledged by the members of the bar.

Among the more important of the advantages afforded to the student by the Law School over the law office or private or solitary pursuit of the study, the following are the most obvious:

1. He is taught to trace the growth, progress, and expansion of our body of law.

2. His studies are directed to give him a comprehensive, general view and analysis of the law as a system. By the inductive or case method he is taught to seek the law in its original sources and deduce principles from decided causes.

3. He is well instructed in elementary principles.

4. While studying the substantive law, he is at the same time familiarized with the principles of procedure and general rules of practice, their necessity and application.

5. Having access to large, well-selected libraries, he becomes familiar with the literature of the law, and learns where to readily find the law of any subject in the decisions and elaborate treatises.

6. Constantly examined, orally and in writing, upon his reading, he becomes more proficient in the expression of his thoughts and knowledge.

7. By constant association, study, discussion, and friendly controversy, with fellow students, he acquires self-reliance, overcomes timidity, and learns the value of thorough preparation. His mental faculties are quickened and his resources are brought under his command.

8. In the preparation and argument of cases in the moot court, under proper guidance, he has an experience of great utility in fitting him for the actual controversies of professional life.

The published statement of a member of the New York Board of Examiners for admission to the Bar shows that nearly twice as large a percentage of applicants educated in law offices fail to pass the bar examination as of applicants educated in Law Schools.

The Law Schools of the United States, as appears by the report of the American Bar Association for 1897, instructed 10,048 students during the past year and they have won the earnest commendation of the best English teachers and writers as: Rt. Hon. James Bryce, Q. C., M. P.; Mr. Dicey, Q. C., Vinerian Professor at Oxford, and Sir Frederick Pollock, Corpus Christi, Professor of Jurisprudence at Oxford, as superior to the English Schools of Law.

The College of Law of the University of Wisconsin offers a course which is believed to be of practical merit, and to give as

much valuable and practical instruction and training as can be given in a three years' course of study. The elementary instruction in substantive law usual in all law schools is here fully and carefully given. Less instruction is imparted by means of the lecture alone than in many schools; the "Case System" is in part used, and much original work carefully directed is required of the students; and examinations are rigid and conducted at frequent intervals.

The design of this College is to prepare students for practice in the several states of the Union, and to this end endeavor is made to give thorough instruction in the principles of law, including:

First. THE COMMON LAW, its history, development, and present state in the United States, with the statutory modifications generally adopted in the several states.

Second. EQUITY, its history, development, and present state in the United States.

Third. THE LAW OF PROCEDURE, including the practice and pleading in Common-law Courts, Courts of Equity, and under the Codes of Civil Procedure.

Fourth. THE PUBLIC LAW of the United States and Constitutional Law.

International Law, Roman Law, and Comparative Constitutional Law are taught in the University in classes open to students of the College of Law.

Admission.

Students applying for admission to the College of Law may be admitted, as are students in other departments, by either of two methods:

1. On certificates from accredited schools or colleges.
2. On examination at the University.

The requirement for admission certificates is the same as for admission to the other departments under title "Admission." The examination required is the regular examination upon the studies of group 1 for admission to the freshman class and is conducted at the same time and by the same members of the Faculty as the examination of candidates for admission to the College of Letters and Science.

These examinations for the freshman class will be held June 16 and 17 and September 27 and 28, A. D. 1898.

The examination will cover the following topics:

GROUP I. *Subjects required of all candidates:*

a. GEOGRAPHY, political and physical.

b. HISTORY OF THE UNITED STATES: Thomas or Johnston's History of the United States, or an equivalent.

c. ARITHMETIC.

d. ALGEBRA: Addition, subtraction, multiplication, division, equations of the first degree with one unknown number, simultaneous equations of the first degree, factors, highest common factor, lowest common multiple, quadratic equations, simultaneous equations above the first degree, theory of indices (positive, negative, fractional, and zero), and radicals.

GEOMETRY: Plane and solid geometry. In solid geometry special attention should be given to the geometry of the sphere.

e. ENGLISH IN GENERAL: No pupil will be accepted in English whose written work is notably deficient in point of *spelling, punctuation, idiom,* or *division into paragraphs.*

f. ENGLISH COMPOSITION: 1. The candidate will be required to write two essays of not less than two hundred words each, on subjects chosen by himself from a considerable number—perhaps ten or fifteen—set before him in the examination paper, and one of the topics chosen must be taken from the books assigned for general reading under English Literature.

2. In place of the essay on the topic drawn from the books set for general reading, the candidate will be allowed to offer an exercise book containing the first draft of essays written during his preparatory course, on topics taken from the works prescribed for general reading. These essays must be written under the eye of the teacher without consulting the books from which the subjects are taken, and without other assistance, must be kept in the care of the teacher, and sent by him to the examiner at least one week before the date of the entrance examination, with his certificate that they have been written in accordance with these requirements.

g. ENGLISH LITERATURE. The following lists include (1) a series of books for general reading, which may also be used as a basis for work in English Composition; (2) a

limited number of masterpieces for thorough study. In addition to the essays called for under the head of *English Composition*, there will be required such further tests as seem suited to secure a careful reading of all the books prescribed in series (1). The written statement of the teacher will be sufficient, in general, for this purpose. In the case of the books set for more thorough study, the candidate will be examined on subject-matter, form and substance, and the examination will be of such a character as to require a thorough study of each of the works named, in order to pass it successfully.

I. For General Reading and Composition work:

1898—Milton's Paradise Lost, Books I. and II.; Pope's Iliad, Books I. and XXII.; The Sir Roger de Coverley Papers in The Spectator, Goldsmith's The Vicar of Wakefield, Coleridge's Ancient Mariner, Southey's Life of Nelson, Carlyle's Essay on Burns, Lowell's Vision of Sir Launfal, Hawthorne's The House of the Seven Gables.

1899—Pope's Translation of the Iliad (Books I., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, De Quincey's Flight of a Tartar Tribe, Cooper's Last of the Mohicans, Lowell's Vision of Sir Launfal, Hawthorne's House of the Seven Gables.

1900—Pope's Translation of the Iliad (Books I., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, Scott's Ivanhoe, De Quincey's Flight of a Tartar Tribe, Cooper's Last of the Mohicans, Tennyson's Princess, Lowell's Vision of Sir Launfal.

1901—George Eliot's Silas Warner, Pope's Translation of the Iliad (Books 1., VI., XXII., and XXIV.) The Sir Roger de Coverley Papers, Goldsmith's Vicar of Wakefield, Scott's Ivanhoe, Shakespeare's Merchant of Venice, Cooper's Last of the Mohicans, Tennyson's Princess, Coleridge's Rime of the Ancient Mariner.

1902—The same as for 1901.

2. For thorough study.

1898—Shakespeare's Macbeth, Burke's Speech on Conciliation with America, De Quincey's The Flight of a Tartar Tribe, Tennyson's The Princess.

1899—Shakespeare's Macbeth, Milton's Paradise Lost (Books I. and II.), Carlyle's Essay on Burns, Burke on Conciliation with America.

1900—Shakespeare's Macbeth, Milton's Paradise Lost (Books I. and II.), Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

1901—Shakespeare's Macbeth, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas, Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

1902—Shakespeare's Macbeth, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas, Burke on Conciliation with America, Macaulay's Essays on Milton and Addison.

ENGLISH GRAMMAR. There is included in this requirement for entrance a knowledge of the leading facts of English grammar, and tests of such knowledge will be made a part of the examination.

2. For thorough study.

1901—Shakespeare's The Merchant of Venice, Burke's Speech on Conciliation With America, Scott's Marmion, Macaulay's Essay on the Life of Samuel Johnson.

Candidates will be admitted without examination upon presenting certificates of graduation from any reputable college or university, State normal school, accredited high school or academy, or upon presenting a first-grade teacher's certificate issued in this state.

Admission of Special Students Twenty-three Years of Age and Upwards.

At a meeting of the Board of Regents held in June, 1897, a resolution was adopted by which persons twenty-three years of age will hereafter be permitted to take *special studies* in the College of Law upon giving satisfactory evidence that they are prepared to take the desired studies advantageously. If they subsequently desire to become candidates for a degree or to take a regular course, they must pass the required entrance examinations.

Under this rule students of the required age can be received without passing the entrance examination, and can prepare themselves to take and pass the entrance examinations during their law course.

The passing of the entrance examination, however, is a condition precedent to their taking a degree.

Elective Studies.

The following regulations have been authorized respecting elective studies:

1. Students of the College of Letters and Science will be permitted to elect, as part of their undergraduate course, junior studies in the College of Law to an amount not exceeding altogether six (6) hours per week for one year. The studies to be so elected are to be designated by the College of Law, and the studies for which they may be substituted, by the College of Letters and Science.

2. Students of the junior class of the College of Law may elect studies in the College of Letters and Science, and substitute them for studies in the junior year of the law course, to an amount not exceeding four hours per week for that year. The studies to be elected are to be designated by the College of Letters and Science, and those for which they may be substituted by the College of Law.

3. Graduates of the College of Letters and Science who have elected six hours of study per week for one year in the College of Law are to be admitted on graduation to the middle class of the College of Law.

4. The fees for such elective studies are prescribed by the Board of Regents at $25 per annum.

METHODS AND COURSE OF INSTRUCTION.

The methods of instruction and course of study in this College, subject to necessary modifications, are substantially as follow:

Junior Year.

First semester. Elementary Law. *Two hours a week,* 15 *weeks.* Text-book: Bryant's Outlines of Law. Dean BRYANT.

Contracts. *Two hours a week.* Text-book: Keener's Selections on Contracts. Associate Dean GREGORY.

Domestic Relations. Text-book: Schouler on Domestic Relations. *One hour a week.* Professor JONES.

Commercial Paper. *One hour a week.* Text-book: Tiedeman on Commercial Paper. Professor BASHFORD.

The Law of Real Property. *One hour a week.* Text-book: Tiedeman on Real Property; to topic, "Trusts," in first year. Professor OLIN.

Courts and Jurisdiction. Notes, lectures and statutes. *One hour a week for ten weeks.* Dean BRYANT and Mr. VILAS.

Common-law Actions and Pleading. Text-book: Andrews and Stephens on Pleading. *One hour a week, twelve weeks.* Dean BRYANT.

Analysis of Cases. Text-book; Wambaugh's Cases for analysis. *One hour a week.* Assistant Professor DREW.

Agency. Text-book: Wambaugh's Cases on Agency. *Two hours a week.* Assistant Professor DREW.

The Class and Faculty Moot Courts meet several times weekly. The Class Moot Court is constituted in several divisions, so that each student is frequently assigned cases. The Faculty Moot Court gives each student opportunity to prepare and argue a case on a submitted statement of facts as often as once each semester.

Written examinations at the close of topics or end of semester are required throughout the course.

Second semester. Text-book: Bryant's Notes on Taxation. *One hour a week, eight weeks.* Professor JONES.

Contracts. *Two hours a week.* Text-book: Keener's Selections on Contracts. Associate Dean GREGORY.

The Law of Public Offices and Officers. Text-book: Mechem on Public Offices and Officers. *One hour a week, twelve weeks.* Dean BRYANT.

Real Property. The study is pursued as indicated in the work for the first semester. *One hour a week.* Professor OLIN.

Municipal Corporations. Text-book: Dillon on Municipal Corporations. *One hour a week, nine weeks.* Professor JONES.

Common-Law Pleading, continued. *One hour a week, twelve weeks.* Dean BRYANT.

Common-law Practice. *One hour a week, eight weeks.* Dean BRYANT.

Equity Jurisprudence. Text-book: Bryant's Outline of Equity Jurisprudence. *One hour a week, eight weeks.* Dean BRYANT.

Commercial Paper, continued. *One hour a week.* Professor BASHFORD.

Agency. Text-book: Wambaugh's Cases on Agency. *Two hours a week.* Assistant Professor DREW.

Middle Year.

First semester. Real property. Text-book: Tiedeman on Real Property, commencing with the subject of Trusts, and ending with the subject of Title by Devise. *One hour each week throughout the year.* Professor OLIN.

Private Corporations. Text-Book: Clark on Corporations. *One hour a week.* Professor BASHFORD.

Equity Jurisprudence, continued. Text-book: Bryant's Outlines Equity Jurisprudence. *Two hours a week, fourteen weeks.* Dean BRYANT.

Equity Pleading and Practice. Text-book: Shipman on Equity Pleading. *One hour a week, sixteen weeks.* Dean BRYANT.

Code Pleading. Text-book: Bryant on Code Pleading. *Two hours a week, fourteen weeks.* Dean BRYANT.

Law of Sales. Text: Williston's Select Cases on Sales. *Two hours a week.* Associate Dean GREGORY.

Partnership. *One hour a week.* Professor CARPENTER.

Municipal Corporations. Text-book: Dillon on Municipal Corporations. *One hour a week, twelve weeks.* Professor JONES.

Evidence. Text-book: Jones on Evidence. *One hour a week for six weeks.* Professor JONES.

Damages. Text: Beales Cases on Damages. *Two hours a week, thirteen weeks.* Assistant Professor DREW.

Carriers. Text: McClain's Cases on Carriers. *Two hours a week, four weeks.* Assistant Professor DREW.

Second semester. Real Property. Text-book: Tiedeman on Real Property. The subjects of Title by Public Grant and Mining Law comes in this semester. *One hour a week.* Professor OLIN.

Equity Jurisprudence, continued. Text-book: Bryant's Outlines of Equity Jurisprudence. *One hour a week, seventeen weeks.* Dean BRYANT.

Code Pleading. *Two hours a week, eight weeks.* Dean BRYANT.

Criminal Law and Procedure. *Two hours a week.* Text: Clark on Criminal Law and and Washburn's Manual of Criminal Law. Associate Dean GREGORY.

Private Corporations, continued. *One hour a week.* Professor BASHFORD.

Equity Practice in Federal Courts. Text: Bryant's Federal Court Rules. Dean BRYANT.

Eminent Domain. *One hour a week, ten weeks.* Dean BRYANT.

Evidence. *One hour a week.* Text: Jones on Evidence. Professor JONES.

Carriers. Text: McClain's Cases on Carriers. *Two hours a week,.* Assistant Professor DREW.

Senior Year.

First semester. Constitutional Law. Lectures and study of leading cases . *One hour a week.* Chief Justice CASSODAY.

Pleading and Practice in Extraordinary Remedies. *One hour a week, six weeks.* Dean BRYANT.

The Law of Evidence. Text-book: Jones on Evidence. *One hour a week.* Professor JONES.

The Practice in Creditors' Suits and Supplementary Proceedings. *One hour a week, six weeks.* (Text: Bryant's Code Practice.) Dean BRYANT.

Practice on Writs of Error and Appeals. *One hour a week, eight weeks.* (Text: Bryant's Code Practice.) Dean BRYANT.

The Practice in Inferior Courts. *One hour a week, eight weeks.* Text: Bryant's Justice. Dean BRYANT.

Banking, Insurance, Voluntary Assignments. Text: Elliott on Insurance. *One hour a week.* Professor BASHFORD and Dean BRYANT.

Probate Law. *Two hours a week.* Lectures, notes and select cases. Associate Dean GREGORY.

The Law of Wills. *Fourteen weeks, one hour each week.* Text: Cassoday on Wills. Professor OLIN.

The Law of Torts. Bigelow on Torts as a text-book. *One hour each week for three weeks.* Professor OLIN.

Actions for Foreclosure and Procedure. *One hour a week, six weeks and assigned work.* Lecture and practical instruction. Dean BRYANT.

International Law. *One hour a week for eight weeks.* Notes and lectures. Dean BRYANT.

Trusts, and Procedure relating thereto. *One hour a week for eight weeks.* Text: Underhill on Trusts. Dean BRYANT.

Patent-Law. *One hour a week, ten weeks.* Curtiss on Patents. Dean BRYANT.

The Law of Estoppel. *One hour a week. ten weeks.* Text: Bigelow on Estoppel. Dean BRYANT.

Second semester. Constitutional Law, continued. Lectures and leading cases. *One hour a week.* Chief Justice CASSODAY.

The Law of Evidence. Text: Jones on Evidence. *One hour a week.* Professor JONES.

Banking, Insurance, and Voluntary Assignments. Lectures and cases. *One hour a week.* Professor BASHFORD.

Select Cases in Equity Procedure. *One hour a week, ten weeks.* Dean BRYANT.

Legal History. Lectures and special studies. *One hour a week, ten weeks.*

Pleading and Practice in Equity. *Two hours a week, six weeks.*

Forensic Oratory. Text-book: Robinson's Forensic Oratory, selections, and lectures. *One hour a week, ten weeks.* Dean BRYANT.

Select Wisconsin Cases in Law of Contracts and Personal Property. *Two hours a week.* Associate Dean GREGORY.

The Law of Torts. Continued as in the first semester. *One hour each week.* Professor OLIN.

Procedure. Methods in different systems contrasted. *One hour a week, eight weeks.* Dean BRYANT.

The Trial of Actions. *One hour a week for seventeen weeks.* Dean BRYANT.

Legal Ethics. Lectures. *One hour a week, four weeks.* Dean BRYANT.

RESOURCES OF THE COLLEGE OF LAW.

The Board of Regents annually make such an appropriation as is needed for the support of this College. The matriculation fees charged for its course constitute only a part of the resources by which it is maintained.

By the will of the late Judge Mortimer M. Jackson, funds to the amount of twenty thousand dollars were bequeathed to the University to found and maintain a Professorship of Law. In accordance with the wishes of the donor, Judge J. H. Carpenter, an instructor of long experience and well-recognized ability, has been elected to this professorship. The act of 1891, by which the legislature provided for the erection of the building for the College, provided also for its equipment; and as fast as this appropriation can be realized the library will be enlarged, and the appointments of the College kept up to maintain it in the greatest utility. One thousand dollars per year is appropriated by the legislature to the support of its library.

Admission to Advanced Standing.

Candidates presenting duly accredited certificates from other law schools of good standing will be admitted to corresponding standing in this College, without passing examinations.

Students entering the junior class after the beginning of the academic year will be required to read and pass examinations in the work of the class which has been done prior to their admission. All who desire to enter the classes should begin at the opening of the year, as the disadvantage of entering a class some weeks after it is organized and well advanced in studies is one that hampers the late-coming student through his whole course.

Students who have graduated from the University of Wisconsin, and who have elected and taken six hours of the junior

year's work in the College of Law, and passed examination, will be permitted to graduate upon taking a two years' course in the College of Law. Students who have studied law elsewhere, and pass examination in the work of the junior year, may be admitted to the class of the middle year.

SPECIAL ADVANTAGES.

The advantages which the City of Madison affords to the law student, it is believed, are equal, and in many respects superior, to those to be found in any place where a law school is established in this country. Among them are the following:

Courts.

The Supreme Court of the state is in session during the most of the academic year; and students have opportunity to listen to carefully prepared arguments by the most able lawyers of the country.

Two terms of the United States Circuit and District Courts are held here annually, and important cases are here tried, both on the law side of the court before juries and in equity causes, illustrating the procedure in the Federal Courts.

The Circuit Court for Dane County holds three terms each year, giving the student opportunity to observe the methods and practice under the code system, which is substantially like that in twenty-seven states and territories.

The Municipal Court of Dane County sits daily for the trial of criminal cases.

Facilities conveniently at hand for becoming familiar with the practice in courts and the methods pursued by able and successful practitioners are thus afforded.

The statutes of the state provide that "All graduates of the Law department of the University of Wisconsin shall be admitted to the bar of all the courts, upon the production of their diploma duly issued by the Board of Regents thereof, and such graduates may be admitted to the Supreme Court when not in session by an order signed by one of the justices thereof and filed with the clerk" (R. S. Wis. §2586.) Under this statute and a rule of the Federal court, it is customary for the graduating class, on motion of a member of the faculty, to be admitted to both courts immediately upon graduation.

The Legislature

of the state holds one or two sessions during each course, enabling students to observe the processes of legislation.

The University.

The Universiy of Wisconsin has a corps of instructors selected from the best scholars in their respective specialties. On obtaining a proper certificate from the Associate Dean, students of the College of Law may pursue studies for which they are prepared in any other department without extra charge, in so far as the work of the College of Law leaves them time. Many students of law avail themselves of the privilege. The site of the University buildings is one of the most beautiful in the United States. Large sums have been and are being expended in building, libraries, and apparatus in all the departments. The attendance of students from the best youth of the country is large and steadily increasing. The student of the College of Law is surrounded by the best influences. He is not only in a "legal atmosphere," but his associations are with those who, in other lines of study, are striving for excellence.

Law College Building.

The liberality of the state has provided the means, and the Regents have erected a building, for the College of Law, which is one of the most commodious in the country. It is located on the campus or University ground, convenient of access, and on a commanding site. A stately structure, elegant in design and finish, built of the brown sand-stone of Lake Superior, at a cost of over $86,000, it is especially designed to be convenient for the uses of the College. Its lecture rooms and library are large, capable of comfortably seating several hundred students. The most approved systems of lighting, heating, and ventilation, and the most convenient appliances for writing or taking notes, are furnished. Rooms for moot courts and class debates are, also, provided.

The School of Economics, Political Science, and History,

under the direction of Dr. Richard T. Ely, with an able corps of instructors and special lecturers, is established in other rooms of the same building. Students of the College of Law are enabled to pursue the studies of this school and attend lectures

upon political economy, institutional history, constitutional and international law, civil polity and American history, and special lectures on such topics as the distribution of wealth, socialism, taxation, government of cities, pauperism, criminology, public finance, economics of agriculture, and various other topics ably treated by advanced teachers and thinkers on these and similar topics. These subjects are of especial importance and value to the student of American law, and add greatly to the advantages of the College of Law, giving its students especially convenient facilities for including the economic studies in their course. To a limited extent the law students are permitted to elect studies in this School during the first year.

Libraries.

The College of Law has an excellent and rapidly increasing library of the best law books and reports. This is enlarged by an annual appropriation made by the Legislature for that purpose. It is open for the use of law students during the day and evening.

The law library of the state, the largest and most complete in the Northwest, is located in the Capitol building; and students of the College of Law have heretofore been permitted, under reasonable restrictions, to use its books for reference, and conveniences are afforded them for the use of the books in preparing briefs or pursuing topical investigations. Under proper regulations it is hoped this will be continued.

The Library of the State Historical Society, with about 97,000 volumes and 93,000 pamphlets, a collection of books of the greatest value in historical study and research, is open to all students of the University.

The General University Library, including the department libraries catalogued with it, contains about 46,000 volumes and 10,000 pamphlets, and is open every week-day and evening to students. About three hundred of the best American and foreign periodicals are taken and kept on the files for students' use.

The Bar.

The bar of Dane County is an unusually strong one, especially noted for the thoroughness of its members in preparing their cases for trial, and for their accurate and precise methods in practice. Students, who desire it, can generally obtain situations in law offices, where they have opportunities to assist in practice, in the preparation of briefs and in the conduct of legal business,

at the same time attending lectures and the practical exercises of the class; and in some instances they thus have opportunity of earning something towards their support.

EXAMINATION FOR ADMISSION.

The examination for admission will be held as per announcements of terms of admission in the College of Letters and Science. Those intending to apply for admission should notify the Dean before the commencement of the year, and apply for directions, as examinations cannot be had after the commencement of the year. No student of the junior class will be admitted to the middle class who fails to pass an examination in the principal studies of the junior year, except conditionally; and the work of the middle year must be completed before the student is entitled to full rank as a senior.

ADMISSION TO ADVANCED STANDING.

Candidates who have studied elsewhere, and can pass examinations upon the studies of the junior year or middle year, or their equivalent, can enter the middle or senior year. But such examination will be most searching and thorough, embracing all the studies of the junior and middle years. The examinations will be chiefly in writing, extending over all the topics of the first two years, except as above indicated, and occupying five days.

Students applying for admission to the middle or senior class, upon examination, must report in person for the examination, which begins on the Tuesday of the week preceding the commencement of the academic year, as the examination will occupy some five days; *and no such examinations can be held after the appointed time.* Such examinations begin September 20, 1898.

EXAMINATION FOR GRADUATION.

For graduation each student will be required to have passed a satisfactory examination upon all studies pursued during the three years of the course; such examinations to be made either at the end of each semester, or on completion of a particular topic; and he must have prosecuted or defended to judgment such moot court cases as shall have been assigned by the Faculty, and must also have prepared such legal papers, pleadings, etc., as have been assigned for practice; and at least one month before the close of the senior academic year, and at such time as the

Dean shall appoint, must have prepared and submitted to the Faculty, a satisfactory thesis upon some legal topic, to be examined, criticised, and marked by some member of the Faculty.

As the real ground-work of legal proficiency is laid in the beginning of the course, all should strive to take the full course rather than trust to such progress as can be made in a law office or reading in private. If but one year can be spent at a law school, the first year will be the most valuable. The student can, upon the proficiency thus gained, more easily be admitted to the examinations by the State Board of Examination for admission to the bar, and, in his future studies, have the benefit of elementary training.

Students, who are able to do so, should furnish their own text-books, and books of selections of cases. They will need them in practice after graduation, and can hardly afford to be without them during their course. Arrangements have been made by which they can be ordered through the Secretary of the Board of Regents, and obtained at a considerable discount from quoted prices. It is believed that the books required for the first year can be obtained for about sixty dollars; for the second and third years, for about one hundred dollars. The law library has several copies of the text-books most used, for the use of students who are unable to buy their own; but it is impracticable for the public libraries to provide text-books sufficient for the use of all the students.

SOCIETIES.

The E. G. Ryan Literary Society, the Forum, and the Columbian are three incorporated literary societies, composed entirely of law students. Each of them holds weekly meetings in one of the rooms of the college for debates and other literary exercises. Opportunity is afforded to each student frequently to take part in debate.

FEES.

The matriculation fee for the full course is $150, of which $75 must be paid at the opening of the first year, $50 at the opening of the second year, and $25 at the opening of the third year. No deductions are made for absences nor for failure to begin at the opening of a year, nor is extension of time allowed for payment of fees. Fees must in all cases be paid in advance.

Expenses.

The matriculation fees in the College of Law are as follows:

For the full course of three years or its equivalent . .	$150.00

The fees are apportioned thus for students graduating in three years:

First year	$75.00
Second year	50.00
Third year	25.00

For students graduating in two years:

First year	75.00
Second year	50.00

For students admitted to the senior class and graduating in one year	$100.00
Students of the College of Letters and Science taking the elective studies in the junior class will pay for the first year	$25.00
And such students will pay for the middle year . .	75.00
For the senior year	50.00

All fees are payable in advance at the office of the Secretary of the Board of Regents, College of Law. Admission to membership in the classes is not permitted until the fees are paid.

The expenses of living are moderate. Good board can be obtained at from $2.50 to $4 per week, and by forming or joining clubs the expenses can considerably be reduced. Students desiring information in regard to boarding places, or general information as to expenses, should address their inquiries to the Secretary of the Board of Regents, Madison, Wisconsin.

A careful perusal of this general statement it is believed will supply all needed information; but should further inquiries as to admission, examination, etc., be neceessary, it should be addressed to the Associate Dean of the Law Faculty, Madison, Wisconsin.

SCHOOL OF PHARMACY.

STAFF OF INSTRUCTION.

C. K. ADAMS, LL. D., President of the University.
E. KREMERS, PH. G., PH. D., Professor of Pharmaceutical Chemistry.
L. W. AUSTIN, PH. D., Assistant Professor of Physics.
C. R. BARNES, PH. D., Professor of Botany.
E. A. BIRGE, PH. D., SC. D., Professor of Zoölogy.
L. S. CHENEY, M. S., Assistant Professor of Pharmaceutical Botany.
J. M. CLEMENTS, PH. D., Assistant Professor of Geology.
W. W. DANIELLS, SC. D., M. S., Professor of Chemistry.
J. C. ELSOM, M. D., Professor of Physical Culture and Director of the Gymnasium.
D. B. FRANKENBURGER, A. M., LL. B., Professor of Rhetoric and Oratory.
C. N. GREGORY, A. M., LL. B., Professor of Law.
L. R. HEAD, A. B., M. D., Special Lecturer on "First Aid to the Injured."
H. W. HILLYER, PH. D., Assistant Professor of Organic Chemistry.
W. H. HOBBS, PH. D., Assistant Professor of Mineralogy and Petrology.
E. T. OWEN, A. B., Professor of French Language and Literature.
W. H. ROSENSTENGEL, A. M., Professor of German Language and Literature.
H. L. RUSSELL, PH. D., Professor of Bacteriology.
C. S. SLICHTER, M. S., Professor of Applied Mathematics.
B. W. SNOW, PH. D., Professor of Physics.
R. H. TRUE, PH. D., Assistant Professor of Pharmacognosy.
C. R. VAN HISE, PH. D., Professor of Geology.
C. A. VAN VELZER, PH. D., Professor of Mathematics.
F. W. WOLL, M. S., Assistant Professor of Agricultural Chemistry.
V. H. BASSETT, A. B., Assistant in Chemistry.
R. FISCHER, PH. C., B. S., Instructor in Practical Pharmacy.

W. D. FROST, M. S., Assistant in Bacteriology.
C. G. HUNKEL, PH. G., August Uihlein Fellow in Pharmaceutical Chemistry.
LOUIS KAHLENBERG, PH. D., Instructor in Physical Chemistry and Lecturer on Pharmaceutical Technique.
A. T. LINCOLN, B. S., Assistant in Chemistry.
B. H. MEYER, PH. D., Instructor in Sociology.
OSWALD SCHREINER, PH. G., Assistant in Pharmaceutical Technique.

GENERAL STATEMENT.

The prime object of the School of Pharmacy is to furnish a thoroughly scientific foundation for the pursuit of the profession of pharmacy. The elements of the fundamental natural sciences, chemistry, botany or biology, and physics must first be studied before their application to pharmacy can rationally be considered. This is as true for pharmacy as for any other applied science or art. In pursuing these general studies the pharmacy students have the advantage of close association with students from other courses. This implies that in these studies they must be able to keep abreast with students who are graduates of accredited high schools. The best preparation for college, therefore, which the prospective pharmacy student should seek is not that of the shops, but that of a good high school or academy of like rank. The University does not demand practical experience for admission to the courses in pharmacy, but desires such preparation as will best fit for college or university work.

The general study of these fundamental sciences is followed by more or less specialized courses. General chemistry, inorganic and organic, qualitative and quantitative analysis are followed by pharmaceutical chemistry and applied chemical analysis; general botany by vegetable histology and anatomy of drugs; general physics by pharmaceutical technique. These somewhat specialized studies, in turn, not only lay the foundation for the study of the more strictly applied courses in practical pharmacy and pharmacognosy, but also prepare the student for thesis work.

The student who can spend only two years at the University is compelled to take up the more technical studies of his course before he has laid a satisfactory foundation. Such a compromise is outlined under *Courses of Study*. The three-year student, as a rule, finds time to pursue other studies besides those outlined above, *e. g.*, German, physiology, or bacteriology, etc. The four-year student has the great advantage of supplementing his high-

school preparation during the freshman and sophomore years by acquiring a reading knowledge of German and French, and by the study of university mathematics, all of which studies are of the greatest importance when the more advanced work of the natural sciences is taken up during the junior and senior years.

Special attention is called to this four years' course offered to graduates of accredited high schools. The course was created in order to accommodate those students who desire to obtain a general scientific education and to include in their course the pharmaceutical studies, and with the hope of stimulating a broader pharmaceutical education. For the more applied courses special laboratories have been equipped.

Like the sister profession, medicine, pharmacy is in need, not only of the general practitioner, but also of the specialist. To meet the demands of such, the School offers graduate courses. Graduates who desire to prepare themselves as chemists for manufacturing establishments, as analytic or sanitary chemists or as bacteriologists, will find that the graduate courses of the School of Pharmacy as well as of the various Colleges of the University offer excellent opportunities for advanced and more specialized study. Special lines of research can also be pursued in various departments by those who desire to work for a higher degree. The attention of advanced students is especially called to the graduate courses outlined on pp. 53-59.

Detailed information about studies in the four years' course and in the College of Science and Letters can be found on pp. 88-132.

The School of Pharmacy is an integral part of the University and is governed by the same general policy that characterizes the institution. The methods of work differ in no essential from those adopted by the other scientific departments. This School has from the beginning demanded a large amount of laboratory instruction, believing that none of the natural sciences can be adequately taught without considerable instruction in the laboratory, or, whenever necessary, in the field.

LABORATORIES.

THE CHEMICAL LABORATORIES, six in number, are in a building devoted exclusively to Chemistry. Three of these are general laboratories, viz.:

First. The Qualitative Laboratory, with accommodations for ninety-six students.

Second. The Organic Laboratory, accommodating thirty-two students; and

Third. The Quantitative Laboratory, accommodating forty-eight students.

Of the three special laboratories, one is for Gas-analysis, one for Urine-analysis and one for Toxicology.

PHARMACEUTICAL CHEMICAL LABORATORY. This is located on the third floor of North Hall. It affords ample accommodation to the advanced students. Every student is assigned a desk, which he alone uses. The balance room is well equipped with Becker's, Sartorius', and Bunge's balances, a torsion balance, etc. A Bunsen combustion furnace, a Glazer combustion furnace with the latest improvement after Anschütz and Kekulé, a Kopfer combustion furnace for compounds rich in halogen, a Kekulé gas furnace for heating substances in sealed tubes, nitrometers and much other chemical and physical apparatus can be used by the student, particularly in the experimental work for his thesis.

LABORATORY FOR PHARMACEUTICAL TECHNIQUE. This laboratory is equipped with apparatus and material for a more detailed and applied study of such chapters of mechanics and physics as are of special importance to the pharmaceutical student. It contains balance models, balances and measuring instruments of various kinds, complete apparatus for determining specific gravity according to different methods, a Laurent's polariscope, a Pulfrich's refractometer, Beckman's apparatus for the determination of molecular weights by the freezing and boiling point methods, apparatus for the determination of vapor densities. Besides these the laboratory is liberally supplied with thermometers, and apparatus for conducting the processes of distillation, sublimation, comminution, extraction, filtration, crystallization, drying, etc.

BIOLOGICAL LABORATORIES. The general biological laboratories are on the third floor of Science Hall. The elementary laboratory for the departments of botany and zoölogy is arranged to accommodate 72 students, and is provided with compound microscopes, dissecting microscopes, and other apparatus necessary to an elementary course in botany and zoölogy. The departments have about 80 compound microscopes, chiefly by Leitz and Bausch & Lomb, fitted for elementary and advanced work, including seven microscopes furnished with oil immersion objectives.

The laboratories for advanced work in botany are fitted up with the apparatus and reagents necessary to an advanced course in vegetable histology, and to a course in vegetable physiology.

There are also laboratories for advanced work in zoölogy and histology, and a well-equipped bacteriological laboratory. The latter is in Agricultural Hall.

Laboratory for Pharmaceutical Botany and Pharmacognosy. The large room on the fourth floor, formerly used as lecture room, has been equipped with tables, microscopes and lockers and is now used as a laboratory for botany and pharmacognosy. It accommodates a class of about thirty-five students and has a capacity when fully fitted out for about twenty more. The room is lighted in a manner favorable for microscopic work.

The students in pharmacognosy working in this laboratory have further accommodations in the adjacent room occupied by the pharmacognostical collection, in the shape of lockers to contain the drug collections made use of in this branch of work.

Laboratory for Practical Pharmacy and Dispensary. On the first floor of North Hall a laboratory has been equipped for individual rather than class instruction in practical pharmacy. It is well furnished with balances, percolation stands, extraction apparatus, a water motor, prescription case and all apparatus necessary in a complete laboratory of this kind. In the basement a room has been fitted to serve as comminution room, equipped with three drug-mills, mortars, sieves, etc.

Mineralogical Laboratory. The Mineralogical Laboratory has reagents and other necessary apparatus for complete courses in blow-pipe analysis and determinative mineralogy. There is a collection of hand specimens of minerals for laboratory use, and for comparative purposes. The students also have access to the large collections in the cabinet.

The Assay Laboratory, situated in the south part of the basement of the chemical building, is one of the largest and best equipped laboratories of its kind in the country.

A more detailed description of these laboratories as well as of the petrological, psychological, and the various agricultural laboratories, will be found in the general catalogue of the University, College of Science and Letters, and College of Agriculture.

COLLECTIONS.

The recent additions to the pharmaceutical collections have necessitated their entire rearrangement. New cabinets have been constructed, and better containers and a large number of illustrations have been purchased.

THE CHEMICAL COLLECTION contains: 1. Cabinet specimens of chemicals and minerals. The latter serve not only to supplement our knowledge of manufactured chemicals, but also to demonstrate the occurrence in nature of chemical elements and their compounds, also to illustrate in many instances the source of many artificial chemicals. Through the liberality of the United Alkali Company of England, some fifty specimens of their products in various stages of manufacture were obtained. During the past year Dr. William Simon of Baltimore contributed a series of specimens illustrating the manufacture of bichromate and ferrocyanide of potassium. 2. Chemical apparatus for the illustration of chemical operations and processes. 3. Charts illustrating chemical processes of manufacture, curves of solubility of classes of salts, chemical apparatus, etc.

THE PHARMACOGNOSTICAL COLLECTION found on the fourth floor in a room especially devoted to it has been very largely increased by purchases made at the World's Fair, these acquisitions consisting chiefly of drugs of Asiatic origin. Notable among them are a collection of fifty Ceylon drugs and medicines and a collection of more than one hundred Malay medicines. Worthy of mention are also a collection of 122 handsome specimens of essential oils and allied synthetic products, liberally donated by Messrs. Schimmel & Co., of Leipzig, Germany; a collection of choice drugs from Messrs. Lehn and Fink, a materia medica cabinet from Parke, Davis & Co., a collection of official drugs from Schieffelin & Co., another from Gilpin, Langdon & Co., etc.

The general HERBARIUM is located in room 41, Science Hall, and is at all times accessible to persons desiring to use it. It is the intention to build up, as rapidly as possible, an herbarium of medicinal plants. For the present the latter will be housed in a room just off the large laboratory on the 4th floor of North Hall. At the present time this collection consists of about four thousand sheets.

A COLLECTION OF OBJECTS OF HISTORICAL interest has been begun, valuable contributions having been received from students and from several druggists of this state.

The biological and the mineralogical and geological museums in Science Hall are well equipped and full of interest to the student of the natural sciences.

LIBRARIES.

The General University Library, including the department libraries catalogued therewith, contains about 54,000 books and 12,000 pamphlets. About 500 of the best American and foreign periodicals are taken.

The several scientific departments have special library facilities. The chemical and pharmaceutical laboratories have their department libraries easily accessible to the laboratory student. Complete sets of several of the best chemical and pharmaceutical journals and of proceedings of associations have been purchased in recent years. Contemporary pharmaceutical literature is well represented in the reading room. During the past year considerable additions have been made to the department library.

Students also have access to the State Historical Library, numbering about 180,000 volumes, including pamphlets, and by special arrangement books may be obtained from the free library of the City of Madison, which is a well-selected collection of over 13,000 volumes.

TERMS OF ADMISSION.

To the Two Years' and Three Years' Courses.

Graduates from accredited high schools are admitted without examination and without practical experience in a drug store.

Non-graduates are admitted if they comply with the following requirements:

They must be at least eighteen years of age.

They must present satisfactory certificates of *at least* one year's attendance from some standard high school, or its equivalent from a similar educational institution.

If possible, they should acquire, before coming to the University, a knowledge of high school mathematics and physics.

The time intervening between the secondary education and the college course should have been spent in a drug store, where physicians' prescriptions are regularly compounded.

To the Four Years' Course.

The terms of admission to this course are the same as those to the General Science Course, as given on page 66. No practical experience in pharmacy is required.

Students from other colleges or schools of pharmacy will be admitted on presentation of satisfactory certificates. However,

no student who enters from another college will be admitted after November 1 of the year in which he intends to graduate.

DEGREES.

The degree of *Graduate in Pharmacy* (Ph. G.) is conferred upon candidates who have successfully met the requirements of either the Two or Three Years' Courses. No practical experience is required for graduation.

The degree of *Bachelor of Science in Pharmacy* is conferred upon candidates who have successfully met the requirements of the Four Years' Course.

The degree of *Master of Pharmacy* is conferred upon graduates of the shorter courses only after a year of residence at the University. They must pursue advanced work in some science or sciences allied to pharmacy, and present a dissertation embodying the results of an original investigation, which shall be satisfactory to the committee on higher degrees.

The degree of *Master of Science in Pharmacy* can be obtained by graduates of the Four Years' Course upon fulfillment of similar requirements.

PHARMACEUTICAL FELLOWSHIPS.

The August Uihlein Fellowship.

Mr. August Uihlein, of Milwaukee, in 1895 generously established a pharmaceutical fellowship on a financial basis of $400 per annum. The holder of this fellowship during the year 1897-8 is Mr. Carl G. Hunkel, Ph. G., U. W. '94, B. S., U. W. '97.

The United States Pharmacopoeia Research Scholarships.

The Committee on Revision of the U. S. Pharmacopoeia maintains this year two scholarships in the School of Pharmacy for the purpose of conducting research in the line of revision of the Pharmacopoeia under the direction of the professor of pharmaceutical chemistry. The holders of these scholarships are Martha M. James, Ph. G., U. W. '96, and J. A. Anderson, Ph. G., U. W. '97.

Mr. R. H. Denniston, Ph. G., U. W. '97, is also working under the direction of the Assistant Professor of Pharmacognosy for the sub-committee of which H. H. Rusby of New York is chairman.

FEES AND EXPENSES.

No tuition is required from students who are residents of the State of Wisconsin; non-residents pay $9.00 each semester.

The fee for incidental expenses is $6.00 per semester.

These fees must be paid before class cards can be issued.

The laboratory fees should be paid within two weeks after the laboratory cards have been issued. For the general laboratory privileges, *i. e.*, desk-room, gas, water, general reagents, use of balances, microscopes, and other larger pieces of apparatus, a charge of one dollar per semester will be made for each fifth of a study; $2.00 for a ⅖ study; $3.00 for a ⅗ study, etc. A separate account will be kept with the accountant of the storage room for special apparatus and material. The student will purchase coupons from the Secretary ($5.00 at a time) and present them at the storage room for what he draws out. At the end of the year full credit will be given for such pieces of apparatus as are taken back by the accountant in accordance with the rules of the storage room.

No diploma fee is required upon graduation.

The payment of all University charges is to be made to Mr. E. F. Riley, Secretary of the Board of Regents, at his office in the Law Building.

The cost of board in clubs is from $2 to $3 per week; in private families, from $3 to $4 per week; and rooms can be obtained in the city at correspondingly reasonable rates.

COURSES OF STUDY.

TWO YEARS' COURSE.

Junior Year.

Chemistry 1*; Pharmaceutical Botany, 1; Pharmaceutical Technique, 1; all throughout the year.

Senior Year.

Chemistry, 5; Pharmaceutical Chemistry, 1, 2; Pharmaceutical Botany, 3; Pharmacognosy, 3 and 4; Practical Pharmacy, 1 and 2; Thesis.

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*The figures refer to the numbers of the courses as given in the statements under Departments of Instruction, College of Letters and Science, and School of Pharmacy.

THREE YEARS' COURSE.

Sophomore Year.

Chemistry, 1; Pharmaceutical Botany, 1, or Biology, 1; Pharmaceutical Technique, 1; Electives.

Junior Year.

Chemistry, 5; Pharmaceutical Chemistry, 1 and 2; Pharmaceutical Botany, 2; Pharmaceutical Technique; Pharmacognosy, 1; Practical Pharmacy, 3; Electives.

Senior Year.

Pharmacognosy, 1 and 2; Practical Pharmacy, 1 and 2; Thesis; Electives.

FOUR YEARS' COURSE.

Freshman Year.

Biology, 1; German 1; Mathematics, 1, 2; Rhetoric, 2; Gymnastics, Military Drill.

Sophomore Year.

French, 3; Chemistry, 1; Physics, 1; Rhetoric, 3; Gymnastics, Military Drill; Electives.

Junior Year.

Pharmaceutical Chemistry, 1, 2, and 3; Pharmaceutical Botany, 2; Pharmaceutical Technique; Pharmacognosy, 1; Practical Pharmacy, 3; Electives.

Senior Year.

Pharmacognosy, 1 and 2; Practical Pharmacy, 1 and 2; Thesis; Electives.

The student should decide at the beginning of the junior year whether his major study is to be of a physical, chemical, or biological character, and arrange his work accordingly. During the second semester the subject for his thesis should be chosen in one of the departments in which he is doing his major work.

For further information address Professor Edward Kremers, Madison, Wis.

DEPARTMENTS OF STUDY.

CHEMISTRY.

PROFESSOR DANIELLS, ASSISTANT PROFESSOR HILLYER, DR. KAHLENBERG, MR. LINCOLN, AND MR. BASSETT.

1. General Elementary Chemistry. A daily exercise throughout the year as follows: *First semester.* Descriptive Inorganic Chemistry; lectures and laboratory work. *Lectures at 2.* Professor DANIELLS, Assistant Professor HILLYER, Mr. LINCOLN, and Mr. BASSETT. *Second semester.* Qualitative Analysis until the Easter recess; then Descriptive Organic Chemistry, lectures and laboratory work. Assistant Professor HILLYER, Mr. LINCOLN, and Mr. BASSETT.

2. Advanced Inorganic Chemistry, second year. Preparation of chemically pure salts; determination of the equivalence of elements and the density of gases; chemical theories and their verification; the principles of gravimetric and volumetric analysis and their applications in the analysis of ores, crude metals, slags, technical products, and gases, together with one exercise each week in theoretical chemistry, the solving of chemical problems and the history of chemistry. *Daily throughout the year.* The amount of time devoted to this subject may be more or less than that of a full study, and will be arranged upon consultation with the instructors. Professor DANIELLS and Mr. LINCOLN.

3. Advanced Inorganic Chemistry, third year. The amount of time and the character of the work will be arranged upon consultation with the instructors. Besides the work required for a graduation thesis, it may consist of advanced work in theoretical, physical, or analytical chemistry, or in research work. Professor DANIELLS and Dr. KAHLENBERG. For graduates and undergraduates.

4. Toxicology, etc. A course in Toxicology, Urine Analysis, and Sanitary Water Analysis will be given the second semes-

ter of each year. Open only to those who have taken at least one semester of quantitative analysis. Professor DANIELLS.

5. Quantitative Analysis for students in Pharmacy. Daily during the first half of the first semester. Professor DANIELLS and Mr. LINCOLN.

7. Advanced Organic Chemistry. Reviews and expansion of the work of the elementary course, with laboratory work mainly in the preparation of aromatic compounds, accompanied by special work on assigned topics. *Full study; first semester.* Assistant Professor HILLYER.

Study of methods of preparation of organic compounds: oxidation, reduction, hydrolysis, dehydration, preparation of salts. Following this work either organic analysis may be taken up or the study of organic compounds of special interest to those preparing for medicine or work in the biological sciences. For graduates or undergraduates. Assistant Professor HILLYER.

8. Physical Chemistry. a. General Course. *First semester* Stochiometry. The theory of the constitution of matter; mass relations of chemical compounds; the properties and the kinetic theory of gases; relations between the physical and chemical properties of liquids; properties and theory of solutions; physical and chemical properties of solids; periodic law and theory of chemical compounds. Lectures and recitations. *Tu., Th., at* 8.

Second semester. Chemical Energy and Chemical Affinity, thermal chemistry; electro-chemistry with special attention given to the theory of electrolytic dissociation, conductivity of electrolytes, electrolysis, primary and secondary batteries; the law of mass action, chemical equilibrium, and chemical kinetics. Lectures and recitations. *M., W., F., at* 8.

Students entering this course should have a knowledge of descriptive inorganic chemistry, qualitative analysis, descriptive organic chemistry and should have taken a year's work in physics. A knowledge of mathematics through the calculus is also highly desirable. Dr. KAHLENBERG.

b. Laboratory Practice in Physico-chemical Measurements. Calibrating and testing of apparatus; determination of molecular weights and volumes; thermal and optical properties of liquids, solutions, and solids; conductivity of

electrolytes and electromotive forces of galvanic chains; speed of chemical reactions; studies in chemical equilibrium. Ostwald's Physico-chemical Measurements. This course supplements course a. and together with it makes a full study. Required. Dr. KAHLENBERG.

11. Research Work in Physical Chemistry. Advanced students can take up research work in physical chemistry. The character of this work will be determined by the preparation that the student has and the facilities of the laboratory. *Full study.* Dr. KAHLENBERG.

Twelve hours' laboratory work a week is regarded as the equivalent of a full study.

The chemical library is well supplied with works of reference and with chemical periodicals, enabling students to familiarize themselves with the most recent investigations bearing upon the work in hand.

Instructors and advanced students meet weekly during the year to report on articles in the current chemical journals and on assigned topics suggested by recent work in chemistry. Nearly all the more important chemical journals are accessible for use in this work, and the department library is steadily growing by accessions of the best books of reference.

PHARMACEUTICAL CHEMISTRY.

PROFESSOR KREMERS AND MR. HUNKEL.

1. Pharmaceutical and Pharmacognostical Chemistry. This course consists of a review of general chemistry, inorganic and organic, with special adaptation of the subject-matter to the interests of pharmacy. Richter's Inorganic Chemistry, Bernthsen's Organic Chemistry. Two lectures and one recitation. *M., Tu., Th.* Professor KREMERS.

2. Applied Chemical Analysis. Chemical analysis, qualitative and quantitative, gravimetric and volumetric, in its application to pharmacy. This will be chiefly a laboratory study. It will not, however, be merely a study of methods, but also of chemical principles involved. Professor KREMERS and Mr. HUNKEL.

3. Reviews with critical reading of the text of the U. S. Pharmacopœia as far as chemicals are concerned. *W.* Mr. HUNKEL.

[4. Nitrogen derivatives of the carbon compounds preparatory to the study of alkaloids and ptomaïnes. *W.* Lectures during the first semester; a course of reading and discussion during the second semester. Professor KREMERS.]

5. Polyatomic alcohols of the paraffin hydrocarbons and their derivatives, with special reference to the chemistry of the sugars and glucosides. For advanced students and graduates. *Lecture, W., first semester.* Professor KREMERS.

6. Hydrocymenes and derivatives, with special reference to the chemistry of volatile oils. For advanced and graduate students. *Lecture, W., second semester.* Professor KREMERS.

7. Advanced laboratory work and thesis adapted to the individual. Professor KREMERS.

BIOLOGY.

PROFESSOR BIRGE, PROFESSOR BARNES, ASSISTANT PROFESSOR MILLER, ASSISTANT PROFESSOR MARSHALL, AND MR. SMITH.

1. General Biology. Introductory to both botany and zoology, and required as preliminary to all advanced work in either department Two recitations or lectures and eight hours laboratory work a week, using as handbooks Arthur, Barnes & Coulter's Plant Dissection and Marshall's The Frog.

The lectures are given in the afternoon at 3 in the *first semester*, at 2 in the *second semester; Tu., Th.* Professor BARNES and Professor BIRGE. For laboratory work the class is divided into two or three sections, each meeting for two hours daily. Dr. MARSHALL and Mr. SMITH. Quiz divisions are also required to meet at least once each week.

The first semester is devoted to the study of the general principles of biology as illustrated by plants. The chief types of structure in the vegetable kingdom are also examined. The second semester is given to zoology. Students can enter the course in either semester.

4. Human Physiology. A. Nutrition, Respiration, Excretion. *First semester; M., W.. F., at* 8. B. Motion, Nervous System, and Sense Organs. *Second semester; Tu., Th.*, 8. Text-book, Martin's The Human Body. Professor BIRGE.

12. and 27. Summer Courses in Zoology and Botany. See announcement of Wisconsin Summer School.

PHARMACEUTICAL BOTANY.

ASSISTANT PROFESSOR CHENEY.

1. General Morphology of Plants. Corresponds to course 20 on p. 124. An elementary course. First semester, the morphology of fungi, algæ, lichens, mosses, and ferns, illustrated by selected types. Second semester, the form and structure of the organs of seed plants, the identification of selected flowering plants and the preparation of an herbarium. The course will be supplemented by botanical excursions, six in the autumn and ten in the spring. *Daily*, 8-10. Excursions on Saturdays.
2. Vegetable Histology. Corresponds to course 16, p. 123. Systematic study of the tissues of phanerogams and ferns. Use of reagents and stains, modes of embedding, section cutting, and mounting. Five times a week first semester, three times a week second semester. Hours on consultation. The work in this course is so arranged that students electing it may take it in either semester or both. For three and four year students.
3. Vegetable Histology. The same as course 2 for the first semester. For two year students.
4. Trees and their Characteristics. Corresponds to course 21, p. 124. A course designed for those who desire to acquaint themselves with forest trees. It contemplates a study of the vegetative and reproductive structures; the general habit and conditions of growth; the anatomy of the wood, etc. Lectures and laboratory work with occasional excursions. Those who expect to take this course should know how to use a microscope and should have had at least the equivalent of one semester's work in general botany. *Twice a week throughout the year.* May be taken either semester or both. Hours to be arranged on consultation.
5. Advanced Work in Anatomy. Special subjects for original investigation will be assigned to such students desiring to do advanced work as are properly qualified.

BACTERIOLOGY.

PROFESSOR RUSSELL AND MR. FROST.

1. General Bacteriology. This course considers the bacteria in their general biological aspect. Special emphasis is laid upon the relation of bacteria to their environment and

the rôle which they play in nature. Various typical forms are studied with the microscope and in the different culture media.

This course is fundamental and should be regarded as a basis on which further specialization along applied lines can take place, as in medical, sanitary, and dairy bacteriology. Applicants must be thoroughly familiar with the compound microscope. *Lectures or equivalent M., W., F., at* 11. *First semester. Full study.* Professor RUSSELL and Mr. FROST.

2. Medical Bacteriology. This course is especially designed for pre-medical students. It includes a detailed study of the most important pathogenic bacteria, the methods for their isolation and rapid diagnosis in both man and animals; also the testing of water filters, antiseptics, disinfectants, etc. Examination of food supplies, soil, water, etc., and the production and standardization of antitoxines. Course 1 is a pre-requisite. *Lectures twice a week, M. and F. at* 11. *Full study, second semester.* Professor RUSSELL and Mr. FROST.
3. Thesis Work in Bacteriology. Students who desire to select their thesis in this department must take course 1 in their junior year or before and select the subject for their thesis before the close of the junior year. Professor RUSSELL and Mr. FROST.
4. Biology of Water Supplies. This course is adapted to the needs of students in Sanitary Engineering. It includes a study of the microscopical plants and animals usually found in water supplies; the isolation and cultivation of water bacteria and their relation to disease; the testing of filters and other methods for the purification of water; and the disposal of sewage. *First semester, full study, lectures and laboratory work.* Mr. FROST.
5. Research Work in Bacteriology. Graduates and undergraduates who have had courses 1 and 2 or their equivalent and who desire to carry on research work may arrange for the same by consultation. A reading knowledge of German and French is desirable for this work. Professor RUSSELL and Mr. FROST.
6. Communicable Diseases: Their Cause and Prevention. This course consists of weekly lectures of as non-technical character as possible, and is intended for the general student. It includes a discussion of bacteria and their mode

of growth as agents of disease; the more important infectious diseases, manner of transmission, together with their prevention and treatment by the use of disinfectants, vaccines and antitoxines. These lectures are illustrated by cultures, microscopical preparations, and lantern slides. The course is intended primarily for students in other than the General Science Course. No previous work in science is required. *Second semester, one-fifth study.* Mr. FROST.

PHARMACOGNOSY.

ASSISTANT PROFESSOR TRUE.

1. Lectures. Brief introduction on development of our knowledge of plants furnishing remedies. Physiological action of main classes of drugs briefly sketched. Crude organic drugs discussed in the order of their natural relationship. This course is meant to present to the student the main facts of the natural history of the plants yielding drugs, as, botanical description, habitat, history, and cultivation, as well as the more strictly applied information. This course supplements the work done in the laboratory with the drugs themselves.

   Two lectures per week during the second semester of the junior year and three per week during the first semester of the senior year. Required of three- and four-year students.

2. Laboratory work for three-year or four-year students. Students are required to arrange systematically a collection of drugs, the material for which is in part purchased and in part collected by the students themselves. These drugs are studied, as far as possible, microscopically, and are regarded as objects of scientific interest as well as of a more technical significance. Drawings of the drug and of the preparations made by the students themselves call attention to the details of aspect and structure.

   Three-fifths work during the first semester of the senior year, and five-fifths during the second semester. Required of seniors of the three and four-year courses.

3. This course will consist of text-book work supplemented by lectures and topics. The official and the most important non-official drugs will be studied. Text used: Sayre's Organic Materia Medica and Pharmacognosy.

Two-fifths, first semester; one-fifth, second semester.
Required of two-year seniors.

4. The laboratory work for two-year students will consist of an abridgment of course 2. Little microscopic work will be required.
Four-fifths in second semester of senior year.

5. For Pre-Medical Students. An abridgment of the work given to pharmacy students is offered for those intending to study medicine. As far as may be, the methods used are those detailed for the foregoing courses. No drug collection is required and no microscopic study is expected.
Three-fifths course during first semester. Two lectures and two hours laboratory work per week.

[6. Plant Ecology. This course will discuss the effects exerted on plants by the principal factors of their environment. Light, heat, winds, water supply, composition and texture of soil, competition with other organisms, animal and vegetable, parasitic and non-parasitic, assistance from other organisms, etc., are among the topics to be touched upon. The effect of these factors in determining plant distribution will receive some attention. In order to make the discucsions concrete, frequent excursions will be made to points characterized by different sets of ecological conditions.
Three lectures per week during the second semester.]

7. Physiology of Certain Plant Constituents. In this course, certain plant products of general interest will be discussed from the standpoint of plant physiology. Among them may be mentioned the tannins, volatile oils, resins, sugars, starch, gums, etc.
One lecture weekly, second semester.

8. Advanced laboratory work and thesis adapted to the individual.

PHYSICS.

PROFESSOR SNOW, ASSISTANT PROFESSOR AUSTIN, MR. WOOD, MR. SMITH, MR. WILDER, AND MR. SHEDD.

1 General Lectures and Introductory Laboratory Practice. Given as a full study throughout the year. Lectures *M., Tu., W., Th., at* 12 o'clock. Professor SNOW. One recitation by

the class in smaller sections at hours to be assigned. Professor SNOW, Mr. WOOD and Mr. SMITH. Laboratory practice twice a week at hours to be arranged. Assistant Professor AUSTIN, Mr. WOOD, Mr. SMITH and Mr. WILDER.

In the general lectures, the subjects of mechanics and heat, electricity and magnetism, acoustics and optics are treated and are fully illustrated by the extensive collection of apparatus for lecture room demonstration. In the laboratory the work is of such a nature as to acquaint the student with the theory and practice of physical measurement.

The course as thus arranged is intended for those taking up the study for the first time, or for those who have studied it only in an elementary manner. A knowledge of plane trigonometry including the use of logarithms is required for registration.

PHARMACEUTICAL TECHNIQUE.

DR. KAHLENBERG AND MR. SCHREINER.

1. A Study in Applied Mechanics and Physics. Laboratory practice in the use of the balance; determining of specific gravity according to various methods; calibration of measuring flasks, graduates, burettes and pipettes; manipulation of glass and other subjects of a mechanical nature. The testing of thermometers; determination of melting point and boiling point; methods of desiccation, extraction, dialysis, filtration, distillation, sublimation and crystallization. Determination of viscosity, optical rotatory power and index of refraction of liquids and solutions. Vapor density determinations and the use of Beckman's apparatus for determining the lowering of the freezing point and the elevation of the boiling point of solutions. The laboratory work will be supplemented by lectures and recitations, the class meeting twice a week in the lecture room. Full study for both semesters.

2. For sophomores of the three years' course, a course in pharmaceutical technique of two exercises per week for both semesters will be given. The character of the work is essentially that outlined under course 1. There will be lectures, recitations, and laboratory practice. The three years' students complete this course in their junior year as a three-fifths study.

Students of the four years' course and those students of the three years' course who have taken course 1 in general physics are expected to take pharmaceutical technique as a three-fifths course only.

PRACTICAL PHARMACY.

MR. FISCHER.

1. Theory and Practice of Pharmacy. Class work, 2 hours a week during both semesters.

History of pharmacopœias and discussion of U. S. Pharmacopœia. Review of subject of metrology. Pharmaceutical operations, as comminution, solution, crystallization, dialysis, filtration, clarification, decolorization, percolation, distillation, desiccation, etc. Galenical preparations, as solutions, tinctures, fluid extracts, extracts, spirits, oleo-resins, pills, suppositories, ointments, plasters, etc. Apparatus used in pharmaceutical operations brought before the class and discussed. Prescription reading. Incompatibilities.

2. Operative Pharmacy. Laboratory work. A three-fifths course throughout the year.

Examination of commercial articles, chemicals, and vegetable drugs, including assaying of the latter. Manufacture of galenical preparations, chemicals, and scale salts, and testing of same when finished. Preparations are so selected as to represent all classes official in the U. S. P.

Compounding of physicians' prescriptions with special reference to those cases in which difficulties are liable to occur.

3. Operative Pharmacy. Laboratory work. For juniors of the three and four years' course. Two-fifths during second semester.

This course is continued during the senior year as course 2, being merely an extension of the latter.

4. New remedies. A study of the newer synthetic remedies from a chemical and therapeutical standpoint. One lecture biweekly. Students taking this course should have a knowledge of organic chemistry.

5. Special work adapted to the individual, including laboratory work in preparation for thesis.

MINERALOGY, PETROLOGY, AND GEOLOGY.

PROFESSOR VAN HISE, ASSISTANT PROFESSORS HOBBS AND CLEMENTS.

1. Blowpipe Analysis. A short course in blowpipe analysis especially adapted to the needs of pharmacy students. *Twice a week during the second semester;* 8-10. Assistant Professor HOBBS.

4. Crystallography for students of chemistry and pharmacy. In the first semester of 1897 a three-fifths course in crystallography will be given for the benefit of students of chemistry and pharmacy. Williams' Elements of Crystallography will be used as a text in considering the symmetry and classification of crystals and will be followed by practice in the measurement of crystals by means of the contact and reflecting goniometers. The optical means of distinguishing the symmetry of a crystal will also be considered and illustrated by practice with the polarizing microscope, each student being supplied with an instrument for his special use. *M., W., and F., at* 9, though this hour may be changed if another is found to be more convenient. Assistant Professor HOBBS.

LAW APPLIED TO PHARMACY.

PROFESSOR GREGORY.

A course of lectures treating of the validity and construction of laws especially restraining the practice of pharmacy; of the liability of pharmacists both criminal and civil; for their own violations of laws and that of their agents; also for their own negligence and that of their agents. Given in second semester, 1898-99.

FIRST AID TO THE INJURED.

DR. HEAD.

A series of lectures upon the first care of emergency cases, embracing essential, anatomical and physiological principles; methods of preventing or combating shock after injuries; checking hemorrhage, manipulation for resuscitation of the asphyxiated; indications for the administration of some of the emergency remedies, and the practical demonstration of the application of temporary dressings. Given in first semester, 1898-99.

THE ECONOMIC FUNCTIONS OF THE STATE.

DR. MEYER.

This course consists of a series of lectures, historical and critical, on the state in its relation to industry, trade, and the professions, with special reference to pharmacy. *First semester*, 1898-99.

All correspondence or inquiries relating to the School of Pharmacy should be addressed to Professor Edward Kremers, Madison, Wis.

SCHOOL OF MUSIC.

STAFF OF INSTRUCTION.

C. K. ADAMS, LL. D., President.
F. A. PARKER, *Director*, Musical History, Harmony, Counterpoint, and Organ.
J. S. SMITH, Piano.
ADA BIRD, Piano.
ALICE S. REGAN, Piano.
H. D. SLEEPER, Voice.
ADELAIDE FORESMAN, Voice.
JOHN LEUDERS, Violin, 'Cello, Mandolin, Zither, and other orchetral instruments.
ANNIE M. LYON, Mandolin, Guitar, and Banjo.
ELIZABETH M. KEELEY, Harp.
SOPHY M. GOODWIN, Secretary.

GENERAL ANNOUNCEMENT.

It is the purpose of the School of Music to furnish superior facilities for the study of music in any or all of its departments, theoretical or practical. The members of the Faculty are teachers of acknowledged ability and large experience. Instruction is offered in organ, piano, harp, singing, orchestral instruments, mandolin, guitar, and banjo, and in musical theory, choral practice, harmony, counterpoint and composition. In the study of piano or of singing (voice culture) instruction is given by means of private or individual lessons, or, should a sufficient number of students desire it, classes limited to three will be organized. In the study of other instruments, private lessons only are employed. In the theoretical studies students are recommended to join the University classes, but private lessons may be arranged for if preferred.

Especial attention is called to the following extracts from the resolution of the Board of Regents establishing the School of Music:

I. The University shall assume no responsibility for individual or class instruction in instrumental music or vocal training.

II. Students shall arrange for individual or class lessons in instrumental music or vocal training, with the Director of the School of Music or some officer designated by him; and for such lessons special fees shall be paid.

III. The University Professor of Music shall furnish instruction as at present to classes in Musical Theory and Choral Practice, in Harmony and in Counterpoint, together with such additions in the way of Musical History and kindred subjects as shall best meet the wants of University students.

It will be seen that the former status of the classes, in Musical Theory and Choral Practice, in Elementary and Advanced Harmony, and in Counterpoint, is not changed. University students not connected with the School of Music may, as at present, take, without charge, any of these classes as electives, and receive proper credit therefor. Students of the School of Music may enter these classes as hereafter specified.

For a detailed statement of the courses and credits see p. 00, and announcement under "Music," in "Departments of Instruction," p. 00.

COURSES.

There are two general courses, as follows:

I. The Collegiate Course,

in which the requirements for admission are the same as for some of the general courses in the College of Letters and Sciences, or for adult special students, together with such proficiency in some department of music as is mentioned in the outlined courses of study. A graduate's diploma will be granted on the completion of this course. Three years of study are required. It is, however, recommended that students extend the time to four years to enable them to take a larger proportion of general studies.

II. The Academic Course,

open to persons not members of the University, and also to University students who do not desire to enter the Collegiate Course pursuant to graduation. Students of this course may, however, be admitted to the musical classes of the University on the payment of the usual incidental fees charged to students of the College of Letters, but will not be considered candidates for graduation or diploma. A certificate of excellence will be granted worthy students of this course on examination, after not less than three years of study.

OUTLINE OF COURSES OF STUDY.

I. COLLEGIATE COURSE.

Piano.

Applicants for admission will be expected to play music of the grade of Haydn's *Sonata No. 2*, or Mozart's *Sonata No. 1*, Cotta edition, and Heller's *Etudes, Op. 47*, first half.

Mason's, Zwintscher's or Plaidy's Technics throughout the course.

First Year: Heller, *Op. 47*, last half. Kuhner, *Instructive Albums*, II. and III. Löw, *Etudes, Op. 233*. Loeschhorn, *Op. 52* and *Op. 66*. Czerny, *Studies in Velocity*. Bach, *Little Preludes and Inventions*.

Second Year: Heller, *Op. 46* and *45*. Czerny, *Fingerfertigkeit*. Jensen, *Op. 32*. Cramer-Bülow, *Etudes*. Marmontel, *Mecanisme*. Bach, *Well-Tempered Clavichord*.

Third Year: Tansig, *Studies*. Kullak, *Octave School*. Moscheles, *Op. 70*. Clementi, *Gradus ad Parnassum*. Chopin, *Preludes and Etudes*.

Selections of the grade of *Perpetual Motion* by Weber; *Arabeske* by Schumann; *Impromptu, Op. 29*, by Chopin, *Variations, Op. 54*, by Mendelssohn; *Sonata Appassionata* by Beethoven.

It is not supposed that a rigid course can be given which will meet the requirements of individual students, but the foregoing outline represents, in a general way, the character of each year's work. Etudes especially are named, because they indicate grade and character of requirements more clearly than can be done otherwise. No single student is expected to take more than a portion of the studies mentioned, and equivalents are liberally used to suit individual cases. On the other hand, these studies are supplemented by ample selections from classic and modern authors for use in the parlor or concert room.

Organ.

No previous knowledge of organ playing is required. The student must be well grounded in piano playing, be possessed of a correct technique, and be able to read plain four-part music.

The course of study is continuous, beginning with Stainer's *Organ School* or Whiting's *First Six Months on the Organ* and following with the larger works of Rink and Best, supplemented by special studies by Thayer, Buck, Ritter, Schneider,

Volckmar, and others. Selections from Bach's organ works, Mendelssohn's Sonatas and the compositions of modern composers are used.

Careful training is given in playing church music and voluntaries, the use of stops and the mechanism of the instrument.

Voice.

The student must be able to read plain music and must have had an amount of training equal to the first half of Concone's Fifty Lessons, and comprising the usual technical study for the same period.

First Year: Tone Placing, Breathing, and Phrasing; Ballad Singing and the Sostenuto style. Technical and other studies of the grade of Bonaldi's Six Vocalizes, Concone's Fifteen Vocalizes, Marchesi's Exercises, Op. 21, Book I., etc. Easy forms of Italian and German Songs.

Second Year: Studies of the grade of Schubert's *Manual of Vocal Technic*, Schubert's *Special Studies*, Marchesi's *Vocalizes, Op. 21, Book II.*, Bordogni's *Bravura Studies*. More difficult German and French songs, and easy oratorio and operatic arias.

Third Year: Study of Cadenzas and larger forms of execution. Recitative and the more difficult oratorio and operatic arias.

On graduattion the student will be expected to sing acceptably selections (according to voice and school) from such songs and arias as: "He Was Despised," "Angels Ever Bright and Fair," "I Know That My Redeemer Liveth," and "Thou Shalt Break Them," by Handel; "With Verdure Clad," "Rolling in Foaming Billows," and "In Native Worth," by Haydn; "If With All Your Hearts," "It Is Enough," and "O Rest in the Lord," by Mendelssohn; "Ah Non Giunge," by Bellini; "Infelice," by Verdi; "Roberto, tu che Adoro," by Meyerbeer; "Vedrai Carino," by Mozart; "Una Voce," and "Pro Peccatis," by Rossini.

Violin.

First Year: Hermann, *Scale Studies*. Kayser, *Violin Instructor, I. and II.* Herbert Ries, *Violin School, Part I.* Easy melodious solos.

Second Year: Kayser, *Violin Instructor, III.* Kayser, *Etudes, Op. 20.* Schubert, *Violin School, IV.* Herbert Ries, *Violin School, Part II.* Solos by *Viotti, Rode, De Beriot.*

Third Year: Schradieck, *Violin Technic.* De Beriot, *School, Part II. Etudes* by Dont, Kreutzer, and Schubert.

Solos by De Beriot, Leonard, Vieuxtemps, and Wieniawski.

THEORETICAL STUDIES.

Musical Theory and Choral Practice.

A one year course, twice a week, in the general theory of music, including notation, scale construction, simple intervals, distinction of rhythm, etc., combined with a practical study of sight reading and choral singing.

This course is especially recommended to all students, whether of instrumental or vocal music, as furnishing a substantial foundation for all other work.

Harmony and Counterpoint.

The student must be able to read and play simple four-part music.

First Year: Review of scales and intervals, triads, seventh chords, augmented sixth chords, modulation, synopsis of suspension and appoggiatura.

Second Year: Detailed treatment of modulation, suspension, appoggiatura, etc. Harmonizing melodies. Simple counterpoint.

Third Year: Double counterpoint, canon and fugue.

History of Music.

A course of lectures, twice a week, extending through the year. In the first semester the lectures give a general survey of music before the Christian era, and down to the eighteenth century.

The second semester is devoted to the eighteenth and nineteenth centuries.

Musical Composition.

A one year course, twice a week. One year of harmony is required as preparation.

II. ACADEMIC COURSE.

There are no requirements for entrance. Students are received and graded according to ability and amount of previous study. This course in all departments leads up to and overlaps the collegiate course. Students after reaching the proper stage of preparation may be transferred to the collegiate course, or may remain in the academic course, the works of the last three years being identical in both courses. But no certificate of excellence will be issued to any student who is not thoroughly fitted to enter the second year of the collegiate course.

Guitar, Banjo, and Mandolin.

In response to the demand growing out of the popularity of these attractive instruments, the School of Music provides ample and excellent opportunities for their study. Special attention is given to expression, technique, and proper fingering. In general correct methods leading to the highest proficiency are employed.

Text-books for Guitar: Carcassi, Sor, Ferranti, Holland, and Langey.

Text-book for Banjo: Dobson, Stewart, Henning, and others.

Text-books for Mandolin: School of Wessenberg, and Progressive Studies by Guiseppi Branzoli, supplemented by solo selections.

Orchestra.

The University Orchestra meets for rehearsal every Saturday forenoon. The purpose of the organization is the study of orchestral music, both light and serious. It is open to all students who have sufficient knowledge of any orchestral instrument to pursue the work profitably. Those who take the rehearsals regularly are entitled to a credit of one hour per week.

Band.

A military band has likewise been organized, open to all students on conditions similar to those mentioned for the orchestra.

Choral Union.

The Choral Union is an organization of students of the University and citizens of Madison for the purpose of studying the oratories and larger choral works of ancient and modern authors, interspersed with lighter part-songs and glees, and adequately presenting the same in public performance. Very successful performances of Handel's *Messiah*, and *Judas Maccabaeus*, Haydn's *Creation*, and Mendelssohn's *Elijah*, and *St. Paul*, have been given, and other works of similar magnitude will follow.

Applicants for membership are expected to be able to read plain music at sight. The rehearsals are held weekly from October until May. The annual membership fee is fifty cents.

Recitals and Concerts.

Student recitals, free to all students, are held monthly during the collegiate year. Recitals and concerts by eminent artists are given from time to time at a low price to students of the School of Music.

Tuition.

The school year is divided into two semesters corresponding with the divisions of the University year. The following charges for tuition are uniformly for a semester of eighteen weeks:

Two lessons a week.

	Half-hour lessons.	Three-quarter hour lessons.	Hour lessons.	In class of three, hour lessons.
Piano,	$27.00	$40.00	$50.00	$18.00
Voice,	27.00	40.00	50.00	18.00
Organ,	.....	.....	54.00	.....
Violin, etc., with Mr. Lueders	18.00	27.00	.....	.....
Guitar, etc., with Miss Lyon..	18.00	27.00	36.00	.....

One lesson a week.

	Half-hour lessons.	Three-quarter hour lessons.	Hour lessons.
Piano,	$15.00	$22.00	$27.00
Voice,	15.00	22.00	27.00
Organ,	.....	.....	27.00
Violin, etc., with Mr. Lueders	9.00	13.50	.....
Guitar, etc., with Miss Lyon	.....	15.00	20.00
Diploma fee	.....	.....	5.00

Theoretical studies are taken in the University classes, and those who are not otherwise connected with the University are expected to pay the incidental fee of the College of Letters, which is $6.00 a semester. This fee, however, is not required of those taking only individual lessons in singing, or on some instrument.

Students are not received for less than one semester except by special permission of the Faculty of the School of Music. Students are allowed, however, to pay the tuition fees by the half-semester in advance.

No student is entitled to lessons until tuition has been paid and a receipt secured from the Secretary of the Board of Regents.

No deduction can be made for absence from lessons, except for long continued illness, in which case the School of Music will share the loss equally with the student.

No student is expected to take part in any public entertainment without the consent of his teacher and the Director.

Students who, by reason of deficient musical ability, neglect of study, or any other valid reason, fail to make satisfactory progress, may be dropped from the classes.

The pianos in Ladies Hall may be used for practice for a limited number of hours daily by students of the University on payment of a fee of from four dollars to ten dollars per semester. Pianos may be rented from dealers at from three to six dollars a month.

The office of the Director in Ladies' Hall at the University will be open for several days before the opening of each semester for the reception of pupils and assignment of lessons. After the opening of the University the Director may be found daily from 10 to 11.

For further information, address

F. A. PARKER, Director, 14 W. Gilman St., or
MISS SOPHY M. GOODWIN, Sec'y, 16 E. Mifflin St.,
Madison, Wis.

DEGREES CONFERRED.

COMMENCEMENT, 1897.

BACHELOR OF ARTS.

Ancient Classical Course.

Mollie Bertles,
George Theophilus Blynd,
Bertha Lucile Gardner,
John Oscar Miller,
Charles Carroll Montgomery,
Arthur Mulberger,
Lucile Howard Schreiber,
Caroline Devereaux Spence,
Gertrude Spence,
Sarah Jennie Thomas,
Robert Wild.

Classical Group.

Marie Antoinette Ernst,
Annie Maria Pitman.

BACHELOR OF LETTERS.

Modern Classical Course.

John Howard Bacon,
Mary Alison Cramer,
Arthur Wilson Fairchild,
Harriet Louise Goetsch,
Mamie Luella Laflin,
Avis Aurelia McGilvra,
Agnes Edna McVicar,
Katherine Eunice McVicar,
William Henry Mann,
Naomi Earhart Melville,
Laura Alma Osborne,
Rosa Anna O'Brien,
Fay Parkinson,
Helen Louise Pray,
Ernest Bradford Smith,
Ernst Arthur Stavrum,
Clara Antoinette Stedman,
Earle Clarence Tillotson,
Arabelle Virginia Zweifel.

English Course.

Ross Everette Andrews,
Florence Mildred Averill,
Maud Mary Averill,
Abram Hess Burkholder,
Rosa Mabel Cheney,
Robert Bruce Dickie,
Sadie Ellen Gallagher,
Laura Marion Guenther,
Marion Cecilia Houlan,
Grace Howe,
May Hunt,
Renette Jones,
Albert Samuel Kingsford,
Barney Andrew Monahan,
Annie Susan McLenegan,
Elizabeth Moulton McNaney,
Ella Mary Niederman,
Lewis Odland,
Albert O'Neil,
Elmer Willis Serl,
Edna E. Smith.

Civic Historical Course.

Marcius Melvin Beddall,
William Lawrence Bolton,
Theodore Walter Brazeau,
Cyrus Marion Butt, Jr.,
Joseph Michael Cantwell,
Susan Frances Chase,
Albert Guy Chase,
Frederick Harold Clausen,
Sadie Marie Clawson,
Henry Frederick Cochems,
George Ford Downer,
Clarence Bushnell Edwards,
Evan Alfred Evans,
Florence Fish,
Walter Scott Gannon,
John Henry Gault,
Julius Gilbertson,
Bertha May Green,
Heber Bishop Hoyt,
Walter Wellington Hughes,
Ralph Willmarth Jackman,
Elizabeth King,
Charles Arthur Libbey,
Henry Lockney,
Clarence Joseph Luby,
Isabelle Jane McCulloch,
Leroy John Nicolai Murat,
Otto August Oestreich,
Frederick Francis Parsons,
Henry Addison Perkins,
Valentine Lawrence Rehn,
Gullick Nelson Risjord,
Roy C. Smelker,
Marietta Baldwin Smith,
William Noble Smith,
George Kemp Tallman,
William Fernando Thiel,
Ossian Thomas Waite.

Economic Group.

Charles Winthrop Lea,
Nellie Irene Nash.

History Group.

Herbert Thomas Ferguson,
Louise Phelps Kellogg.

BACHELOR OF SCIENCE.

General Science Course.

John Arbuthnot,
Mertie Harriet Benedict,
Guerdon Conde Buck,
Elizabeth Comstock,
Adelaide Dutcher,
Albert Ralph Hager,
William Thomas Harvey,
Rolland Frederick Hastreiter,
Andrew Phillip Hollis,
Charles Kenneth Leith,
Guy Nash,
Ernest Sprague Park,
John Jay Rogers,
Emma Frances Rowan,
Walter Hodge Sheldon,
George Smieding,
Grant Smith,
Andrew David Tarnutzer,
Thorval John Thorson.

Mathematics Group.

Elting Houghtaling Comstock, Leora Esther Mabbett,
Herman Henry Liebenberg, Charlotte Elvira Pengra,
Henry Charles Wolf.

Philosophy Group.

Clement Abner Boughton, Burton Haines Esterly.

Civil Engineering Course.

Arnold Emil Broenniman, Henry Christian Fuldner,
Perry Fisher Brown, William Gray Kirchoffer,
Edward Christopher Coombs, Charles Mears Kurtz,
Ross Carlton Cornish, Clinton McDonald,
Fred Dixon, Harry Hurson Ross,
Spencer Smith Rumsey.

Mechanical Engineering Course.

Walter Alexander, William Herman Kratsch,
Robert Boyd Cochrane, Emil Samuel Lueth,
Nathan Comstock, Wallace Francis MacGregor,
Benjamin Winfield James, Fred William Nelson,
Frank James Short.

Electrical Engineering Course.

John Samuel Allen, Wallace Phillip Kiehl,
Murray Charles Beebe, Otto Thilo Lademan,
Victor William Bergenthal, Llewellyn Owen,
Leon Raymond Clausen, Harry Winne Reilly,
John Edwin Dutcher, Edward Schildhauer,
George Harvey Jones, Charles John Schmidt,
Rudolph Fred Schuchardt.

Bachelor of Science in Pharmacy.

Carl George Hunkel, William Oscar Richtmann,
Oswald Schreiner.

GRADUATES IN PHARMACY.

Joseph Alvin Anderson, Alexander Metz,
John Henry Arent, Arthur Louis Reichert,
Rollin Henry Denniston, William Carl Ferdinand Witte.

BACHELOR OF LAWS.

John Brown Amazeen,
Henry Newton Bacon,
Cameron Leander Baldwin,
Thomas Sloan Bell,
Lawrence Joseph Bischel,
Adelbert Linley Blackstone,
Albert Newton Briggs,
George Otto Buchholz,
Samuel Howard Cady,
Thomas Percy Carter,
William Edward Cavanaugh,
Joseph William Collins,
Alvin Edward Davis,
James Dolan,
Frank Berry Dorr,
Thomas Lewis Doyle,
George Elholm,
Jacob Fehr, Jr.,
Marcus Clisbe Ford,
Elmer Ellsworth Gittins,
William Frederick Hase,
Herbert Michael Haskell,
William Arthur Hayes,
Henry Hendrickson,
Albert Hougen,
George Almon Kingsley,
Knox Kinney,
Walter John Luedke,
Eugene Roderick MacDonald,
Herbert Hayes Manson,
Cranston George Phipps,
Will Anson Powell,
James Patrick Reilly,
Herman John Severson,
Leonard Melvin Shearer,
George Mathew Sheldon,
Albert John Simpich,
Leo Torbe,
Kenneth James Urquhart,
Edgar Victor Werner,
Herman C. Winter,
Charles Louis Wolf,
Gustave Wollaeger, Jr.

MASTER OF ARTS.

Pearl E. Doudna, A. B. (Univ. of Wis.), in Mathematics and Astronomy.—*Thesis: "On the flow of viscous liquids."*

Joseph Andrews Doremus, A. B. (Gates College), in Sociology and Economics.—*Thesis: "The theory of evolution applied to society."*

Frank Waterbury Hall, A. B. (Univ. of Wis.), in English Literature and Hebrew Jurisprudence.—*Thesis: "The dramatic element of the New Testament gospels in the light of inductive criticism."*

Grant Showerman, A. B. (Univ. of Wis.), in Latin and Greek.—*Thesis: "Horace and Thackeray."*

MASTER OF LETTERS.

Elsey Lois Bristol, B. L. (Univ. of Wis.), in English Literature and History.—*Thesis: "A study of the night in the poetry of Byron, Keats, and Shelley."*

Edna Chynoweth, B. L. (Univ. of Wis.), in English Literature and Institutional History.—*Thesis: "English life as seen in the works of George Crabbe and Alfred Tennyson."*

August John Giss, B. L. (Univ. of Wis.), in American History and Philosophy.—*Thesis: "The diplomatic relations between the United States and Mexico, 1829-1848."*

Josephine Hunt Raymond, B. L. (Northwestern Univ.), in Sociology and Economics.—*Thesis: "The social settlement movement in Chicago."*

John Bell Sanborn, B. L. (Univ. of Wis.), in History and Economics.—*Thesis: "Railway land grants, 1850-1857."*

Arthur Romeyn Seymour, B. L. (Univ. of Wis.), in French and Spanish.—*Thesis: "A study from a romance standpoint of the Low Latin text Vita Eufrosine."*

CIVIL ENGINEER.

Andrews Allen, B. C. E. (Univ. of Wis.)—*Thesis: "Design of 246 ft. 6 in. double-track swing-draw span for the Calumet and Blue Island Railway."*

Walter Alexander Rogers, B. C. E. (Univ. of Wis.)—*Thesis: "The reconstruction of Grand River bridge."*

DOCTOR OF PHILOSOPHY.

Jonathan Bailey Browder, M. A. (Harvard Univ.), in Greek, Latin, and Sanskrit.—*Thesis: "On the duration of the action in the Oresteia."*

William B. Cairns, M. A. (Univ. of Wis.), in English Literature, Anglo-Saxon, and Rhetoric.—*Thesis: "The development of American literature from 1815 to 1833."*

Balthasar Henry Meyer, B. L. (Univ. of Wis.), in Economics, Sociology, and American History.—*Thesis: "The history of railway legislation in Wisconsin."*

James Francis Augustine Pyre, B. L. (Univ. of Wis.), in English Literature, Anglo-Saxon, and American History.—*Thesis: "A study of Tennyson's blank verse."*

John Oscar Quantz, A. B. (Univ. of Toronto), in Psychology, Philosophy, and Pedagogy.— *Thesis: "Problems in the psychology of reading."*

Charles H. Shannon, A. B. (Emory and Henry College), in Greek, Sanskrit, and Latin.—*Thesis: "Repetition in Aeschylus."*

Henry Freeman Stecker, M. S. (Univ. of Wis.), in Mathematics, Applied Mathematics, and Astronomy.—*Thesis: "On the roots of equations, particularly the imaginary roots of numerical equations."*

Henry Huntington Swain, A. M. (Beloit College), in Economics, Political Science, and History.—*Thesis: "Economic aspects of railway receiverships."*

Thomas Klingenberg Urdahl, M. L. (Univ. of Wis.), in Economics, Political Science, and History.—*Thesis: "The fee system in the United States."*

HONORS IN SPECIAL STUDIES.

Walter Alexander, in Steam Engineering.—*Thesis: "A comparative test of simple and compound locomotives."*

Murray Charles Beebe, in Electrical Engineering.—*Thesis: "The electrolytic decomposition of the chlorides of sodium and magnesium."*

Arnold Emil Broenniman, in Civil Engineering.—*Thesis: "The internal hydrostatic pressure in masonry, with especial reference to masonry dams."*

Rosa Mabel Cheney, in Philosophy.—*Thesis: "The philosophy of Tennyson's In Memoriam."*

Elting Houghtaling Comstock, in Mathematics.—*Thesis: "On some of the real singularities of the harmonic curves."*

Arthur Wilson Fairchild, in Philosophy.—*Thesis: "The delineation of remorse in Shakespeare."*

Henry Christian Fuldner, in Civil Engineering.—*Thesis: "Modulus of elasticity of brick and stone."*

Ralph Willmarth Jackman, in History.—*Thesis: The claims of Georgia to state sovereignty."*

Louise Phelps Kellogg, in History.—*Thesis: "The formation of the state of West Virginia."*

Charles Kenneth Leith, in Geology.—*Thesis: "Pre-Cambrian volcanic rocks of the Fox River valley."*

Clinton McDonald, in Civil Engineering.—*Thesis: "Modulus of elasticity of bricks and stones."*

Annie Susan McLenegan, in English Literature.—*Thesis: "The epic as an expression of national consciousness."*

Charles Carroll Montgomery, in International Law.—*Thesis: "International arbitration."*

Guy Nash, in Physical Chemistry.—*Thesis: "On solutions of cellulose."*

Charlotte Elvira Pengra, in Mathematics.—*Thesis: "General rational fractional linear transformation of plane curves."*

Harry Hurson Ross, in Civil Engineering.—*Thesis: "The internal hydrostatic pressure in masonry, with especial reference to masonry dams."*

Edna E. Smith, in Rhetoric.—*Thesis: "The sources of Burke's style."*

GRADUATES.

Number of University Graduates, 1854-1897, . .	3,306	1897,	210
Ancient Classical Course, ...	353	.	14
Modern Classical Course, ...	371	.	19
English Course, ...	216	.	23
Civic Historical Course, ...	172	.	43
General Science Course, ...	520	.	26
Normal Course (1865-68), ...	25	.	—
Engineering Courses, ...	267	.	33
Law Course, ...	1,192	.	43
Pharmacy Courses, ...	145	.	9
Agricultural Course, ...	12	.	0

STUDENTS.

FELLOWS AND SCHOLARS.

Baker, Myron Eugene, A. M. . . 627 University Ave..
Honorary Fellow in English.

*Barrett, Martha B., A. M., ... 712 Langdon St.
Fellow in American History, 3rd Floor, Law Building.

Becker, Carl Lotus, B. L., ... 430 Francis St.
Fellow in American History, Room 51, University Hall.

Bleyer, Willard Grosvenor, B. L., . . 625 Langdon St.
Fellow in English Language and Literature, Room 6, University Hall.

Catron, William Van Allen, A. M., . . . 251 Langdon St.
Fellow in Greek, Room 32, University Hall.

Griffith, John Howell, B. S., ... 440 W. Gilman St.
Fellow in Civil Engineering, Room 18, Science Hall.

Hagerty, James Edward, A. B., . . . 313 Mills St.
Honorary Fellow in Economics.

Harding, Harry Alexis, B. S., . . . Washburn Observatory.
Research Fellow in Bacteriology.

Herfurth, Sabena Mildred, B. L., . . . 703 E. Gorham St.
Fellow in German, Room 9, North Hall.

Hunkel, Carl, Ph. G., B. S., . . . 403 W. Mifflin St.
August Uihlein Fellow in Pharmaceutical Chemistry.

Hunt, May, B. L., ... 706 University Ave.
Alumni Fellow in English.

James, Martha Morris, Ph. G., ... 223 W. Gilman St.
United States Pharamcopoeia Research Fellowship.

Lane, Wilmot Burkemar, A. M., ... 513 State St.
Fellow in Philosophy, Room 34, Science Hall.

Shedd, John Cutler, M. S., ... 531 State St.
Fellow in Physics, Room 17, Science Hall.

Shiozawa, Masasada, A. B., ... 5 Langdon St.
Honorary Fellow in Economics.

Showerman, Grant, A. M., ... 321 Francis St.
Fellow in Latin, Room 29, University Hall.

*Resigned.

Tallman, William Duane, B. S., . . . 502 W. Miffin St.
Fellow in Mathematics, Room 28, University Hall.
Weston, Nathan, Austin, B. L., . . . 208 Monona Ave.
Fellow in Economics, Room 50, University Hall.
Pitman, Annie Marie, B. A., ... 414 N. Henry St.
W. F. Allen Graduate Scholarship in Greek and Latin.
McLenegan, Annie Susan, B. L., ... 803 State St.
J. C. Freeman Graduate Scholarship in English Literature.
Odland, Lewis, B. L., ... 123 E. Gorham St.
Norwegian Graduate Scholarship.
Kellogg, Louise Phelps, B. L., . . . 148 Langdon St.
Graduate Scholarship in American History.
Ward, Louis Merrick, B. L., ... 614 Langdon St.
Graduate Scholarship in European History.

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GRADUATES IN RESIDENCE.

Alexander, Walter, B. S., Univ. of Wis., *Milwaukee.*
Steam Engineering.
Allen, Katherine, A. M., Univ. of Wis., *Madison.*
Latin, Greek.
Bagley, William Chandler, B. S., Mich. Agricultural College, *Detroit, Mich.*
Psychology, Pedagogy.
Baker, Florence Elizabeth, A. B., Univ. of Wis. *Madison.*
English Literature, History.
Bassett, Victor Hugo, A. B., Knox College, *Aledo, Ill.*
Chemistry, Bacteriology.
Beddall, Marcus Melvin, B. L., Univ. of Wis., *Trim Belle.*
History, Economics.
Beebe, Murray Charles, B. S., Univ. of Wis., *Racine.*
Electrical Engineering.
Bergenthal, Victor William, B. S., Univ. of Wis., *Milwaukee.*
Electrical Engineering.
Bleedorn, Bertha Ida, B. L., Univ. of Wis., *Janesville.*
German, French.
Brooks, John Craft Wright, Graduate West Point Military Academy, *Madison.*
Electrical Engineering.
Buckley, Ernest Robertson, B. S., Univ. of Wis., *Madison.*
Geology, Petrography, Botany.
Buell, Charles Edwin, B. S., Univ. of Wis. *Madison.*
English Literature, History.

Buell, Martha Merry, B. S., Cornell University, *Madison.*
English Literature, History.
Burgess, Charles Frederick, B. S., Univ. of Wis., *Oshkosh.*
Electrical Engineering.
Carlton, Mary Louise, B. L., Univ. of Wis., *Madison.*
Descriptive Geometry, Elementary Drawing.
Chandler, Elwyn Francis, M. A., Ripon College, *Ripon.*
Applied Mathematics, Physics, Astronomy.
Chase, Albert Guy, B. L., Univ. of Wis., *Ladoga.*
History, Political Economy.
Conyngton, Mary Katherine, B. A., Wellesley College, *Fort Worth, Texas.*
Economics, Sociology.
Cook, Alfred Newton, M. A., Knox College, *Madison.*
Chemistry, Mineralogy.
Cooley, Frederick Smith, B. S., Massachusetts Agricultural College, *Amherst, Mass.*
Agriculture.
Crealy, John Ernest, B. S. A., Ontario Agricultural College, *Exeter, Ontario.*
Dairying.
Cowdery, Edith Aldrich, B. L., Univ. of Wis., *Elkhorn.*
Latin, German.
Dudgeon, Matthew S., B. A., Baker University, *Madison.*
English Literature, History.
Dudgeon, Richard Ball, B. A., Univ. of Wis., *Madison.*
Pedagogy, English Literature.
Dudley, William Henry, A. B., Univ. of Wis., *Madison.*
Norse.
Edgren, C. Josephine, B. A., Univ. of Wis., *Madison.*
English Literature.
Elward, DeWitt, B. S., Lawrence University, *Madison.*
English Literature.
Elward, Gertrude Jefferson, B. L., Lawrence University, *Madison.*
English Literature.
Erdall, John L., B. L., LL. B., Univ. of Wis., *Madison.*
English Literature.
Fraser, Georgine Zetelle, B. S., Wellesley College, *Baltimore, Md.*
History, Economics.
Freehoff, Joseph C., B. S., Univ. of Wis., *New London.*
Economics, Sociology.

Frost, William Dodge, M. S., University of Minnesota, *Madison.*
Bacteriology, Botany, Chemistry.

Giss, August John, M. L., Univ. of Wis., *Sauk City.*
Economics, History, Political Economy.

Griffiths, Anna Cecilia, B. A., Univ. of Wis., *Madison.*
Greek, Latin, French.

Guthormsen, Gunluf, Lawrence University, *Neenah.*
History, Physics, Vegetable Physiology.

Hall, Francis Waterbury, M. A., Univ. of Wis., *Madison.*
English Literature, History, Greek.

Harper, Mildred Lewis, M. L., Univ. of Wis., *Madison.*
English Literature, Anglo-Saxon, History.

Harris, Juliet Parker, B. L., Univ. of Wis., *Reedsburg.*
English Literature, French.

Hazzard, William Clarence, B. A., Leland Stanford University, *Madison.*
History, Economics.

Hollis, Andrew Phillip, B. S., Univ. of Wis., *Madison.*
Pedagogy, Philosophy.

Ishikawa, G. Sadakuni, Graduate of Anglo-Japanese College, *Tokio, Japan.*
Political Economy, Political Science.

Ishikubo, Gisaburo, Graduate of College of Tokio, *Saitamaken, Japan.*
Economics, Political Science, History.

Jenks, Albert Ernest, B. S., Univ. of Chicago, *Kalamazoo, Mich.*
Economics, History.

Jolliffe, William Morley, B. S., Lawrence Univ., *Berlin.*
Mathematics, Physics, Astronomy.

Kinsman, Delos Oscar, B. L., Univ. of Wis., *Platteville.*
Economics, History, Sociology.

Kratsch, William Herman, B. S., Univ. of Wis., *Madison.*
Steam Engineering.

Leith, Charles Kenneth, B. S., Univ. of Wis., *Madison.*
Geology.

Lincoln, Azariah Thomas, B. S., Univ. of Wis., *Montfort.*
Physical Chemistry, Geology.

Lyle, Edith Katherine, M. L., Univ. of Wis., *Madison.*
Latin, Pedagogy.

Mac Gregor, Wallace Francis, B. S., Univ. of Wis., *Janesville.*
Steam Engineering.

McIver, Matthew Nelson, Ph. B., Beloit College, *Glen Haven.*
History, Political Economy.

Meisnest, Frederick William, B. S., Univ. of Wis., *Madison.*
German, Anglo-Saxon.

Meyer, Frederick Hugo, B. S., Kansas Agricultural College, *Menager, Kas.*
Dairying.

Nelson, John Mandt, B. L., Univ. of Wis., *Madison.*
English Literature, Economics.

O'Connor, Charles James, B. A., Univ. of Wis., *Madison.*
Latin, Greek.

Parsons, Frederick Francis, B. L., Univ. of Wis., *Berlin.*
Hebrew, New Testament, Greek.

Reed, Emerson Golden, B. S., Iowa Agricultural College, *Knoxville, Ia.*
Electrical Engineering.

Reinsch, Paul Samuel, B. A., LL. B., Univ. of Wis., *Madison.*
History, Political Science, Economics.

Rice, Ernest Joseph Axtell, B. A., Gates College, *Neligh, Neb.*
Economics, Sociology, History.

Rogers, Lore Alfred, B. S., Maine State College, *Patten, Me.*
Bacteriology, Botany.

Rountree, Ellen Jewett, B. L., Univ. of Wis., *Platteville.*
English Literature, English History.

Rowan, Emma Frances, B. S., Univ. of Wis., *Sparta.*
Botany, Biology, Geology.

Running, Theodore, M. S., Univ. of Wis., *Viroqua.*
Mathematics.

Sanborn, John Bell, M. L., Univ. of Wis., *Madison.*
History, Economics.

Schaffner, Margaret Anna, B. A., Emporia College, *Morganville, Kas.*
Economics, Sociology.

Schreiner, Oswald, B. S., Univ. of Wis., *Baltimore, Md.*
Mathematics, Mineralogy.

Schults, Walter Francis, B. A., Storrs Agricultural College, *Hartford, Conn.*
Dairying.

Seymour, Arthur Romeyn, B. L., Univ. of Wis., *Madison.*
French.

Smith, Charles Marquis, B. S., Univ. of Wis., *Racine.*
Physics.

Smith, Grant, B. S., Univ. of Wis., *Madison.*
Botany, Biology.

Sober, Hiram Allen, B. A., Univ. of Mich., *Madison.*
Latin.

Stavrum, Ernst Arthur, B. L., Univ. of Wis., *La Crosse.*
Latin, Greek.

Swanson, Samuel T., B. L., Univ. of Wis., *Madison.*
English Literature, History.

Taylor, Henry Charles, B. S. A., Iowa Agricultural College, *Willsonville, Ia.*
Economics, History, Sociology.

Towne, Ezra Thayer, B. L., Univ. of Wis., *Waupun.*
Sociology, Economics, Philosophy.

Urdahl, Margarethe, B. L., Univ. of Wis., *Madison.*
German.

Veerhusen, Elsbeth, B. A., Univ. of Wis., *Madison.*
German.

Webb, Howard Scott, M. E., Maine State College, *Orono, Me.*
Electrical Engineering.

Weidman, Samuel, B. S., Univ. of Wis., *Madison.*
Geology, Petrography, Chemistry.

Wilder, George Walker, B. S., Univ. of Wis., *Madison.*
Physics, Astronomy.

Wiley, Roy Rodney, B. S., Univ. of Mich., *Peoria, Ill.*
Electrical Engineering.

Winter, Herman C., B. L., Univ. of Wis., *Madison.*
New Testament Greek.

Wolff, Henry Charles, B. S., Univ. of Wis., *Evansville.*
Mathematics, Geology.

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GRADUATES STUDYING IN ABSENTIA.

Brower, Herman G. A., A. B., *Colorado Sprgs. Col.*
Economics.

Burgess, George Heckman, B. S., *Pittsburg, Pa.*
Civil Engineering.

Burney, Robert H., B. S., *Cicso, Texas.*
Economics.

Cheney, Rosa Mabel, B. L., *Platteville.*
American History.

Frankenfield, Budd, B. S., *State College, Pa.*
Electrical Engineering.

Gale, Zona, B. L., *Milwaukee.*
English Literature, History.
Hain, James C., B. S., *Chicago, Ill.*
Civil Engineering.
Hancock, Lemuel Morris, B. M. E., *Nevada City, Col.*
Mechanical Engineering.
Hanson, William Sewell, B. S., *Chicago Heights, Ill.*
Mechanical Engineering.
Hatherell, Rosalia, B. S., *River Falls.*
Zoology.
Hayden, Mary Estelle, B. L. (Eng.), *Sun Prairie.*
History, English Literature.
Lawrence, Carl Gustavus, B. L., *Canton, S. D.*
Modern European History.
Marshall, Ruth, B. S., *Madison.*
Zoology.
O'Neil, Albert B., B. L. (Eng.), *Appleton.*
Pedagogy, History.
Smithyman, William Lincoln, B. L., *Milwaukee.*
Economics.
Swezey, Goodwin Deloss, A. M., *Lincoln, Neb.*
Astronomy, Physics, Applied Mathematics.
Tormey, James Albert, B. L., *Winona, Minn.*
Sociology and History.
Walker, Lou Cain, M. A., *Lincoln, Neb.*
Mathematics, Astronomy, Mechanics.
Whitmore, Eugene R., B. S., *Chicago, Ill.*
Vertebrate Anatomy.
Williams, Charles H., B. S., *Columbus.*
Steam Engineering.
Wray, James Glenn, B. S., *Chicago, Ill.*
Electrical Engineering.
Zimmerman, Oliver B., B. S., *Milwaukee.*
Steam Engineering.

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UNDERGRADUATES.

COLLEGE OF LETTERS AND SCIENCE.

Senior Class.

Ableiter, Theodore Louis,	*Boscobel,*	M. C.
Alexander, Albert Fred,	*Centralia,*	G. S.
Allen, Mary Olivia,	*Milwaukee,*	G. S.
Bailey, Grace Ethel,	*Sun Prairie,*	C. H.

Barker, Mary Rogers,	*Janesville,*	C. H.
Berg, Theodore,	*Appleton,*	C. H.
Berg, William Carl,	*Madison,*	C. H.
Bird, Louise Marie,	*Madison,*	M. C. (Math.)
Blumer, Edward,	*Monroe,*	G. S.
Bosshard, Otto,	*La Crosse,*	C. H.
Bowers, Ray,	*Madison,*	G. S.
Briesen von, Elizabeth Johanna,	*Columbus,*	M. C.
Bump, Mary Evelyn,	*Wausau,*	C. H.
Burns, Leslie Rush,	*Oakfield,*	G. S.
Burnton, Harriot,	*Fond du Lac,*	M. C.
Burton, Anna Livingston,	*Livingston,*	G. S.
Cairns, Gertrude Maude,	*Ellsworth,*	M. C. (Eng.)
Cairns, Rolla Ullin,	*Madison,*	G. S.
Carlton, Alice Elizabeth,	*Madison,*	C. H.
Cary, Irving Boyd,	*Milwaukee,*	A. C.
Case, Jessie Marvin,	*North Greenfield,*	G. S.
Chandler, Albert James,	*Ripon,*	C. H.
Chapman, Agnes,	*Watertown,*	M. C.
Charleton, Fannie,	*Madison.*	Eng.
Chase, Wilfrid Earl,	*Madison,*	G. S.
Church, May Elizabeth,	*Milwaukee,*	C. H.
Colver, Harley Ross,	*New Lisbon,*	C. H.
Corscot, Kate May,	*Madison,*	A. C.
Cushing, Alice Gertrude,	*Wauwatosa,*	C. H.
Dacy, Alice Beatrice,	*Woodstock, Ill.,*	C. H.
Darrow, William,	*Yellowstone,*	G. S.
Davies, Joseph Edward,	*Watertown,*	M. C.
Davis, David John,	*Madison,*	G. S.
Donnelly, Christopher Andrew,	*Meeker's Grove,*	Phil.
Doyon, Bertrand Herrick,	*Madison,*	C. H.
Eckelman, Ernest Otto,	*Milwaukee,*	M. C.
Ehlman, Ernest George,	*Milwaukee,*	G. S.
Elver, Elmore Theodore,	*Madison,*	C. H.
Enteman, Karl Ernest,	*Hartland,*	C. H.
Fabrick, Glen Ray,	*Harlem, Ill.,*	G. S.
Ford, William Brown,	*Madison,*	G. S.
Forrest, Harry Gustavus,	*Manitowoc,*	C. H.
Fortier, Camille A. Hermand,	*Florence,*	G. S.
Fowler, Roy Edward,	*Wauwatosa,*	G. S.
Freeman, Mary Louise,	*Madison,*	M. C.
Gay, Robert James,	*Madison,*	G. S.
Gierhart, Harry Shockley,	*Argyle,*	C. H.

Glenn, Clara Abigail,	*Viroqua,*	C. H.
Goddard, Louis Allen,	*Madison,*	C. H.
Goodell, Kate Louise,	*Viroqua,*	M. C.
Gordon, Esther,	*Brodhead,*	G. S.
Graham, Grace,	*Tomah,*	M. C.
Greenbank, Grace,	*Madison,*	M. C.
Griffiin, Hattie Josephine,	*Madison,*	A. C.
Grover, Arlene Edna,	*Madison,*	M. C.
Gunthrop, Pauline Priscilla,	*Austin, Ill.,*	C. H.
Hagemann, Charles Frederick,	*Mauston,*	A. C.
Hancock, Edward Lee,	*Shullsburg,*	G. S. (Math.)
Hanks, David Arthur,	*Madison,*	M. C.
Hardy, Horace Whitney,	*Grand Rapids, Mich.,*	C. H.
Harper, Blanch,	*Madison,*	G. S.
Harvey, Richard Guille,	*Racine,*	A. C.
Hay, William Henry, Jr.,	*Oshkosh,*	C. H.
Hegg, Clara Ellida,	*Decorah, Ia.,*	C. H.
Hirschberg, Joseph Gustav,	*Milwaukee,*	C. H.
Horsch, John,	*Madison,*	A. C.
Huff, Mary Rebecca,	*Boscobel,*	Phil.
Huntley, Maud,	*Elroy,*	A. C.
Hurlbut, Sarah Elizabeth,	*Elkhorn,*	M. C.
Irish, James William,	*Black Earth,*	Eng. (Heb.)
Iwert, Alvin Henry,	*Watertown,*	M. C.
Joannes, Eugene Charles,	*Green Bay,*	M. C.
Jonas, Emma C.,	*Beaver Dam,*	M. C.
Knudtson, Knudt,	*Madison,*	G. S.
Kronshage, Ernst Hildebrand,	*Boscobel,*	A. C.
Kunz, Edessa Luella,	*Poynette,*	C. H.
Linde, Clarissa Augusta,	*Oshkosh,*	M. C.
Link, George Martin,	*Leon,*	G. S. (Math.)
Lipe, Olive,	*Sharon,*	Eng.
Loeper, Addie W.,	*Prairie du Chien,*	C. H.
Luetscher, George Daniel,	*Sauk City,*	Eng.
McCullough, Harriet E.,	*Janesville,*	Eng.
McNair, Grace Elizabeth,	*Brodhead,*	C. H. (Hist.)
Main, John Smith,	*Madison,*	A. C.
Markham, Henry Stewart,	*Milwaukee,*	C. H.
Marlow, John Anthony,	*Madison,*	M. C.
Mason, Max,	*Madison,*	C. H. (Math.)
Merrill, Grace,	*Ashland,*	M. C.
Meyer, Arthur W.,	*Cedarburg,*	G. S.
Moessner, Lillie Elda Dellé,	*Madison,*	G. S.

Moore, William Washburn,	*Glendale,*	Eng. (Heb.)
Nelson, Annette,	*Madison,*	M. C.
Nelson, George Bliss,	*Amherst,*	C. H.
Nelson, Jessie Louise,	*Sturgeon Bay,*	C. H.
Norsman, Anna,	*Madison,*	Eng.
Noyes, Katherine,	*Oshkosh,*	M. C.
Ochsner, Henry William,	*Waumandee,*	G. S.
Parkinson, Eve,	*Madison,*	A. C.
Parkinson, Maude,	*Madison,*	A. C.
Patzer, Otto,	*Wausau,*	C. H.
Penniston, Dora Luella,	*Argyle,*	C. H.
Perkins, Frances Gay,	*Fond du Lac,*	M. C.
Perry, Agnes Arlette,	*McHenry, Ill.,*	Eng.
Peterson, Charles Nelson,	*Union Grove,*	C. H.
Peterson, Frederick Burns,	*Madison,*	Eng.
Pollard, Eliza Alwilda,	*Madison,*	M. C. (Math.)
Raymer, John Wesley,	*Madison.*	G. S.
Reedal, George Banks,	*Dekorra,*	G. S.
Riordan, Jeremiah Patrick,	*Myra,*	C. H.
Robinson, Eliza,	*Madison,*	G. S. (Math.)
Rockwell, Adaline Benson,	*Oneiaa, N. Y.,*	Eng.
Roden, August H.,	*Madison,*	C. H.
Ruebhausen, Julia,	*Madison,*	G. S.
Rued, Hjalmar,	*Madison,*	Eng. (Norse.)
Ryan, Herbert Harry,	*Milwaukee,*	C. H.
Sanborn, Dwight Alexander,	*Milwaukee,*	C. H.
Sauthoff, August,	*Madison,*	G. S.
Schmidt, Edward Alexander,	*West De Pere,*	G. S.
Schmidtman, John Christian,	*Manitowoc,*	C. H.
Schreiber, Amelia Maude,	*Madison,*	M. C.
Scribner, Annie Nyhan,	*Madison,*	A. C. (Greek Group.)
Secker, Charles Mitchell,	*Baraboo,*	M. C.
Shapiro, Rebecca,	*Medford,*	C. H.
Shearer, Louise Dalziel,	*Janesville,*	C. H.
Sheldon, Stuart Harris,	*Madison,*	G. S.
Shong, Albert Clifton,	*West Superior,*	C. H.
Sias, Jessie Josephine,	*Sparta,*	M. C.
Smith, Ella Knowles,	*New Richmond,*	M. C.
Smith, Lloyd Dean,	*Amherst,*	C. H.
Snively, Letitia Rowena,	*Menomonie,*	Eng.
Spiegelberg, Fred Fitzgerald,	*Boscobel,*	A. C.
Squire, Charles Albert,	*Sheboygan,*	G. S.
Stephenson, Harriet Frances,	*Madison,*	M. C.

Suhr, Edmund,	*Madison,*	C. H.
Thomas, Herbert Henry,	*Darlington,*	C. H.
Todd, William Sharp,	*Madison,*	C. H.
Tomkins, Lucy S. Estelle,	*Madison,*	M. C.
Van Kirk, Frank Walter,	*Janesville,*	G. S.
Van Vorhis, James Harrison,	*Shullsburg,*	G. S.
Vogel, Guido Charles,	*Milwaukee,*	G. S.
Weter, James Parsons,	*De Pere,*	M. C.
Wigdale, Norman Amos,	*Ft. Atkinson,*	C. H.
Woy, Maud,	*Madison,*	M. C.
Wright, Christine Ramsay,	*Baraboo,*	M. C.
Wright, Grace Anna,	*Janesville,*	M. C.
Young, John Howard,	*Madison,*	C. H.

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Junior Class.

Adams, Clara Dane,	*Sechlerville,*	Phil.
Adams, Myrtle Grace,	*Beloit,*	M. C.
Allen, Charles Elmer,	*Madison,*	G. S. (Botany.)
Allen, Eldreth Gordon,	*Madison,*	G. S. (Phys.)
Allen, Philip Loring,	*Madison,*	C. H.
Allen, William H.,	*Fulton, N. Y.,*	Phil.
Anderson, Lewis Albert,	*Mt. Horeb,*	M. C. (Pol. Sci.)
Andrews, Helen Grace,	*Lodi,*	Eng.
Anthony, Anna Gertrude,	*Central City, Neb.,*	G. S.
Axley, Frederick William,	*Edwards,*	Phil.
Baldwin, Jay Burdette,	*Evansville,*	Eng.
Bartmann, Joseph E.,	*Appleton,*	Eng.
Bass, Horace Herbert,	*Platteville,*	C. H.
Becker, Charles Henry,	*Kenosha,*	Eng.
Beerbaum, Adolph Frederick,	*Waterloo,*	G. S.
Bibbs, Emma Marion,	*Madison,*	Eng.
Block, Manfred Sickle,	*Platteville,*	C. H.
Blodgett, Katherine Maude,	*Sharon,*	Eng.
Borgers, William Benjamin,	*Madison,*	A. C.
Bush, Nellie Martha,	*Sparta,*	M. C.
Butt, Margaret Elizabeth,	*Viroqua,*	M. C.
Calkins, Ernest Eugene,	*Delavan,*	Eng.
Campbell, Daisy,	*Hudson,*	Eng.
Carlson, Mathew O.,	*Stoughton,*	A. C.
Carter, Harrie Nathan,	*Humbird,*	G. S.
Case, Lillian,	*Madison,*	A. C.
Cederstrom, John Alfred,	*Nandiyohi, Minn.,*	Phil.
Chamberlain, Alonzo Albert,	*Darlington,*	Eng.

Chamberlain, Harlem Roy,	*Darlington,*	Eng.
Chubbuck, Alice Louise,	*Hudson,*	Eng.
Churchill, Arthur Moore,	*Marinette,*	A. C.
Cloes, Grace Gage,	*Lake Bluff, Ill.,*	M. C.
Cole, Orasmus Jr.,	*Milwaukee.*	M. C.
Cook, Mathilde Viola,	*Madison,*	M. C.
Curtis, Nathan Stephenson,	*Madison,*	Eng.
Darling, William Sylvester,	*Madison,*	G. S.
Davies, Charles George,	*Spring Green,*	G. S.
Deans, Margaret Isabella,	*River Falls,*	Phil.
Denu, Albert Rudolph,	*Madison,*	Eng.
De Reamer, Gertrude Elizabeth	*Fond du Lac,*	M. C.
Desmond, Cora Frances,	*Fox Lake,*	Eng.
Desmond, Thomas Aquinas,	*Milwaukee,*	Eng.
Dilatush, Carrie Maude,	*Robbinsonville, N. J.,*	G. S.
Dopp, Mary,	*Oconomowoc,*	G. S.
Dorset, Helen,	*La Crosse,*	M. C.
Driver, Bert Ormond,	*Darlington,*	Eng.
Ela, Emerson,	*Rochester, Minn.,*	M. C.
Ellison, Wanda Gladys,	*Darlington,*	Eng.
Emerson, John Bolles,	*Madison,*	G. S.
Fargo, Elsie Ruthford,	*Lake Mills,*	M. C.
Fiske, Lulu Blanche,	*Burlington,*	A. C.
Fowler, Helen Ada,	*Madison,*	M. C.
Fox, Edward Tappan,	*Milwaukee,*	M. C.
Friend, Alice Relaine,	*Milwaukee,*	M. C.
Gaenslen, Frederick Julius,	*Milwaukee,*	G. S.
Gale, Gladys,	*Reedsburg,*	G. S. (Math.)
Galpin, Lloy,	*Los Angeles, Cal.,*	Phil.
Gardner, Mabel Bernice,	*Grand Rapids,*	G. S.
Gates, Frederick William,	*Pickwick, Minn.,*	Phil.
Geilfuss, Carl Frederick,	*Milwaukee,*	C. H.
Gibson, Edith Van Slyke,	*Madison,*	M. C.
Goddard, Jennie Elvira,	*Chippewa Falls,*	M. C.
Griffith, Max Wilder,	*Milwaukee,*	M. C.
Gugel, Frank Henry,	*Madison,*	Eng.
Hagemann, John August,	*Mauston, Minn.,*	Phil.
Haight, George Ives,	*Rockdale,*	C. H.
Hanchett, Ruth May,	*Sparta,*	M. C.
Hanson, Albert,	*Eau Claire,*	G. S.
Harrison, Frederick Arthur,	*Elkhorn,*	Phil.
Hatton, Edward Howard,	*Madison,*	C. H.
Heimdal, Sara Guenvar,	*Madison,*	G. S. (Math.)

Hinckley, Lucretia French,	*Milwaukee,*	A. C.
Holmes, Harvey Robson,	*Geneva, Minn.,*	Phil.
Hopkins, George Allen,	*New York, N. Y.,*	A. C.
Houghton, Anna Pauline,	*Racine,*	G. S.
Huenkemeier, Etta,	*Freeport, Ill.,*	Eng.
Hutson, Charles Thomas,	*Edgerton,*	Eng.
Inglis, John Percy,	*Bayfield,*	Eng.
Jacobson, Marcus,	*Waukesha,*	Eng.
Jeffrey, John Jonas,	*Centralia,*	Eng.
Jenney, Adeline Miriam,	*Huron, S. D.,*	A. C.
Johnson, Lillian Gertrude,	*Decorah, Ia.,*	M. C.
Jones, Lewis Albert,	*Georgetown,*	Phil.
Kasson, Alice P.,	*Madison,*	A. C.
Kienholz, Albert Aaron,	*Billingham, Minn.,*	Phil.
Kingsford, Alfred Charles,	*Rushford, Minn.,*	Phil.
Kittle, William,	*Aberdeen, Wash.,*	Phil.
Koltes, Frank Xavier,	*Madison,*	G. S.
Kurtz, Frank Howard,	*Milwaukee.*	Eng. (Civic.)
Langemo, Peter Cornelius,	*Kenyon, Minn.,*	Eng.
Laube, Frank Joseph,	*Brodhead,*	G. S.
Lee, Jessamine,	*Vermillion, S. D.,*	Eng. (Eng.)
McBride, Rosa Lillian,	*Platteville,*	Phil.
McCoy, Nettie Irene,	*Madison,*	Eng.
McCumber, Anna Levina,	*Fond du Lac,*	Eng.
McCumber, Mary Etta,	*Madison,*	M. C.
McMillan, Antoinette,	*Appleton,*	A. C.
Malec, Marie,	*Madison,*	Eng.
Mashek, Anna,	*Kewaunee,*	Eng.
Medbury, Estelle Eliza,	*Elkhorn,*	G. S. (Math.)
Meeker, Guy Abbott,	*Marshalltown, Ia.,*	C. H.
Mehl, Hugo Francis,	*Milwaukee,*	G. S.
Miller, Mary Elizabeth,	*Racine,*	Eng.
Miller, Maude Elsie,	*Edgerton,*	A. C.
Mills, Lewis Welling,	*Racine,*	M. C.
Mitchell, Thomas William,	*Cuba City,*	Eng.
Montgomery, Milton Gray,	*Omaha, Neb.,*	C. H.
Moore, Lydia Emma,	*Madison,*	Eng.
Morley, Ralsa Fred,	*Baraboo,*	C. H.
Murrish, Harry John,	*Mazomanie,*	Eng.
Murrish, Maude Grace,	*Mazomanie,*	Eng.
Nelson, Edith,	*Madison,*	A. C.
Odell, Susan,	*Des Moines, Ia.,*	M. C.
Ogilvie, Jenny,	*Madison,*	Eng.

O'Neill, Ernest Andrew,	*Neillsville,*	M. C.
Pahlow, Edwin William,	*Milwaukee,*	Eng.
Pearson, Samuel E.,	*Madison,*	Phil.
Pengra, Mabel Agnes,	*Madison,*	A. C.
Persons, Warren Milton,	*Madison,*	G. S. (Math.)
Pinkum, Anna Shaw,	*Eau Claire,*	C. H.
Powers, James Montgomery,	*Highland,*	Phil.
Pratt, Grant Ellsworth,	*De Pere,*	Phil.
Radensleben, Frank Ernest,	*Eau Claire,*	C. H.
Random, Gilbert,	*Macfarland,*	Phil.
Rice, Ole S.,	*Madison,*	G. S.
Rickfort, William Otto,	*Lake Mills,*	G. S.
Riley, Mabel Victoria,	*Madison,*	G. S.
Robertson, William Spence,	*Oxford,*	Eng. (Hist.)
Roseman, William Wallace,	*Mt. Hope,*	Phil.
Rountree, Mary Mitchell,	*Platteville,*	Phil.
Ruediger, William Charles,	*Madison,*	Phil.
Sceets, Laura Alice,	*Milwaukee,*	Eng.
Schumaker, Raymond H.,	*McGregor, Ia.,*	Eng.
Shaw, Eliza Harper,	*Geneseo, Ill.,*	A. C.
Shaw, Joseph Lawrence,	*Geneseo, Ill.,*	A. C.
Shopbell, Martha,	*Janesville,*	G. S.
Slack, Elizabeth Anna,	*Big Patch,*	Phil.
Stahl, Henry Vincent,	*Bayfield,*	Eng.
Stangel, Charles George,	*Tisch Mills,*	G. S.
Stanton, Belle,	*Warren, Ill.,*	Eng.
Stauff, John Henry,	*Milwaukee,*	A. C.
Staver, Frances Mary,	*Monroe,*	Eng. (Eng.)
Stearns, Jane Athlyn,	*Milwaukee,*	G. S.
Stillman, Gertude,	*Milwaukee,*	G. S. (Math.)
Stock, Alma,	*Madison,*	Eng.
Stone, Jesse Raymond,	*Burnett,*	Eng.
Stuntz, Stephen Conrad,	*Monroe,*	G. S. (Botany.)
Sykes, Maude,	*Janesville,*	Phil.
Sylvester, Genevieve,	*Milwaukee,*	C. H.
Thompson, Cora,	*Beloit,*	Eng.
Thomson, Fred,	*Tomah,*	Eng.
Thomson, John Chester,	*Esdaile,*	Phil.
Tormey, Thomas William,	*Madison,*	G. S.
Tratt, Paul,	*Whitewater,*	C. H.
Trettien, August William,	*Madison,*	C. H.
Updegraff, Samuel,	*Madison,*	C. H.
Van Dusen, Harmon Lewis,	*Montfort,*	Phil.

Verplanck, Helen Gertrude,	*Madison,*	M. C.
Vilas, Charles Atwood,	*Milwaukee,*	A. C.
Wadsworth, Timothy Benjamin.	*Milwaukee,*	A. C.
Walker, Mabel Emma,	*Racine,*	Eng.
Washburn, Andrew August,	*Horicon,*	Phil.
Watson, Frank Hosford,	*Milwaukee,*	G. S.
Webster, Thomas,	*Elk Grove,*	Phil.
Weld, Laura Hayden,	*River Falls,*	Phil.
Westover, Minnie Comstock,	*Madison,*	G. S.
Whare, George Bartholomew,	*Madison,*	G. S.
White, Adeline Rawson,	*Madison,*	M. C.
White, Allen Orvis,	*Madison,*	M. C.
White, Mabel S.,	*Madison,*	Eng.
Williams, Daniel Jenkins,	*Genesee Depot,*	A. C.
Wright, Luther Millard,	*New London,*	G. S.
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Sophomore Class.

Adams, Edna Couper,	*Madison,*	Eng.
Adams, William Frazier,	*Mukwonago,*	A. C.
Albrecht, Sebastian,	*Milwaukee,*	G. S.
Allen, Florence Eliza,	*Madison,*	C. H.
Anderson, Andrew Runni,	*Melvina,*	A. C.
Andresen, Oliver Sverre,	*Medford,*	Eng.
Austin, Rolland Melvin,	*Monroe,*	G. S.
Bachhuber, Charles Hugo,	*Mayville,*	Eng.
Barber, Winchel Fay,	*Waukesha,*	C. H.
Bertles, Anna Caroline,	*Green Bay,*	M. C.
Boardman, Howard Gilman,	*Milwaukee,*	G. S.
Bolender, Charles Barton,	*Monroe,*	A. C.
Brayton, Fannie Elizabeth,	*La Crosse,*	A. C.
Briesen, von, Ernst,	*Columbus,*	C. H.
Brigham, Bertha Blanche,	*Evansville,*	M. C.
Brown, John Sears,	*Sparta,*	G. S.
Brown, Luther Edward,	*Rhinelander,*	A. C.
Burnham, Charles Lewis,	*Milwaukee,*	A. C.
Cantwell, Catherine I.,	*Madison,*	M. C.
Carney, Francis Joseph,	*Eau Claire,*	Eng.
Cashel, Mae A.,	*Arcadia,*	Eng.
Cassels, George Snowden,	*Tomah,*	G. S.
Castle, Mildred Alice,	*Black River Falls,*	Eng.
Challoner, Grace Mary,	*Oshkosh,*	A. C.
Coen, Benjamin Franklin,	*Cleveland, O.,*	C. H.

Collie, Henry Glenwood,	*Williams Bay,*	G. S.
Congdon, Mirah,	*La Crosse,*	A. C.
Crosby, Francis Hinckley,	*Hinsdale,*	C. H.
Damuth, Libbie M.,	*Fort Atkinson,*	C. H.
Darling, Frank Edward, Jr.,	*Madison,*	G. S.
Davis, Jessica Esther,	*Madison,*	G. S.
Devine, Clark Bailey,	*Oregon,*	G. S.
Dillingham, Grace Louise,	*Baraboo,*	M. C.
Dillon, Joe Golder,	*Sterling, Ia.,*	G. S.
Dopp, Homer Rodger,	*Oconomowoc,*	G. S.
Dorset, Bernard Charles,	*La Crosse,*	A. C.
Dreyer, John William,	*Fitchburg,*	G. S.
Eastman, Clarence Winans,	*Portage.*	G. S.
Egdahl, Anfin,	*Menomonie,*	G. S.
Elmer, Walter Edgar,	*Hustler,*	Eng.
Emery, Sydney Lawton,	*Madison,*	Eng.
Everts, Leslie Shinoe,	*Rice Lake,*	C. H.
Fairchild, Margaret Tecklah,	*Clinton, Ia.,*	M. C.
Ferris, George Neb,	*Whitewater,*	C. H.
Fischer, Carl Elisha,	*Bayfield,*	Eng.
Fletcher, Mabel Emily,	*Portage,*	G. S.
Fraser, Rebecca Smith,	*Lake Beulah,*	Eng.
Gabel, Charles Ernst,	*Milwaukee,*	G. S.
Gath, Emelia Caroline,	*Madison,*	M. C.
Gillies, Laverna Elpha,	*Evansville,*	G. S.
Goddard, Herbert,	*Decorah, Ia.,*	A. C.
Goodwin, John Enward,	*Madison,*	Eng.
Gray, Walter Kempster,	*Milwaukee,*	M. C.
Greverus, Ernst,	*New Holstein,*	C. H.
Gunderson, Henry Adolph,	*Rio,*	Eng.
Hall, Claudia Jeanie,	*Madison,*	M. C.
Hall, Roy Dykes,	*Burnett Junction,*	G. S.
Hardgrove, George Patrick,	*Fond du Lac.*	Eng.
Haskin, Walter Edwin,	*Milwaukee,*	G. S.
Hibbard, Carlisle V.,	*Racine,*	G. S.
Hinkley, Louise,	*Janesville,*	M. C.
Hobbins, Harry Mears,	*Madison,*	M. C.
Hoffmann, Frank,	*St. Wendel,*	Eng.
Honeywell, Jesse Frank,	*Monroe,*	A. C.
Hook, Edward Alfred,	*South Milwaukee,*	G. S.
Howe, Winfred Chester,	*Sheboygan,*	C. H.
Hutchinson, Mabel Ferne,	*Colby,*	C. H.
Hutton, Margaret Meiklejohn,	*Whitewater,*	A. C.

Jackman, Marcia Maria,	*Janesville,*	M. C.
Jackson, Alice Fanny,	*Madison,*	M. C.
Jamieson, William Henry,	*Shullsburg,*	C. H.
Joannes, Ralph Lillis,	*Green Bay,*	C. H.
Johnson, Nora Francesca,	*Rockdale,*	M. C.
Ketcham, Florence Josephine,	*Madison,*	Eng.
Kies, William Samuel,	*Madison,*	M. C.
King, Bessie Susan,	*Neillsville,*	M. C.
Klahr, Leora Einsel,	*Horicon,*	G. S.
Koch, Arthur Alexander,	*Beaver Dam,*	G. S.
Koffend, Joseph, Jr.,	*Appleton,*	Eng.
Lamberson, Elbert Ward,	*Richland Center,*	G. S.
Law, J. Eugene,	*Perry, Iowa,*	G. S.
Lee, Kenelm Julius,	*Chippewa Falls,*	G. S.
Loeb, Joseph,	*Appleton,*	C. H.
Lowell, Susie Eugenia,	*Janesville,*	M. C.
Lucas, Sarah May,	*Brodhead,*	M. C.
Luhmann, Frederick Walter,	*Manitowoc,*	G. S.
Lyle, Stuart,	*Madison,*	M. C.
McClernan, Marie,	*Janesville,*	A. C.
McDonald, Alexander Vaughn,	*Fond du Lac,*	G. S.
McGilvra, Sadie Love,	*Baraboo,*	M. C.
McKitrick, Marcella May,	*Viroqua,*	M. C.
McLean, Marion Clara,	*Monroe,*	M. C.
McNeel, James Herbert,	*Fond du Lac,*	A. C.
Mac Graw, Mae Maud.	*Chippewa Falls,*	M. C.
Maercklein, Ella Dorothy,	*Milwaukee,*	G. S.
Mickelson, Albert G.,	*Mt. Horeb,*	Eng.
Minnick, Paul W.,	*Kewanee, Ill.,*	C. H.
Monahan, Daniel George,	*Madison,*	G. S.
Moser, Alma Marie,	*Ashland,*	A. C.
Moseley, Wayne Thornton,	*Madison,*	C. H.
Mosher, George Warner,	*Prophetstown, Ill.,*	C. H.
Murphy, Daniel Hayes,	*Milwaukee,*	G. S.
Nelson, Norman,	*Madison,*	G. S.
Nicholson, John Frederick,	*Brodhead,*	G. S.
Niven, John McKean,	*Ironwood, Mich.,*	A. C.
Ochsner, Emma Julia,	*Chicago, Ill.,*	G. S.
Osborne, John Goodrich,	*Milwaukee,*	M. C.
Palmer, Bernard Morey,	*Janesville,*	C. H.
Pearce, Charles Summer,	*Walworth,*	C. H.
Pease, Raymond Burnett,	*Oregon,*	Eng.
Pfisterer, Clara,	*Brodhead,*	Eng.

Pierce, Helen Augusta,	*Chicago, Ill.,*	Eng.
Pierpont, David Cowee,	*Milwaukee,*	G. S.
Poss, Benjamin,	*Milwaukee,*	Eng.
Pyre, Walton Hawkins,	*Madison,*	G. S.
Ramsay, Sarah Isabella,	*Madison,*	A. C.
Reed, Miriam Keith,	*Madison,*	M. C.
Robinson, Irving Porter,	*Milwaukee,*	C. H.
Rothmann, Emma,	*Chilton,*	Eng.
Ruschhaupt, Louis Fred,	*Milwaukee,*	G. S.
Russell, Harry Alexander,	*Fort Scott, Kas.,*	C. H.
Scheer, George Henry,	*Sheboygan,*	G. S.
Schultz, Alfred Reginald,	*Toman,*	G. S.
Seiler, Livia Estelle,	*Alma,*	M. C.
Sheldon, Mabel,	*Reedsburg,*	Eng.
Sherman, Gertrude,	*Milwaukee,*	A. C.
Siefert, Carl Frederick,	*Milwaukee,*	G. S.
Simpson, Edward Bert,	*Chippewa Falls,*	G. S.
Slatter, Frances,	*Sun Prairie,*	G. S.
Smith, Allard Johnson,	*Milwaukee,*	C. H.
Smith, Almeda Marion,	*Cherokee, Ia.,*	M. C.
Smith, Harry Gray,	*Madison,*	M. C.
Smith, Jennie Harrison,	*Mauston,*	Eng.
Smith, Laura Foleen,	*Wheaton, Ill.,*	M. C.
Smith, Winifred Alice,	*Wheaton, Ill.,*	M. C.
Sprague, Edna Mabel,	*Sioux City, Ia.,*	M. C.
Stewart, Harriet Belle,	*Brodhead,*	Eng.
Stowell, Sarah Lillian,	*La Crosse,*	Eng.
Strong, Mary Louise,	*Dodgeville,*	Eng.
Sutherland, Charles Henry,	*Janesville,*	G. S.
Sutherland, William Chester,	*Madison,*	G. S.
Swain, Katharine Egerton,	*Milwaukee,*	A. C.
Taylor, Henry Herman,	*Barron,*	Eng.
Tearse, Clarence Dudley,	*Winona, Minn.,*	Eng.
Thompson, George,	*Moscow,*	Eng.
Thompson, James,	*Moscow,*	C. H.
Underwood, Enoch William,	*Minneapolis, Minn.,*	Eng.
Valentine, Anna DeRiemer,	*Janesville,*	M. C.
Vallee, Francis Arthur,	*Racine,*	C. H.
Van Horn, Fred Milo,	*Omaha, Neb.,*	A. C.
Vincent, Edward,	*Grand Rapids,*	Eng.
Wachtmann, Edmund Louis Charles	*Oldham, S. D.,*	G. S.
Warner, Fanny,	*Windsor,*	M. C.
Warner, Florence Maurine,	*Windsor,*	G. S.

Warriner, Helen Haskell,	*Portage,*	M. C.
Washburn, Robert Glendenning,	*Milwaukee,*	G. S.
Waters, Herbert,	*Fond du Lac,*	C. H.
Weber, Anna Katherine,	*Monroe,*	C. H.
Welsh, Eunice Wallace,	*Madison,*	M. C.
Whelan, Dutee Allen,	*Mondovi,*	Eng.
White, Alfred Edward,	*Sparta,*	C. H.
Willett, Thomas,	*Madison,*	G. S.
Winter, Paul Gerhard,	*Madison,*	Eng.
Wolcott, Edson Ray,	*Sharon,*	G. S. (Phys.)
Wright, Paul Randall,	*Monroe,*	A. C.
Yankey, Charles,	*Juneau.*	Eng.

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Freshman Class.

Appleby, Adah Margaret,	*Savanna, Ill.,*	Eng.
Allen, Eric William,	*Milwaukee,*	A. C.
Angell, Martin Fuller,	*Delavan,*	G. S.
Bacon, Elbridge,	*La Crosse,*	C. H.
Baer, Clarence Allen,	*Milwaukee,*	Eng.
Baldwin, Arthur Algernon,	*Madison,*	C. H.
Ball, Sydney Hobart,	*Oak Park, Ill.,*	A. C.
Barber, William Harley,	*Black Earth,*	G. S.
Barkhausen, Louis Henry,	*Green Bay,*	C. H.
Barney, Jessie Alice,	*Mayville,*	Eng.
Barney, John McHenry,	*West Bend,*	C. H.
Bartlett, Eliza Wheelock,	*Milwaukee,*	M. C.
Bath, Dane Henry,	*Oshkosh,*	M. C.
Berg, Joseph Nicolai,	*Nelsonville,*	C. H.
Bergstrom, Willis Charles,	*Neenah,*	C. H.
Best, Charles Lorton,	*Freeport, Ill.,*	C. H.
Beule, Arthur Franz,	*Beaver Dam,*	G. S.
Blackburn, Arthur William,	*Rochester,*	A. C.
Blood, Henrietta Ada,	*Madison,*	M. C.
Boehm, Paul Waldemar Leopoldt,	*Wausau,*	Eng.
Bohling, Frederick Clark,	*Poynette,*	Eng.
Bostwick, Harriet M.,	*Janesville,*	Eng.
Bradley, Harry Ernest,	*Madison,*	A. C.
Brahany, Mary Eleanor,	*Madison,*	M. C.
Brayton, Abbie Louise,	*La Crosse,*	M. C.
Bridge, Burton Hathaway,	*Monroe,*	M. C.
Bross, Agnes Marie,	*Chicago, Ill.,*	M. C.
Brownson, Laura,	*Sharon,*	Eng.
Brunckhorst, Louis Arthur,	*Kewaunee,*	Eng.

Buchanan, Herbert Daniel,	*Rio,*	C. H.
Buehler, Henry Andrew,	*Monroe,*	G. S.
Buell, Kate M.	*Sun Prairie,*	G. S.
Buell, Phoebe Lucinda,	*Sun Prairie,*	Eng.
Burke, Laurance Charles,	*Chicago, Ill.,*	C. H.
Carr, William James,	*Madison,*	C. H.
Carrington, Daisy Lottie,	*Waupun,*	Eng.
Carthew, Harry Edward,	*Lancaster,*	C. H.
Casson, Henry, Jr.,	*Madison,*	C. H.
Caulkins, Annie Knower,	*Madison,*	G. S.
Cavanaugh, Abigail Emma,	*Shullsburg,*	Eng.
Chandler, Zach Anson,	*Oregon,*	G. S.
Chesebro, Angia May,	*Delavan,*	M. C.
Clark, Emily Margaret,	*Stoughton,*	G. S.
Cleary, Michael Joseph,	*Blanchardville,*	Eng.
Cohen, Max,	*Milwaukee,*	A. C.
Coville, Herbert Chester,	*Oconomowoc,*	C. H.
Collins, William Benjamin,	*Sheboygan,*	C. H.
Condon, Elizabeth Agnes,	*Oregon,*	Eng
Crouch, George Frederick,	*Davenport, Ia.*	A. C.
Crumb, Bertha Sophronia,	*Rockford, Ill.,*	Eng.
Cummings, Maud Elizabeth,	*Madison,*	G. S.
Curtis, Dorothea Hughes,	*Madison,*	A. C.
Curtis, George Gregory,	*Merrill,*	Eng.
Daggett, Philip,	*Ottumwa, Ia.,*	G. S.
Davidson, Flora Neil,	*Madison,*	Eng.
Davis, Eva Eleanor,	*Lake Mills,*	C. H.
Davis, Herbert Wallace,	*Camp Douglas,*	Eng.
Doherty, William Henry,	*Berlin,*	Eng.
Drotning, Anon Ferdinand,	*Stoughton,*	G. S.
Dusold, August George,	*Manitowoc,*	C. H.
Ehrlich, Charlotte,	*Berlin,*	Eng.
Evans, Carrie Whettan,	*Madison,*	G. S.
Farness, Thomas Olin,	*Madison,*	G. S.
Fernekes, Gustave,	*Milwaukee,*	G. S.
Franc, Dorothy Helena,	*West De Pere,*	M. C.
Fritsche, Gustav Armin,	*Milwaukee,*	A. C.
Fuller, Clarence Curtis,	*Necedah,*	Eng.
Gifford, Byron Towne,	*Oconomowoc,*	Eng.
Goddard, Frederic Richardson,	*Decorah, Ia.*	C. H.
Godfrey, Elmer Elsworth,	*Milton,*	G. S.
Godfrey, James Dudley,	*Waukwatosa,*	Eng.
Graham, James Blain,	*Roberts,*	A. C.

Graham, Katherine Sophia,	*Merrill,*	Eng.
Grandy, Adah Georgina,	*Sioux City, Ia.,*	C. H.
Groffman, George William,	*Berlin,*	Eng.
Haecker, Mary Mendota,	***St. Anthony Park, Minn.,***	Eng.
Hancock, Eugene Thomas,	*Tomah,*	G. S.
Harlin, Agnes,	*Fond du Lac,*	C. H.
Hart, Isaac Henry,	*Wild Rose,*	Eng.
Harvey, Edward Joseph,	*Racine,*	G. S.
Hastie, Grace Reedal,	*Hartman,*	Eng.
Hatton, Fred Hammond,	*Madison,*	G. S.
Hektoen, Marie,	*Westby,*	M. C.
Hettman, Sadie Lavinia,	*Sparta,*	M. C.
Hitchcock, Harry Jason,	*Berlin,*	Eng.
Holmes, Clayton Langmuir,	***Janesville,***	C. H.
Hook, Frederick, Luther,	*South Milwaukee,*	G. S.
Houser, Ethel Isabelle,	*Mondovi,*	Eng.
Hoy, William Pierson,	***Woodstock, Ill.,***	C. H.
Huening, Frank, Theodore,	*Waterford,*	M. C.
Hughes, Kittie Gertrude,	*Waushara,*	Eng.
Hutchings, Charles Stephen,	*Milwaukee,*	A. C.
Jacobs, Frank,	*Madison,*	A. C.
Jacobson, Louis Christian,	*Elroy,*	Eng.
Johnson, Evelyn Ottillia,	*La Crosse,*	M. C.
Johnson, Margaret Mathilda,	*Verona,*	Eng.
Kasberg, Tinora Luthera,	*Bratsberg, Minn.,*	G. S.
Kavanaugh, Katherine Blanche,	*Madison,*	Eng.
Kentzler, Mabelle Elizabeth,	*Madison,*	M. C.
Keyser, Laura Victoria,	*Baraboo,*	M. C.
Kinnear, Lewis Reuben,	*Portage,*	Eng.
Knoff, Robert Ernest,	*Janesville,*	Eng.
Kohler, Marie Christine,	*Sheboygan,*	Eng.
Kuechenmeister, Florence Adell,	*West Bend,*	Eng.
Lachmund, Robert,	*Sauk City,*	Eng.
Lea, Harry Richard,	*Waupaca,*	C. H.
Lea, William Francis,	*Waupaca,*	C. H.
Lee, William Arthur,	*Madison,*	A. C.
Lewis, Paul Adin,	*Milwaukee,*	Eng.
Libby, Benjamin,	*Madison,*	C. H.
Link, Mamie Josephine,	*Madison,*	Eng.
Lounsbury, Benjamin Franklin,	*Pipersville,*	Eng.
Luhmann, Hugo Frank,	*Manitowoc,*	C. H.
Lund, Nels James,	*West Superior,*	G. S.
Lyman, John Quinton,	*Kenosha,*	C. H.

Lynch, James Francis,	*West Bend,*	G. S.
Mansfield, Flora Frances,	*Johnson Creek,*	G. S.
Markham, George Francis,	*Milwaukee,*	M. C.
Mauermann, Julius Ferdinand,	*Brodhead,*	G. S.
Maurer, Robert Adam,	*Sheboygan,*	C. H.
Meinert, Herman Timothy,	*Green Bay,*	M. C.
Morgan, James Carlos,	*Hartford,*	C. H.
Nash, James Bertram,	*Centralia,*	G. S.
Neilson, Allan Samuel,	*North Milwaukee,*	Eng.
Nelson, Carl Emil,	*Racine,*	C. H.
Nelson, Ingwald,	*Madison,*	G. S.
Nelson, Nels Bastian,	*Eau Claire,*	Eng.
Newman, Mark Humphrey,	*Madison,*	A. C.
Nicholas, Walter Alvin,	*Livingston,*	Eng.
Nichols, Amy Huntley,	*Madison,*	Eng.
North, Charles Raymond,	*Onalaska,*	Eng.
Nye, Evans McGregor,	*Lancaster,*	C. H.
Osborne, Harry Stephens,	*Darlington,*	C. H.
Pardee, Neeley Eugene,	*Wausau,*	M. C.
Patterson, Russell Wilson,	*Madison,*	Eng.
Peterson, Harold Stuart,	*Milwaukee,*	A. C.
Pettibone, Mary Inez,	*Fond du Lac,*	A. C.
Pfund, August Herman,	*Madison,*	G. S.
Plumb, Ralph Gordon,	*Manitowoc,*	C. H.
Powell, Daisy Dean,	*Argyle,*	Eng.
Prichard, Helen Louise McG.,	*Janesville,*	M. C.
Priestley, Thomas Mortimer,	*Madison,*	M. C.
Regan, Katherine Patricia,	*Madison,*	Eng.
Reynolds, Edward John,	*Madison,*	Eng.
Richards, Stanley Harold,	*Woodstock, Ill.,*	C. H.
Ricker, Summer J.,	*Aurora, Ill.,*	G. S.
Ridlington, Daniel James,	*Dell Rapids, S. D.*	A. C.
Ruhnke, Richard,	*Algona,*	G. S.
Salisbury, Winifred,	*Oregon,*	Eng.
Sawyer, Walter Percy,	*Waukesha,*	G. S.
Schermerhorn, Emma Rebecca,	*Madison,*	Eng.
Schoensigel, Fred C.,	*Plymouth,*	Eng.
Schubring, John Bernhard Ed.,	*Sauk City,*	Eng.
Sherman, Leta,	*Madison,*	A. C.
Sias, Nellie Bly,	*Sparta,*	M. C.
Skonnord, Olaf Norman,	*La Crosse,*	C. H.
Smart, Jennie Myrtle,	*New Lisbon,*	Eng.
Smith, Arthur Frank,	*Madison,*	G. S.

Smith, Ashbel V.,	*Waukegan, Ill.,*	Eng.
Smith, August,	*Berlin,*	Eng.
Smith, James Elmo,	*Sharon,*	Eng.
Smith, Julia Forster,	*Madison,*	A. C.
Smith, Morton Weir,	*Waupun,*	Eng.
Stevens, John Charles,	*Milwaukee,*	A. C.
Stillman, Clara Luemma,	*Milwaukee,*	G. S.
Stover, Paul,	*Milwaukee,*	A. C.
Sweet, Lucien Samuel,	*Madison,*	C. H.
Swensen, Mena,	*Madison,*	G. S.
Thomas, Alice Elizabeth,	*Waukesha,*	M. C.
Thompson, Albert S.,	*Mt. Horeb,*	G. S.
Thompson, Charles Lowry,	*Davenport, Ia.,*	A. C.
Tracy, Lyndon Hickok,	*Madison,*	A. C.
Tracy, Percy Wheeler,	*Madison,*	G. S.
Trippel, Frank Charles,	*Milton Junction,*	Eng.
Turnbull, Fred William,	*Racine,*	C. H.
Van Kirk, Joseph Arthur,	*Janesville,*	Eng.
Verberkmoes, John Martin,	*Madison,*	G. S.
Vroman, William Phillips,	*Green Bay,*	M. C.
Wadsworth, Clinton Daniel,	*Evansville,*	G. S.
Watson, John Charles,	*Livingston,*	Eng.
Werner, Fred William, Jr.,	*Milwaukee,*	G. S.
White, Clarence Joel,	*Monroe,*	A. C.
Wilder, Ralph Lee,	*Evansville,*	G. S.
Williams, Charles A.,	*Madison,*	C. H.
Williams, Evart Velie,	*Dodgeville,*	G. S.
Wing, Florence Sherwood,	*La Crosse,*	M. C.
Wilson, Mary Lang,	*Berlin,*	G. S.
Wilson, Simon Patrick,	*Northport,*	Eng.
Winkenwerder, Hugo August,	*Watertown,*	G. S.
Wolcott, Floyd Garrison,	*Sharon,*	Eng.
Wolf, Hermann Emil, Jr.,	*La Crosse,*	G. S.
Wyssmann, Arthur Joseph,	*Manitowoc,*	C. H.

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Special Students.

Adams, Harry Wilfred,	*Black Earth,*	Eng.
Alfred, Clarence John,	*Lake Geneva,*	C. H.
Anderson, William John,	*Madison,*	Eng.
Ayers, Arthur Carlton,	*Sparta,*	C. H.
Aylward, Joseph John,	*Black Earth,*	Eng.
Barns, Frank Rowe,	*St. Louis, Mo.,*	Eng.

Beattie, John Mesner,	*Florence,*	G. S.
Beebe, Claude Spencer,	*Milwaukee,*	G. S.
Black, Robert Franklin,	*Madison,*	A. C.
Brand, Bessie Goodrich,	*Madison,*	M. C.
Bredsteen, Joseph,	*Stoughton,*	Eng.
Brewer, Chester Leland,	*Janesville,*	M. C.
Briere, Carolyn Louise,	*Grand Rapids,*	Eng
Brockway, Walter H.,	*Wauwatosa,*	G. S.
Brown, Bertha Mower,	*Eau Claire,*	Eng.
Brownell, George Holmes,	*Janesville,*	C. H.
Carter, John Edward,	*Menomonie,*	Eng.
Chase, Ransom Jay,	*Sioux City, Ia.,*	G. S.
Clark, Henry Kendall,	*Madison,*	Eng.
Clark, William Bernard,	*Belleville,*	Eng.
Cochems, Edward Bulwer,	*Sturgeon Bay,*	Eng.
Cook, Edward Albert,	*Madison,*	Eng.
Crabtree, John Buel,	*Dixon, Ill.,*	C. H.
Cronk, Claude Henry,	*Oregon,*	Eng.
Cross, Mary Helen,	*Madison,*	Eng.
Dahl, Gerhard Melvin,	*Madison,*	Eng.
Dean, Joseph, Jr.,	*Madison,*	G. S.
Dickinson, William Frederick,	*Rockford, Ill.,*	Eng
Drinker, Florence Lydia,	*Portage,*	Eng.
Duke, Henry Clay,	*Madison,*	A. C.
Dye, Daisy Rumina,	*Madison,*	Eng.
Ellis, Ard Hoyt,	*Vinton, Ia.,*	Eng.
Elward, Dorothy,	*Sprinfield, Ill.,*	Eng.
Enge, John Jacob,	*Eau Claire,*	Eng.
Esch, George Edwin,	*Sparta,*	Eng.
Evans, Isaac Crosby,	*Spring Green,*	Eng.
Farrand, Roy Felton,	*Galesville,*	Eng.
Ford, Frank Leland,	*Grand Rapids,*	Eng.
Gardner, Harry Irving,	*Grand Rapids,*	Eng.
Gohlke, Emma Luella,	*Madison,*	Eng.
Gregg, Samuel Bowman,	*Danville, Ia.,*	Eng.
Henry, Herbert Arthur,	*Whitewater,*	Eng.
Hogan, James Cook,	*La Crosse,*	A. C.
Hopkins, James Stolp,	*Aurora, Ill.,*	Eng.
Horton, Angelo Burgess,	*Oregon,*	Eng.
Housel, Jennie Edna,	*Madison,*	G. S.
Hoy, Eugene Richard,	*Woodstock, Ill.,*	C. H.
Jacobson, Anna,	*Stoughton,*	Eng.
Johnson, Frank Erastus,	*Lake Geneva,*	Eng.

Keenan, John Leo,	*Winona, Minn.*,	C. H.
Kney, Ena Elsbeth,	*Madison*,	Eng.
Langley, Ina Virginia,	*Merrill*,	Eng.
Lowell, Jacob, Jr.,	*Fargo, N. D.*,	G. S.
Lueders, Minnie M.,	*Madison*,	Eng.
McGee, Charles Anson Augustus,	*Whitefish Bay*,	C. H.
McGowan, Fred C.,	*Eau Claire*,	Eng.
McKinley, John Patrick,	*Postville, Ia.*,	Eng.
Malloy, Kathryn Gertrude,	*Fond du Lac*,	Eng.
Marlow, Ella Ethelind,	*Decorah, Ia.*,	M. C.
Mather, Israel,	*Chicago, Ill.*,	Eng.
Meinhardt, Leonore Agnes,	*Burlington*,	Eng.
Mutch, James William,	*Elroy*,	G. S.
Newton, Charles M.,	*Bangor*,	A. C.
Noelke, Augusta Elizabeth,	*La Crosse*,	Eng.
Nohelty, Patrick,	*Lake Geneva*,	Eng
Norcross, Edward Powers,	*Janesville*,	Eng.
Oscar, Stephen Albert,	*Washburn*,	Eng.
Parks, Edna Mary,	*Crystal Falls, Mich.*,	A. C.
Pearson, Louis Mossop,	*Madison*,	G. S.
Peck, Roy Walter,	*Milwaukee*,	M. C.
Pellage, George William,	*Madison*,	Eng.
Perry, Ralph Waldo Emerson,	*Stevens Point*,	G. S.
Pick, John Balthasar Frank,	*West Bend*,	Eng.
Ranseen, Carl M.,	*Chicago, Ill.*,	Eng.
Reinhard, Hans August,	*Milwaukee*,	M. C.
Richards, Lillian Ethel,	*Lake Geneva*,	Eng.
Ringle, Oscar Louis,	*Wausau*,	Eng.
Ritan, Elling S.,	*West Superior*,	Eng.
Roberts, John Alvin,	*Portage*,	G. S.
Rogers, Victor Eugene,	*Plankington, S. D.*,	Eng.
Ross, Lura Llora,	*Hudson*,	Eng.
Ross, William Harvey,	*Chicago, Ill.*,	G. S.
Russell, Edna Leona,	*Manistee, Mich.*,	Eng.
Ryan, Ferne,	*Reedsburg*,	Eng.
Seabury, Roxie Katharyne,	*Oak Park, Ill.*,	A. C.
Seiler, Charles Edwin,	*Alma*,	G. S.
Short, George Howard,	*Lake Geneva*,	Eng.
Smith, Goldwin Howard,	*Madison*,	Eng.
Stenzel, Leopold,	*South Wayne*,	A. C.
Stetson, Dudley Donnelly,	*Milwaukee*,	G. S.
Tuffley, Frank Sylvester,	*Boscobel*,	G. S.
Vilas, Katherine Porter,	*Madison*,	M. C.

Walker, Mabel Emma,	*Racine,*	Eng.
Warner, Paul Sherman,	*Madison,*	Eng.
Wehmhoff, Eugene John,	*Burlington,*	A. C.
Wilcox, Frances May,	*Madison,*	Eng.
Williams, Jason P.,	*Sparta,*	C. H.
Wilson, William Cyrus,	*Santa Barbara, Cal.,*	G. S.
Young, Edna M.,	*Reedsburg,*	Eng.
Young, Fred Arthur,	*Reedsburg,*	Eng.

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ADULT SPECIAL STUDENTS.

Babcock, Ella Louise,	*Manistee, Mich.*
Barton, Ella Andria,	*Mount Vernon.*
Bates, Walter Eugene,	*Retreat.*
Berg, Martin John,	*Madison.*
Bliss, Eleanor Beattie,	*Richland Center.*
Bohran, Christian Bernard,	*Madison.*
Bold, Mabel Dixon,	*Madison.*
Boyd, Eric,	*Madison.*
Crocker, Levi Archibald,	*Madison.*
Cunningham, Delia Katharine,	*Madison.*
Dawson, William,	*Marshall.*
De Soucy, Pierre Emmanuel F.,	*Madison.*
Dibble, Olive Amanda,	*Madison.*
Eddy, Ernest Wilder,	*Janesville.*
Edgar, Thomas Oscar,	*Madison.*
Esterly, Henry Minor,	*Madison.*
Fish, Albert Elias,	*Florence, O.*
Ford, Edna Hillyer,	*Madison.*
Fordyce, Maude Beryl,	*Fond du Lac.*
Fox, Philip Angus,	*Milwaukee.*
Gilbertson, Nellie Mathilda,	*St. Ansgar, Ia.*
Glass, Charles Russell,	*Madison.*
Gray, Eunice Thompson,	*Darlington.*
Gray, Zoe Leonore,	*Gratiot.*
Harker, Bert,	*Linden.*
Harrigan, Frank Elwood,	*Madison.*
Henkes, David Albert,	*Madison.*
Herfurth, Elizabeth Marie,	*Madison.*
Hewitt, Harry Roland,	*Marinette.*
Holden, Roy Jay,	*Sheboygan Falls.*
Johnson, Jesse Worthington,	*Sterling, Ill.*
Jones, Warren Gilbert,	*Moundville.*

Joslin, Orin William,	*Kingston.*
Ketcham, Preston Harry,	*Madison.*
Kittleson, Ole Andrew,	*Perry.*
Lamb, Mary Effie,	*Melrose.*
Lawson, George Lorando,	*Milwaukee.*
Lyon, Frank Emory,	*Sun Prairie.*
McMillan, John Walter,	*Milwaukee.*
McRae, Mary Catherine,	*Alma.*
Martin, Benjamin Franklin,	*Fulton.*
Mathias, Mary Constance,	*Madison.*
Meisnest, Frank William,	*Branch.*
Mills, Nettie,	*Lodi.*
Miner, Marie S.,	*Racine.*
Moore, Maybelle Emma,	*Clyde, Ill.*
Morris, Thomas Sherman,	*Madison.*
Moyle, Nellie Avis,	*Yorkville.*
Nuzum, Willard Otto,	*Brooklyn.*
Pickarts, Mary Eliza,	*Madison.*
Price, Clinton Guilford,	*Madison,*
Rice, Hildor Petrehn,	*Stoughton.*
Richardson, Robert Emmons,	*Burlington.*
Rogers, James Hanson,	*Madison.*
Rogers, Margaret Fuller,	*Milwaukee.*
Rohde, Hugo William,	*Milwaukee.*
Ruediger, Gustav Ferdinand,	*Alma.*
Sauthoff, Harriet Rosetta,	*Madison.*
Sharpe, Guy Arnold,	*Johnsonburg, N. Y.*
Sieker, William Christian,	*Manitowoc.*
Smith, Edward Henry,	*Madison.*
Smith, Leona,	*Cherokee, Ia.*
Smyth, Herman Augustine,	*Stuart, Ia.*
Wald, Emilie Rose,	*Madison.*
Weekes, Emily R.,	*Plymouth.*
Westenhaver, Adda Josephine,	*Madison.*
Williams, John,	*Barneveld.*
Williamson, Richard,	*Madison.*
Wojta, Joseph Frank,	*Nero.*

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COLLEGE OF MECHANICS AND ENGINEERING.

Senior Class.

Ashton, James,	*Milwaukee,*	E. E.
Bentley, Fred William,	*Oregon,*	M. E.

Boynton, Clarence William,	*Clark Mills,*	M. E.
Campbell, Bert,	*Evansville,*	C. E.
Connor, Samuel Powers,	*Clinton, Ia.,*	C. E.
Crandall, Henry Roy,	*Milwaukee,*	M. E.
Elser, Robert Charles,	*Milwaukee,*	C. E.
Fugina, Arthur Rudolph	*Fountain City,*	C. E.
Gerlach, Thomas Anton,	*Milwaukee,*	C. E.
Hargrave, Russell William,	*Orlando, Fla.,*	M. E.
Heine, Rudolph Ernst,	*Milwaukee,*	E. E.
Jenne, Robert Daniel,	*Berlin,*	E. E.
Klug, Lebrecht J.,	*Milwaukee,*	C. E.
Kremers, John G.,	*Milwaukee,*	E. E.
Landgraf, Fred Karl,	*Ft. Atkinson,*	M. E.
Leich, Oscar M.,	*Jackson,*	E. E.
Lueth, Paul Frederick;	*Baraboo,*	M. E.
Malec, Anton,	*Madison,*	M. E.
Merriam, Hugh Nelson,	*Waupun,*	C. E.
Newman, Frederick Jacob,	*Milwaukee,*	E. E.
Pope, George William,	*Mayville,*	C. E.
Schafer, Otto,	*Madison,*	C. E.
Scheiber, Arthur Valentine,	*Milwaukee,*	E. E.
Schneider, Henry Charles,	*Appleton,*	M. E.
Seymour, Marshall Ehle,	*Madison,*	E. E.
Smith, Allard,	*Eau Claire,*	E. E.
Smith, Harrison Arthur,	*Brodhead,*	E. E.
Smith, Philip Sheridan,	*Dodgeville,*	E. E.
Spence, Harry,	*La Crosse,*	E. E.
Spindler, Max Henry,	*Dale,*	C. E.
Swaty, David Youngs,	*Milwaukee,*	C. E.
Thorkelson, Halsen Jos. Besford,	*Racine,*	M. E.
Warner, Horace Roy,	*Whitewater,*	M. E.
Zabel, Max William,	*Milwaukee,*	E. E.
Zinn, Walter Adolph,	*Milwaukee,*	M. E.

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Junior Class.

Austin, Wilbur Azro,	*Bloomington,*	M. E.
Barr, John Martin,	*Milwaukee,*	M. E.
Buckley, Walter John,	*Lake Mills,*	E. E.
Farris, James Archibald,	*Fennimore,*	M. E.
Freschl, Edward,	*Milwaukee,*	M. E.
Hambuechen, Carl,	*Milwaukee,*	E. E.
Hanson, Henry Olaus,	*Eau Claire,*	E. E.

Hogan, John Joseph,	*Chippewa Falls,*	E. E.
Hunner, Earl Emmet,	*Spokane, Wash.,*	C. E.
Johnson, Edwin S.,	*Sterling, Ill.,*	C. E.
Keller, Carl A.,	*Chilton,*	E. E.
Knowles, James Henry,	*Berlin,*	C. E.
Lippert, Arthur Bernard,	*Milwaukee,*	E. E.
Logemann, Richard Thomas,	*Milwaukee,*	C. E.
McArthur, Joseph Maxwell,	*Gainesville, Fla.,*	E. E.
McConville, Curran Collins,	*La Crosse,*	M. E.
Mason, Charles Thomas,	*Fond du Lac,*	M. E.
Merrick, Eldridge Gerry,	*Danbury, Conn.,*	E. E.
Nee, Thomas George,	*Ft. Atkinson,*	E. E.
Newell, Martin W.,	*New Richmond,*	C. E.
Nommensen, Richard Arthur,	*Sheboygan,*	C. E.
Olson, Louis Walter,	*Manitowoc,*	E. E.
Olson, Martin C.,	*Eau Claire,*	E. E.
Peele, Hereward John,	*New Westminster, B. C.,*	E. E.
Ragland, John Kelley,	*Boonville, Mo.,*	M. E.
Reynolds, William Everett,	*Mineral Point,*	E. E.
Richards, William Allen,	*Madison,*	M. E.
Schroeder, Frederick Albert,	*Milwaukee,*	E. E.
Shaffer, Robert Lyman,	*Neoga, Ill.,*	M. E.
Sloan, William Griffith,	*Chicago, Ill.,*	M. E.
Stewart, Ralph William,	*Madison,*	C. E.
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Sophomore Class.

Ackerman, Harry Roy,	*Necedah,*	E. E.
Barnes, Charles Ballou,	*Denrock, Ill.,*	M. E.
Baus, Richard Edward,	*Madison,*	M. E.
Blood, Clarence Curtice,	*Appleton,*	C. E.
Buttles, Ben Elijah,	*Madison,*	E. E.
Cannon, Willis West,	*Algona,*	E. E.
Collins, Charles Graham,	*Madison,*	C. E.
Cook, Thomas Russell,	*Oshkosh,*	M. E.
Countryman, Merton Alvin,	*Rochelle, Ill.,*	C. E.
Dixon, John Edward,	*Milwaukee,*	M. E.
Echlin, Samuel Bosset,	*Janesville,*	M. E.
Egan, Richard Anthony,	*Northport,*	E. E.
Emerson, Fred Merrill,	*Milwaukee,*	C. E.
Fowler, Myron Marshall,	*Wauwatosa,*	E. E.
Goodsell, Charles Glenn,	*Sparta,*	E. E.
Granke, Leo Ernest,	*La Crosse,*	C. E.
Hagg, John Richard,	*Cumberland,*	C. E.

Harvey, John LeRoy,	*Mondovi,*	M. E.
Heald, Eugene Hamilton,	*Oak Park, Ill.,*	C. E.
Hedke, Charles Richard,	*Racine,*	C. E.
Hirshheimer, Louis Carver,	*La Crosse,*	M. E.
Hoyt, Warren Albert,	*Madison,*	C. E.
Humphrey, Clifford Wane,	*Waterloo,*	E. E.
Hurd, John Thomas,	*Oregon,*	C. E.
Icke, John Frederick,	*Marshfield,*	C. E.
Jones, Frank William,	*Milwaukee,*	E. E.
Knutson, Arthur Martin,	*Madison,*	E. E.
Lacey, Frank Herbert,	*Sioux Falls, S. D.,*	E. E.
Lea, John McKenzie,	*Waupaca,*	E. E.
Lindem, Olaf James,	*Marinette,*	C. E.
McArthur, Arthur Royal,	*Johnstown,*	M. E.
McKay, Clyde Marshall,	*Chippewa Falls,*	M. E.
Minch, Walter Bernard,	*Madison,*	M. E.
Moore, Lewis Eugene,	*Chicago, Ill.,*	M. E.
Muther, Lorenz Francis,	*Oak Park, Ill.,*	M. E.
Nelson, Clarence Lotario,	*Racine,*	C. E.
Oberland, Edmund,	*Manitowoc,*	E. E.
Older, Clifford,	*Portage,*	C. E.
Putney, George Sidney,	*Waukesha,*	M. E.
Rawson, Charles P.,	*Madison,*	C. E.
Ray, Walter William,	*Waukesha,*	M. E.
Rhine, Charles Augustus,	*Madison,*	E. E.
Rothfolk, Edward,	*New Holstein,*	E. E.
Rowe, Clarence Wallace,	*Janesville,*	M. E.
Sands, Edward Emmet,	*Sparta,*	C. E.
Schmitt, Frederick Emil,	*Green Bay,*	C. E.
Seaman, Harold,	*Milwaukee,*	E. E.
Smith, Sydney Thomas,	*Sturgeon Bay,*	C. E.
Stone, Melvin Bailey,	*Melrose Park, Ill.,*	C. E.
Sweet, Henry Levington,	*Fond du Lac,*	C. E.
Taylor, John Clarence,	*Barron,*	E. E.
Wasmansdorff, Otto Francis,	*Chicago, Ill.,*	C. E.
Weed, Louis Burgess,	*Bristol,*	C. E.
Wheeler, Herbert Edward,	*La Crosse,*	M. E.
Wheeler, Wallace Earle,	*Chicago, Ill.,*	E. E.
Williams, Lynn Alford,	*Milwaukee,*	M. E.
Williams, William T.,	*Oshkosh,*	C. E.
Williamson, Edward Lucius,	*Janesville,*	C. E.
Wipfler, Robert Edwin,	*Detroit, Mich.,*	C. E.
Whomes, Harry Richards,	*Baraboo,*	M. E.

Freshman Class.

Abbott, Clarence Eugene,	*Florence,*	M. E.
Adams, Robert Elmore,	*Beloit,*	E. E.
Bachelder, Clare Herbert,	*Madison,*	M. E.
Bachelder, Frank Jerome,	*Madison,*	C. E.
Balding, Harry Alford,	*Milwaukee,*	E. E.
Benson, Lisle Victor,	*Madison,*	E. E.
Boyle, James Murray,	*Boston, Mass.,*	E. E.
Brobst, John Everett,	*Mondovi,*	E. E.
Brooker, Eugene G.,	*Lancaster,*	M. E.
Buerstatte, Frederick William,	*Manitowoc,*	M. E.
Bunker, George Tracy,	*Woodstock, Ill.,*	M. E.
Burdick, William Courtenay,	*Milwaukee,*	C. E.
Carter, Archy Burt,	*Humbird,*	C. E.
Colbert, Lawrence Clarence,	*Whitewater,*	M. E.
Dean, Charles Lyman,	*Seymour,*	M. E.
De Lille, Albert John,	*Two Rivers,*	M. E.
Dohearty, William Henry,	*Sturgeon Bay,*	C. E.
Fricke, August Charles,	*Milwaukee,*	M. E.
Fugitt, Carroll Townsend,	*Washington, D. C.,*	C. E.
Hartmann, Rudolph,	*Milwaukee,*	C. E.
Haskin, Edwin Easter,	*Milwaukee,*	M. E.
Hawn, Russell John,	*Stevens Point,*	C. E.
Hirschberg, Walter Paul,	*Milwaukee,*	C. E.
Hood, John Alexander,	*Racine,*	M. E.
Hopkins, Roy Edward,	*Edgerton,*	C. E.
Hurd, Nathaniel Leslie,	*Chippewa Falls,*	M. E.
Kalvelage, John Bernhard,	*Milwaukee,*	E. E.
Kershaw, Clifton Willey,	*Wauwatosa,*	M. E.
King, Arthur Charles,	*Chicago, Ill.,*	M. E.
Kull, Herman,	*Lake Geneva,*	E. E.
Larson, Albert Frederick,	*Sioux Falls, S. D.,*	M. E.
Leahy, John Hamilton,	*Madison,*	E. E.
Legg, Ernest Friend,	*Wausau,*	E. E.
Lewis, Arthur Warner,	*Madison,*	C. E.
Little, Frederick Arthur,	*Fond du Lac,*	M. E.
Lorch, John August,	*Madison,*	C. E.
McCollister, Chester Ward,	*Whitehall, Ill.,*	C. E.
Meyers, Alvin,	*Verona,*	E. E.
Meehan, Frank Rockwell,	*Darlington,*	E. E.
Murray, Archie Rolfe,	*Madison,*	E. E.
Mutchler, Carl Bertolette,	*Madison,*	C. E.
Neef, John Henry,	*Portage,*	E. E.

Nicolaus, Albert Adam,	*Beaver Dam,*	E. E.
Palmer, Roy,	*Sparta,*	E. E.
Powell, William Robert,	*Chicago, Ill.,*	C. E.
Rollman, Alfred,	*Chilton,*	E. E.
Salsich, Le Roy,	*Hartland,*	C. E.
Sanborn, Roy Asa,	*Janesville,*	E. E.
Savage, Edwin Forrest,	*Madison,*	M. E.
Severson, Harry Ashton,	*Milwaukee,*	C. E.
Spencer, Lloyd,	*Evansville,*	C. E.
Stadelman, William Emil,	*Mazomanie,*	M. E.
Stevens, Chester Harris,	*Mason City, Ia.,*	C. E.
Stevens, Harold Lisle,	*Tomah,*	C. E.
Thorgerson, Chris Theodore,	*Mason City, Ia.,*	C. E.
Townsend, Hubert Isaac,	*Poynette,*	E. E.
Treber, John Alfred,	*Deadwood, S. D.,*	E. E.
Vautrot, Frank Jules.	*Durand,*	M. E.
Vea, Fritchjof Johnson,	*Stoughton,*	M. E.
Ward, Sidney George,	*Chicago, Ill.,*	E. E.
Washburn, Frank Edwin,	*Sturgeon Bay,*	C. E.
Watson, James Webster.	*La Crosse,*	E. E.
Weirich, Paul Joseph.	*Monroe,*	E. E.
Wilcox, Howard,	*Madison,*	M. E.
William, Lester Denison,	*Fox Lake,*	C. E.
Wood, Henry Harrison,	*Stebbensville,*	M. E.

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Special Students.

Byrne, James M.,	*Ironton,*	C. E.
Campbell, Mildred Wadsworth,	*Madison,*	C. E.
Chamberlain, Paul Fairfield,	*Madison,*	C. E.
DeMontigny Henrie George	*Salt Lake City, U.,*	M. E.
Ellsworth, Gleason Sherwood,	*Marshfield,*	M. E.
Hodges, James S.,	*Denmark,*	C. E.
Klingholz, Edward Carl,	*Manitowoc,*	E. E.
Knauer, Bernard Francis,	*Chicago, Ill.,*	C. E.
McCullogh, Robert Henry,	*Oak Park, Ill.,*	C. E.
McCullough, Frank Michael,	*Sturgeon Bay,*	C. E.
Meffert, Edward Percy,	*Wonewoc,*	C. E.
Morrow, Homer,	*Spring Green,*	M. E.
Parsons, Walter Jay,	*Chicago, Ill.,*	C. E.
Pooler, Earl,	*Onalaska,*	C. E.
Robinson, Robert Edwin,	*Hermosa,*	E. E.
White, Sidney John,	*Canton,*	E. E.

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COLLEGE OF AGRICULTURE.

Long Course.

Dietrich, William,	*Black River Falls,*	Junior.
Johnson, Philip T.,	*Milwaukee,*	Sophomore.
Langlois, Archer Gillett,	*Racine,*	Freshman.
Michels, John,	*Calumet Harbor,*	Sophomore.
Parks, Perry Calhoun,	*Orangeburg, S. C.,*	Special.
Schlundt, Charles Ferdinand,	*Two Rivers,*	Sophomore.
Taylor, Frederick Dan,	*Springfield, Ill.,*	Freshman.
Trott, Harry Louis,	*Milwaukee,*	Junior.

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Short Course (Second Year).

Aldrich, Harry Elliot,	*Burlington.*
Arms, Walter Lyon,	*Randolph.*
Barber, Marvin Joseph,	*Strykersville, N. Y.*
Bernard, Hubert John,	*Ashton.*
Black, Reynolds Harvey,	*Lone Rock.*
Blonien, Michael,	*Johnsburg.*
Burchard, Henry Charles,	*Fort Atkinson.*
Cotzhausen, Curt v.,	*Milwaukee.*
Dukleth, Peter Andrew,	*Big Bend.*
Dworak, Henry Albert,	*Slovan.*
Elliott, John,	*River Falls.*
Follmer, Clarence,	*Oak, Neb.*
Good, Sidney Edgar,	*Vilas.*
Grover, Wilbur Arthur,	*Annsburgh.*
Haevers, Martin Ferd.,	*Tonet.*
Hamilton, James Henry,	*Poynette.*
Hanchett, William Henry,	*Sparta.*
Johnson, Orlo,	*Appleton.*
Joos, Alfred,	*Fountain City.*
Koch, Gustav Charles,	*Beecher, Ill.*
Krueger, Alexander,	*Watertown.*
Marshall, Samuel Hager,	*Madison.*
Murphy, Samuel Irwin,	*Woodbine, Pa.*
Newberry, William Ray,	*Peshtigo.*
Parks, Perry Calhoun,	*Orangeburg, S. C.*
Patterson, John Leon,	*Bloomington.*
Rabeler, Peter Fred,	*Leigh, Neb.*
Ray, William Frank,	*Alaska.*
Reddemann, August William,	*Danville.*

Renk, William Frank,	*Sun Prairie.*
Ritzinger, George,	*Eau Claire.*
Snyder, Robert Byron,	*Clinton.*
Stanton, James Henry,	*Mitchell.*
Steffen, Charles,	*Western Union.*
Thompson, Anders Cornelius,	*Clark's Mills.*
Thorsgaard, Emil Oscar,	*Westby.*
Thronson, Thron,	*Big Bend.*
Tormey, James Ambrose,	*Fennimore.*
Voegeli, William,	*Jordan.*
Williams, Harry Taylor,	*Waukesha.*
Woodworth, Roy Dennis,	*Geneva, Ill.*
Yerkey, Otto Robert,	*Husher.*

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First Year.

Anderson, Jens,	*Stone Bank.*
Andrews, Arthur Leon,	*South Wayne.*
Aus, Charles Robert,	*Woodford.*
Austin, Alvah Reed,	*White Creek.*
Austin, James Lee,	*Bay View Station.*
Baesmann, Otto,	*Edgar.*
Bagnell, James,	*Pewaukee.*
Baker, Howard Homer,	*Mapleton.*
Bandoli, Max Albert,	*Eau Claire.*
Banse, Henry August,	*Wolsey, S. D.*
Banzhof, George Emanuel,	*Elmira, N. Y.*
Barthel, Adolph,	*Madison.*
Becker, Peter Valentine,	*Trempealeau.*
Birmingham, Lester Ellsworth,	*Sturgeon Bay.*
Boesen, Jens,	*North Lake.*
Boisen, Martin Henry,	*De Bolt, Neb.*
Brinkerhoff, Frank Harvey,	*Brandon.*
Brown, George Shoff,	*Whitefish Bay.*
Bullock, Elmer Marshall,	*Nodaway, Ia.*
Buswell, James Cromwell,	*Eagle Point, Ill.*
Cebell, Roy Albert,	*Augusta.*
Clark, Lester,	*Viola.*
Cook, Jay Butler,	*Portage.*
Crosby, Anson Newell,	*South Wayne.*
Curran, William,	*Sechlerville.*
Dailey, Elmer Jay,	*Hudson.*
Deans, Ernest,	*River Falls.*

Dixon, Thomas,	*Boaz.*
Donnelly, John Englebert,	*Gratton.*
Doty, Marwell Dorr,	*Burke.*
Drissen, Peter John,	*Alaska.*
Ellegaard, Nels Anderson,	*Marinette.*
Englebretson, Martin,	*Cartwright.*
Erstad, Peter,	*Menomonie.*
Fillbach, Willie,	*Cobb.*
Fluetsch, Lucius,	*Fountain City.*
Fogle, Louis James,	*Shell Lake.*
Frank, Wendelin,	*Dufur, Ore.*
Freitag, Henry,	*Monticello.*
Fried, Gandenz,	*Fountain City.*
Fuller, Curtis Frank,	*Brooks, Ia.*
Gass, William James,	*Sheboygan.*
Geise, William George,	*Underwood, Ia.*
Grist, Harry Cleveland,	*Hayward.*
Griswold, Robert Gray,	*West Salem.*
Haag, Louis Casper,	*Cadott.*
Hall, John Veazey,	*James, Ala.*
Hamilton, Homer Willis,	*Rantoul, Ill.*
Harr, Ernest Bryant,	*Rockland.*
Hasey, Ralph Austin,	*Columbus.*
Hedderich, Gustavus Michael,	*Williston, N. D.*
Heiter, Henry August,	*Kewaunee.*
Henkel, Lewis Evans,	*Lancaster.*
Holston, Eugene,	*Ashland.*
House, Elmer,	*Delton.*
Jones, Moses Lloyd,	*Sparta.*
Jones, Tillman Howard,	*Monroe.*
Kelly, Arthur Horace,	*Mineral Point.*
Kingston, Percival Stuart,	*Jacksonport.*
Kramer, Charles Norman,	*Edgerton.*
Kufahl, Henry,	*Taegesville.*
Lassell, Harry James,	*Orfordville.*
Lynch, Silvester,	*Augusta.*
McComb, Cardell John,	*Ft. Atkinson.*
McDonald, John William,	*Cambria.*
Main, Aura Gilbert,	*Appleton.*
Martiny, Louis Paul,	*North Freedom.*
Miller, William Charles,	*Center.*
Moilien, Tilmar James,	*Coon Valley.*
Moore, Arthur Destin,	*Kingston.*

Morse, Jay Warner,	*Manitowoc.*
Muenster, Herman,	*New Holstein.*
Nelson, John,	*Kaukauna.*
O'Day, Patrick,	*Madison.*
Oddie George Miller,	*Hartman.*
Oestreich, Rudolph Charles.	*Kewaunee.*
Padden, Henry,	*Erin.*
Parks, Patrick Frank,	*Gratton.*
Pollock, Wilbur Horace,	*Shirland, Ill.*
Preston, Ross Clark,	*West De Pere.*
Ranum, Peter,	*Forward.*
Rath, William Henry,	*Richland.*
Roe, Thomas Cory,	*Augusta.*
Rohl, John Fred,	*London.*
Rood, Ole,	*Wiota.*
Ross, Harry Fleming,	*Hinsdale, Ill.*
Runice, Martin,	*Rising Sun.*
Sager, Herbert Benjamin,	*Nora.*
Sather, Edgar Julius,	*Coon Valley.*
Schaefer, Rudolph John,	*Neenah.*
Schmidt, Otto Benjamin,	*Wayne.*
Schroeter, Hugo,	*New Coeln.*
Schwartz, John Joseph,	*Troy Center.*
Seaberg, Charles,	*Brodhead.*
Seeman, Walter,	*Silverspring.*
Sherman, Martin Isaac,	*Pawlet, Vt.*
Sievers, Frederic John,	*Silverspring.*
Simon, Frank Peter,	*Sawyer.*
Skidmore, Elwin Lyman,	*Oshkosh.*
Smiley, Dan Bemus,	*Albany.*
Smith, Harry Forseythe,	*Jacksonport.*
Snow, Dana Bickford,	*Huntley, Ill.*
Strnad, Joseph,	*Kewaunee.*
Tate, George Harvey,	*La Farge.*
Thurlow, Ralph Wilson,	*La Crosse.*
Tobler, Charles,	*Knoxville, Tenn.*
Trageser, Stephen,	*Gary, S. D.*
Trenckmann, Emil Frederick,	*Peters, Tex.*
Wagner, Joseph Michael,	*Hillsboro.*
Wahrenbrock, Amos Joe,	*Corder, Mo.*
Walline, Charles William,	*Cambridge, Ill.*
Warnemuende, Theo. Fred,	*Lyndon.*

White, Thomas Joseph,	*Vesper.*
Williams, Joseph,	*Waukesha.*

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DAIRY CLASS.

Second Year.

Hastings, Roy Clifford,	*Oconomowoc.*
Helgeson, Thomas Franklin,	*Holman.*

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First Year.

Adams, Robert Layton,	*Summit Center.*
Ahlness, Nels,	*Hanska, Minn.*
Arntsen, Engvald Meai,	*Woodville.*
Bachman, John Fred,	*Bonduel.*
Backus, William Arthur,	*Madison.*
Baetz, Charley William,	*Hullsburg.*
Bagnall, Joseph Wilson,	*Jacksonport.*
Barnes, Fred R.,	*Cassville.*
Biegler, John Fred,	*Monroe.*
Blanck, August Herman,	*Johnsonville.*
Boelter, Herman August,	*Berlin.*
Brown, Mead J.,	*Hastings, Mich.*
Churchill, Leroy D.,	*Marion.*
Claybaugh, Francis Eugene,	*Wyoming.*
Cockerill, William Henry,	*Berlin.*
Coggeshall, Benjamin Rogers,	*Solomon, Kan.*
Conry, Elmer Seth,	*Sun Prairie.*
Corneliussen, Thomas,	*Huntley, Ill.*
Cough, Henry Guy,	*Appleton.*
Curtis, Charles William,	*Patch Grove.*
Dassow, Herman Henry,	*Sheboygan Falls.*
Dassow, Rudolph Peter,	*Sheboygan Falls.*
Downer, George Orton,	*Viola.*
Dufner, Samuel Joseph,	*Fennimore.*
Edge, Samuel James,	*Scales Mound, Ill.*
Engelmann, Charles Lewis,	*Madison.*
Erickson, Carl Albert,	*Little Falls.*
Fagan, John,	*Stanley.*
Fitzgerald, Patrick Henry,	*Providence, Ill.*
Forbes, Doric William,	*Lake Geneva.*
Frisbee, Jerome B.,	*Brooklyn.*
Godfrey, Joseph Herbert,	*Lima Center.*
Gullickson, Martin Nils,	*Cushing.*

Hansen, Henry Jacob,	*Albertsville.*
Harville, Thomas William,	*Wyalusing.*
Haushalter, John,	*Pulaski.*
Hessler, Romie Jerome,	*Balmoral.*
Hoover, Maurice Samuel,	*Wolf Creek.*
Hutchinson, Fred Alonzo,	*Bellaine, Kan.*
Imobersteg, Gottlieb,	*Mayville.*
Jensvold, Zacharias,	*Perry.*
Johnson, Emanuel,	*Trade Lake.*
Jungels, Joseph,	*Louisburg.*
Kanera, John Joseph,	*Norman.*
Kasten, William Frederick,	*Watertown.*
Key, Scott	*Patch Grove.*
Kimball, Henry,	*Lake Geneva.*
King, Clayton George,	*Pleasant Prairie.*
Kirley, John Eugene,	*Doyleston.*
Klossner, John Gottfried,	*Monroe.*
Kohli, Robert,	*Le Roy.*
Kots, William,	*Baldwin.*
Lindow, Frank Otto,	*Franklin.*
Ludwig, Matt.,	*Goodings Grove, Ill.*
Lyons, Michael,	*Fontenoy.*
McAllister, Ward Sagefield,	*Kelly Brook.*
McBride, George Gary,	*Scales Mound, Ill.*
McGuire, Frank James,	*Marshall.*
Metzger, John,	*Madison.*
Mill, Rudolph Fred,	*Hika.*
Millius, Henry August,	*Almond.*
Mink, Frank Roy,	*Burton.*
Montag, Henry,	*Dickeyville.*
Munroe, Joshua Wales,	*Plainfield, Ill.*
Nedvidek, Victor Hugo,	*Star Prairie.*
Nejedlo, John Andrew,	*Pilsen.*
O'Neill, James,	*Fennimore.*
Orth, Frank Charles,	*Waupun.*
Otterson, Oscar,	*Little Falls.*
Panian, George John, Jr.,	*Almena.*
Parge, Henry George,	*Dorchester.*
Parks, John Theodore,	*Lancaster.*
Perren, Charles Fred,	*Mount Calvary.*
Peters, John Henry,	*Sheboygan Falls.*
Peterson, John Scott,	*Denmark.*
Pluss, Robert John,	*Superior.*

Randall, George Franklin,	*Spring Green.*
Reid, Clarence Penny,	*Providence, Ill.*
Rickert, George William,	*Clintonville.*
Roberts, John Pritchard,	*Ixonia.*
Robinson, George James,	*Jacksonport.*
Roethel, Willie,	*Ada.*
Sargent, Fred Nathan,	*New Lisbon.*
Savary, George John,	*Benton.*
Schaber, Francis Charles,	*Millbrig, Ill.*
Schmidt, Frederic August,	*Two Rivers.*
Scott, Peter Sherman,	*Brodhead.*
Seitz, Jacob,	*Tabor.*
Starr, Joseph,	*La Crosse.*
Strupp, William Edward,	*Coon Valley.*
Taege, Henry Ferdinand,	*Taegesville.*
Thompson, Charles Brazier,	*La Delle, S. D.*
Thompson, James McGregor,	*Poynette.*
Thorson, Edward Oscar,	*Henderson.*
Vandewater, Richard Balas,	*Dona Ana, N. M.*
Viergutz, Frank Albert,	*Marion.*
Walker, Arthur Pridd,	*Koro.*
Wallace, Joseph Warren,	*Floyd.*
Wallace, Patrick William,	*Wittlin.*
Waller, Andrew,	*North Bend.*
Walsh, William Steven,	*Plain.*
Weaver, Ross Daniel,	*Tibbets.*
Webb, George Henry,	*Cadott.*
Weller, Alfred William,	*Mauston.*
Wilson, Oscar Emil,	*Gratiot.*
Zimmerman, Francis Frederick,	*Rome.*

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COLLEGE OF LAW.

Senior Class.

Alsted, Lewis Losey,	*Milwaukee.*
Blewett, Francis Dennis,	*Fond du Lac.*
Burgess, Ezra Roy,	*Racine.*
Clark, Homer Caswell,	*Damariscotta Mills, Me.*
Conway, William James,	*Rudolph.*
Dolph, Cyrus Washington,	*Brookfield.*
Ellis, Frederick Charles,	*Oconto.*
Frame, Harvey Jay,	*Waukesha.*

Frazier, William Sumner,	*Madison.*
Griswold, William Edson,	*Columbus.*
Harnan, John Michael,	*Madison.*
Hollister, Raymond Asa,	*Oshkosh.*
Kauwertz, Walter Washington,	*Milwaukee.*
Kirkland, Ira Bird,	*Jefferson.*
Krugmeier, Albert Harmen,	*Horicon.*
Kulig, John Frank,	*Independence.*
Magne, Charles William,	*Polo, Ill.*
Magoon, Jay Howard,	*Milwaukee.*
Meyrose, Henry Victor,	*Milwaukee.*
Rowan, Frank Joseph,	*South Milwaukee.*
St. Peters, Reginald Ivar,	*Kewaunee.*
Schmidt, Albert Henry,	*Manitowoc.*
Stockett, Norman,	*Pottsville, Pa.*
Upham, Robert Allen,	*Shawano.*
Van Doren, Ray Newton,	*Birnamwood.*
Warren, Edgar Beach,	*Green Bay.*
Weidner, Adolph John,	*Milwaukee.*

Middle Class.

Anderson, Earle S.,	*Madison.*
Barney, Charles Richard,	*Mauston.*
Baumgarten, Otto Charles,	*Milwaukee.*
Baxter, Charles Melvin,	*Waupaca.*
Bean, Frank L.,	*Hamilton, Mont.*
Bertles, John Francis,	*Green Bay.*
Case, Henry Cadby,	*Milwaukee.*
Cate, Walter S.,	*Stevens Point.*
Clausen, Frederick Harold,	*Fox Lake.*
Collipp, Platon,	*Portage.*
Cryderman, Charles Alexander,	*Milwaukee.*
Curtis, Alfred Tennyson,	*Madison.*
Devney, Edward James,	*Reeseville.*
Edwards, Clarence Bushnell,	*Madison.*
Evans, Evan Alfred,	*Spring Green.*
Fisher, John Lincoln,	*Janesville.*
Frye, Herman Sidney,	*Mason City, Ia.*
Gannon, Walter Scott,	*Cedarburg.*
Gault, John Henry,	*Poynette.*
Gernon, George Edward,	*Madison.*
Gilbert, Frank Lynch,	*Madison.*

Gilman, Stephen Warren,	*Burke.*
Greenwood, Charles Sheen,	*Lake Mills.*
Gregg, John Parker,	*Madison.*
Groelle, Frederick Ford,	*Unity.*
Hartwell, Frederick Hoffman,	*La Crosse.*
Heyn, Bernard Goldsmith,	*Milwaukee.*
Hoyt, Heber Bishop,	*Waterloo.*
Humphrey, Thomas Augustus,	*Dancey.*
Hutchinson, Richard Gill,	*Roselawn.*
Jackson, Russell,	*Madison.*
Kelley, John William,	*Menomonie.*
Klatte, William Augustus,	*Milwaukee.*
Kreiss, William Henry,	*Appleton.*
Lowry, Robert Burr,	*La Crosse.*
McGee, Charles Anson Augustus,	*Milwaukee.*
McPhail, Archibald Cameron,	*Stevens Point.*
Martin, George Cushing,	*Omaha, Neb.*
Mason, Vroman,	*Madison.*
Maybury, James Henry,	*St. Cloud, Minn.*
Miller, George Harvey,	*Winneconne.*
Miller, John Oscar,	*Marinette.*
Minty, Louis William,	*Chicago, Ill.*
Murat, LeRoy John,	*Stevens Point.*
O'Connor, George Egbert,	*Eagle River.*
Oliver, James Frederick,	*Montrose.*
Page, Jay Wright,	*Honey Creek.*
Paulson, Ernest William,	*Elkhorn Lake.*
Pinkerton, David Clark,	*Menasha.*
Putnam, Giles Henry,	*Greenbush.*
Rehm, Henry Charles,	*Milwaukee.*
Schendel, Oscar John,	*Columbus.*
Schmidt, Adelbert Carl,	*Manitowoc.*
Seymour, Harry Ozias,	*Lake Geneva.*
Shaw, James Deyo,	*Wauwatosa.*
Shimeall, Spencer Ray,	*Shopiere.*
Sidler, Cornelius Anthony,	*Milwaukee.*
Smelker, Roy C.,	*Dodgeville.*
Sturges, Benjamin Oscar,	*Lake Geneva.*
Thorn, Paul Chaney,	*New London.*
Tillotson, Earle Clarence,	*Baraboo.*
Tolrud, Thomas Anderson,	*Peterson, Minn.*
Torkelson, Theodore Bernard,	*Black River Falls.*

True, Edgar Curtiss,	*Portage.*
Voight, Edward,	*Milwaukee.*
Wild, Robert,	*Milwaukee.*
Winterbotham, John Miller,	*Eau Claire.*
Woodmansee, John Frasier,	*Milwaukee.*

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Junior Class.

Alexander, Albert Fred,	*Centralia.*
Alexander, George Arnold,	*Manitowoc.*
Andrews, Ross Everett,	*Mukwonago.*
Backaus, August Charles,	*Kewaskum.*
Bartlett, Charles Lackey,	*Clayton, Ill.*
Bartman, John Henry,	*Appleton.*
Berg, Theodore,	*Milwaukee.*
Biersach, William Mann,	*Milwaukee.*
Blakeley, Henry Justus,	*Appleton.*
Bowler, James,	*Sparta.*
Chase, March Frederick,	*Mineral Point.*
Cochems, Henry Frederick,	*Sturgeon Bay.*
Comstock, Nathan,	*Baltimore, Md.*
Coyle, John Joseph,	*Freeport, Ill.*
Crawford, George,	*Oconto.*
Crego, Irving,	*Aurora, Ill.*
Davis, DeWitt, Jr.,	*Milwaukee.*
Dietrich Pearl,	*Prairie du Chien.*
Dietz, Robert,	*Mayville.*
Downey, Frank Elbert,	*Waupun.*
Ferguson, Herbert Thomas,	*Waupun.*
Finnegan, William Everette,	*West Green Bay.*
Gilmore, Eugene Leffler,	*Monticello.*
Glasier, Gilson Gardner,	*Wauwatosa.*
Gold, Walter Louis,	*Milwaukee.*
Graham, John Gray,	*Tomah.*
Graves, James Aloyus,	*Milwaukee.*
Gurnee, Paul Dennison,	*Madison.*
Hanks, David Arthur,	*Madison.*
Hay, Henry,	*Oshkosh.*
Hensel, Earl Franklin,	*Arcadia.*
Hillesheim, Adolph John,	*Dwight, Ill.*
Hirschberg, Joseph Gustave,	*Milwaukee.*
Huchting, Arnold Louis,	*Milwaukee.*
Husting Berthold Juneau,	*Mayville.*

Johnson, Buchanan,	*Sheridan.*
Johnson, Ole Lawrence,	*Black River Falls.*
Jones, William Thomas,	*Spring Water.*
Kelley, Charles Alonzo,	*Iroquois, S. D.*
Lewis, Howard Wilton,	*Mendota, Ill.*
McGrath, William Howard,	*Argyle.*
McManamy, Francis Vincent,	*Cashton.*
McNamara, Frank Landis,	*Janesville.*
Main, John Smith,	*Madison.*
Merrill, Fred,	*Green Bay.*
Metzler, Charles Henry,	*Portage.*
Montgomery, Charles Carroll,	*Omaha, Neb.*
Moran, John,	*De Forest.*
Morrow, William Ambrose,	*Omro.*
Moss, George Vernon,	*Rensselaer, Ind.*
Myers, Peter Jacob,	*Racine.*
O'Dea, Patrick John,	*Madison.*
Okeneski, John,	*Wausau.*
Pattee, Frank Dent,	*Lowell, Ind.*
Peterson, Edward Henry,	*Janesville.*
Peterson, Frederick Burns,	*Madison.*
Pierielee, Victor,	*Granton.*
Replinger, Charles Nichols,	*Madison.*
Richardson, Robert,	*Burlington.*
Riley, George Corey,	*Madison.*
Robbins, Samuel Brownlee,	*Carthage, Ill.*
Rodolf, Frank,	*Muscoda.*
Rogers, Selden Wallace,	*Portage.*
Rush, Walter James,	*Waterford.*
Sarau, George Adolphus,	*Oshkosh.*
Saucerman, Willard Thurman,	*Winslow, Ill.*
Schmidtman, John Christian,	*Manitowoc.*
Siggelko, Herbert Scott,	*Madison.*
Silber, Harry Mamlok,	*Milwaukee.*
Smith, Lloyd Dean,	*Amherst.*
Smith, William Noble,	*Madison.*
Suhr, Edmund,	*Madison.*
Tallman, George Kemp,	*Janesville.*
Tilden, George Huntington,	*Ames, Ia.*
Tirrill, Edward Drew,	*Lodi.*
Van Steenwyk, Gysbert,	*La Crosse.*
Von Cotzhausen, Arthur,	*Milwaukee.*

Werve, Charles Benjamin,	*Kenosha.*
Wheeler, William Philander,	*Omro.*
Willard, Harrison Henry,	*Mazomanie.*
Williams, Glenn Herbert,	*Grand Rapids.*
Wolf, Albert Christian,	*Greenville.*
Young, John Howard,	*Madison.*

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Special Students.

Buchholz, William David,	*Whitehall.*
Burke, Timothy,	*Wayside.*
Gillen, Martin James,	*Racine.*
James, Edward Holton,	*Concord, Mass.*

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SCHOOL OF PHARMACY.

Four Years' Course.

Anderson, Joseph Alvin,	*Argyle,*	Junior.
Bobb, Clement Luesther,	*Madison,*	Senior.
Denniston, Rollin Henry,	*Burlington,*	Junior.
Ferris, William Stewart,	*Whitewater,*	Senior.
Gage, Florence Meta,	*Madison,*	Senior.
James, Martha Morris,	*Oshkosh,*	Senior.
Kopp, Hermann,	*Chippewa Falls,*	Freshman.
Nolte, Simon Christian Henry,	*Milwaukee,*	Junior.
Stephens, Henry Elmo,	*Fennimore,*	Senior.

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Three Years' Course.

Alden, Frederick William,	*Madison,*	Senior.
Bjoernsen, Henry Nordie,	*Madison,*	Junior.
Brandel, Irvin Walter,	*Madison,*	Junior.
Chandler, Roy Parker,	*Milwaukee,*	Sophomore.
Davidson, Morton Stanley,	*Madison,*	Sophomore.
Donkle, Alfred De Forest,	*Madison,*	Senior.
Eighmey, Alva,	*McFarland,*	Junior.
Eighmey, Frank Wilbur,	*McFarland,*	Sophomore.
Funck, George William,	*Milwaukee,*	Junior.
Geerlings, Isaac,	*Milwaukee,*	Sophomore.
Gorr, Charles William,	*Milwaukee,*	Junior.
Grenier, Achille Bettridge,	*Racine,*	Sophomore.
Hendricks, Wallace Edward,	*Campbellsport,*	Senior.
Henning, Albert Louis,	*Iron Ridge,*	Junior.

Hindley, Robert Wiliam,	*Racine,*	Senior.
Holen, Henry Bronson,	*Eau Claire,*	Sophomore.
Hubbard, Frank Ruggles,	*Oakfield,*	Sophomore.
James, Charlotte Frances,	*Oshkosh,*	Senior.
Jensen, August Edham,	*Baldwin,*	Sophomore.
Jewett, Harvey Claude,	*Oregon, Ill.,*	Junior.
Kiesslich, Robert,	*Milwaukee,*	Senior.
Kimball, Myra Weston,	*Green Bay,*	Sophomore.
Klueter, Harry,	*Madison,*	Sophomore.
Krogh, Clarence Alford,	*Mt. Horeb,*	Senior.
Randall, May Inez,	*Ladoga,*	Junior.
Schowalter, Edwin Andrew,	*Milwaukee,*	Junior.
Schwarz, Herman Frederick,	*Green Bay,*	Senior.
Shields, George Alvin,	*Mazomanie,*	Junior.
Strauss, Richard James,	*Appleton,*	Sophomore.
Tandvig, Albert Nicholas,	*Madison,*	Sophomore.
Tiedemann, Rudolph Jacob,	*Middleton,*	Sophomore.
Upjohn, James,	*Fond du Lac,*	Sophomore.
Wadmond, Louis Christensen,	*Racine,*	Junior.
Young, Clark,	*Poynette,*	Sophomore.

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Two Years' Course.

Bosshard, Oscar William,	*Bangor,*	Senior.
Criddle, Arthur George,	*Stoughton,*	Junior.
Curtis, Clarence Edward,	*Shell Lake,*	Junior.
Doty, Clarence Bintliff,	*Edgerton,*	Junior.
Ehlert, Fred Gustave,	*Milwaukee,*	Junior.
Hubenthal, Charles Gilfred,	*Waukesha,*	Junior.
Kellogg, Harry Lyman,	*Oconomowoc,*	Junior.
Koske, Edwin Charles William,	*Fond du Lac,*	Senior.
Miller, George Joe,	*Beaver Dam,*	Senior.
Penberthy, William Bertell,	*Florence,*	Junior.
Schroeder, John Hugo,	*Madison,*	Senior.
Schulz, Henry Louis,	*Watertown,*	Junior.
Shepard, Alfred Clayton,	*Mauston,*	Senior.
Treloar, Delbert Claude,	*Waukesha,*	Junior.
Wigdale, Enos Samuel,	*Ft. Atkinson,*	Senior.
Zinn, Robert John,	*East Troy,*	Junior.

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SCHOOL OF MUSIC.

Collegiate.

THIRD YEAR.

Bliss, Eleanor Beattie,	*Richland Center.*
Dacy, Alice Beatrice,	*Woodstock, Ill.*
Fordyce, Maude Beryl,	*Fond du Lac.*
Fowler, William Muzzy,	*Madison.*
Fuller, Shirley,	*Madison.*
Goodwin, Sophy Marie,	*Madison.*
Hayden, Blanche Mary,	*Sun Prairie.*
Mills, Nettie,	*Lodi.*
Olsen, Clara,	*Madison.*
Walden, Alice,	*Argyle.*
Walker, George Parrott,	*Madison.*
Westonhaver, Adda Josephine,	*Madison.*

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SECOND YEAR.

Bach, Frank Charles,	*Madison.*
Beck, Clara Margaret,	*Madison.*
Brand, Bessie Goodrich,	*Madison.*
Burnham, Lillian Everette,	*Madison.*
Dibble, Olive Amanda,	*Madison.*
Dye, Daisy Rumina,	*Madison.*
Eager, Gertrude,	*Madison.*
Gibbons, Frank Clark,	*Sun Prairie.*
Gray, Zoe Lenore,	*Warren, Ill.*
Gunthrop, Pauline Priscilla,	*Austin, Ill.*
Haner, Cordelia,	*Sun Prairie.*
Haythurst, Elizabeth,	*Waterloo.*
Heim, Frederick Carl,	*Madison.*
Koltes, Mary,	*Madison.*
Lipe, Olive,	*Sharon.*
Luеders, Minnie Magdalene,	*Madison.*
Lyon, Jennie Charity,	*Sun Prairie.*
Mathias, Mary Constance,	*Madison.*
Miner, Marie Stevens,	*Racine.*
Mosel, Clara Belle,	*Sun Prairie.*
Moyle, Nellie Avis,	*Yorkville.*
Pickarts, Mary Elisa,	*Madison.*
Pound, Martha Edith,	*Madison.*
Rogers, Margaret Fuller,	*Milwaukee.*

Ross, Cora,	*Belleville.*
Russell, Henry Alexander,	*Fort Scott, Kan.*
Seiler, Livia Estelle,	*Alma.*
Shapiro, Rebecca,	*Medford.*
Stavrum, Ernst Arthur,	*La Crosse.*
Wippert, Emma,	*Milwaukee.*

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FIRST YEAR.

Ashley, Maude,	*Windsor.*
Baer, Clarence,	*Milwaukee.*
Bolender, Charles Barton,	*Monroe.*
Brigham, Bertha Blanche,	*Monroe.*
Brownson, Laura,	*Sharon.*
Castetter, Hallie Dell,	*Honey Creek.*
Clement, Grace Beatrice,	*Sun Prairie.*
Clifford, Ellen Ora,	*Madison.*
Clifford, Grace,	*Madison.*
Comstock, Lelia Leona,	*Oregon.*
Dahle, Eleonore Benedicta,	*Madison.*
Gale, Gladys,	*Reedsburg.*
Gibson, Edith Van Slyke,	*Madison.*
Gilbertson, Martha,	*Mt. Horeb.*
Gillies, Laverna Elpha,	*Evansville.*
Glasier, Emma Belle,	*Bloomington.*
Glenn, Mary Alice,	*Rockford, Ill.*
Glenz, Johanna,	*Madison.*
Graham, Katherine Sophia,	*Merrill.*
Hughes, Kathryn,	*Waushara.*
Jackman, Marcia Maria,	*Janesville.*
Johnson, Evelyn Otillia,	*La Crosse.*
Kies, Samuel William,	*Madison.*
King, Bessie Susan,	*Neillsville.*
Langley, Ina Virginia,	*Merrill.*
Law, J. Eugene,	*Perry, Ia.*
Loomis, Florence S.	*Windsor.*
Main, John S.,	*Madison.*
Marlow, Ella Ethelind,	*Decorah, Ia.*
Mehl, ugo Francis,	*Milwaukee.*
Murrish, Harry John,	*Mazomanie.*
Nash, James B.,	*Centralia.*
Port, Elizabeth Augusta,	*Millbank, S. D.*
Pratt, Frank Thomas,	*Madison.*

Stoddart, Harriet E.,	*Black Earth.*
Sheldon, Mabel,	*Reedsburg.*
Shockley, Mabel,	*Sun Prairie.*
Smith, Mary Campbell,	*Madison.*
Stephens, Isabel Mary,	*Madison.*
Thompson, Martha,	*Mt. Horeb.*
Willard, Alma Luthera,	*Tacoma, Wash.*
Wright, Nettie Estelle,	*Merrill.*
Young, Edna May,	*Reedsburg.*

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Academic.

Adams, Mabel,	*Wingra Park.*
Alford, Alice Irene,	*Madison.*
Alford, Hazel Viola,	*Madison.*
Angwick, Martin M.,	*Madison.*
Askew, Amelia Alice,	*Madison.*
Baas, Alexius,	*Madison.*
Barber, Winchell Fay,	*Waukesha.*
Beatty, Arthur,	*Madison.*
Bertles, Anne C.,	*Green Bay.*
Cooley, Fannie,	*Madison.*
Cooley, Ida,	*Madison.*
Cunningham, Delia Kathryn,	*Madison.*
Deike, Walter,	*Madison.*
Dietrich, William,	*Black River Falls.*
Dye, Rose Aileen,	*Madison.*
Edgren, Carrie Josephine,	*Madison.*
Fay, Helen Armine,	*Madison.*
Fay, Martha Marion,	*Madison.*
Flanagan, George H.,	*Sun Prairie.*
Gill, William Wesley,	*Madison.*
Hart, John,	*Waunakee.*
Hektoen, Marie,	*Westby.*
Hindley, Robert William,	*Racine.*
Holt, Marietta,	*Madison.*
Jewett, Hattie,	*Madison.*
Jones, Marion Burr,	*Madison.*
Keyes, Donald,	*Madison.*
Lamberson, Elbert Ward,	*Richland Center.*
McConnell, Emily,	*Madison.*
McNaught, William Christie,	*Madison.*
Mann, Sarah Haner,	*Washburn.*

Mayers, Charles,	*Madison.*
Montgomery, Milton Gray,	*Omaha, Neb.*
Neckerman, Reuben,	*Madison.*
Nichols, Minnie Irene,	*Madison.*
Nietert, Herman Adolph,	*Madison.*
Omen, Earl,	*Madison.*
Percival, Ida,	*Madison.*
Pierce, Helen,	*Madison.*
Pinkum, Anna Shaw,	*Eau Claire.*
Powell, Daisy,	*Argyle.*
Rasmussen, Thora Ferdinanda,	*Madison.*
Regan, Anne Howe,	*Madison.*
Renk, Mary Catherine,	*Bristol.*
Riley, Carrie May,	*Madison.*
Rogers, Selden Wallace,	*Portage.*
Schlimgen, Michael J.,	*Madison.*
Taylor, Frederick D.,	*Bates, Ill.*
Van Etta, Florence,	*Madison*
Van Hise, Mary Janet,	*Madison.*
Wagner, Meta,	*Madison.*
Walbridge, Ethel Lavonne,	*Blooming Grove.*
Walbridge, Marion Bae,	*Blooming Grove.*
Weekes, Emily Ruth,	*Plymouth.*
Winden, Nora,	*Madison.*
Wirth, Carl,	*Blooming Grove.*

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WISCONSIN SUMMER SCHOOL.

Students in 1897.

Adams, Lillian Howes,	*Columbus,*	1st Grade, Columbus.
Allen, Ira Madison,	*Waupun,*	Prin. High School, Kaukauna.
Allen, Phillip Loring,	*Madison,*	Student, U. W.
Anderson, Andrea Martina,	*Stoughton,*	Ass't High School.
Axley, Frederick William,	*Edwards,*	Ass't High School.
Barker, Ella Blanche,	*River Falls,*	Public School, Ashland.
Barker, Mellie Edes,	*River Falls,*	Primary, Ashland Public S.
Beeman, Edward Monroe,	*Fairchild,*	High School.
Blood, Henrietta Ada,	*Madison*	Student, U. W.
Bold, Mabel Dixon,	*Madison,*	Student, U. W.
Borden, James Benjamin,	*Milton,*	Prin. High School, Marshfield.
Brady, Charles Eugene,	*Osman,*	Osman Public School.
Casey, Simon Francis,	*Chicago, Ill.,*	Grammar Grade, Chicago.
Clark, Arthur, Ozias,	*Salt Lake City, U.,*	Prin., High School.

Clark, Robert Luther, *Beaver Dam*, Prin., Ward S., Oshkosh.
Cook, Louise, *Columbus*, 5th Grade, Columbus.
Crocker, Levi Archibald, *Madison*, Student, U. W.
Devlin, Sarah Rebecca, *Woodworth*, G. Dept., Whitewater Nor.
Dickie, Sarah, *N. Freedom*, T'cher, High S., Waukesha.
Dixon, John, *Madison*, Teacher, Milwaukee.
Dixon, William Waldo, *Peshtigo*, Ass't High School and Gram.
Drake, John Payson, *Stevens Point*, Teacher, High School.
Edwards, Elizabeth, *Hazel Green*, Intermed'te Grade, Pub. S.
Ehlman, Ernest George, *Milwaukee*, Student, U. W.
Ellis, Leander Dallas, *Burlington, Kan.*, Sup't Schools.
Emerson, Arthur R., *Etna*, Prin., Graded School, Leadmine.
Farrand, Roy Felton, *Delafield*, Student, U. W.
Farrell, William James, *Wausau*, Prin., Ward School.
Fischer, Herman, *Pardeeville*,
Fobes, Merton Perez, *Sutherland, Ia.*, Prin., Public Schools.
Foster, John Nelson, *Shell Lake*, Prin., High School.
Fox, Philip Angus, *Milwaukee*, Student, U. W.
Fraser, Georgine Z., *Baltimore, Md.*, Student, U. W.
Gensch, Fred Michael, *Louis Corners*, District School.
Gill, Eliza Anne, *Kenosha*.
Gillespie, Mary, *Winnetka, Ill.*, Prin., High School.
Gould, Frances Dibblee, *Chicago*.
Grady Ellen Sara, *Columbus*, 4th Grade, Public School.
Griffith, Kate Elizabeth, *Racine*.
Grisim, Laura Knapp, *Madison*, Ass't High School.
Grossheusch, John Wm., *Franklin*.
Guile, Ella May, *Wauwatosa*.
Haddock, Frank Dickinson, *Holland, Mich.*, Prin., High School.
Haessler, Bettie, *Milwaukee*, Ass't High S., River Falls.
Harper, Blanche, *Madison*, Student, U. W.
Hayes, Mary Elizabeth, *Eden*, 8th Grade, Milwaukee Public S.
Hatherell, Rosalia Amelia, *River Falls*, Ass't Science Dept., Nor. S.
Hendricks, Wallace Edw., *Campbellsport*, Student, U. W.
Herrell, Ernest G., *Augusta*, Grammar Grade, New Lisbon.
Hewitt, Mary, *Manitowoc*, Ass't, High School.
Howe, Winfred Chester, *Sheboygan*, Student, U. W.
Huber, Grace Emma, *Madison*, 4th Grade, Streator, Ill.,
Jenkins, Emma, *Berlin*, Gram. Grade and High School.
Johns, Richard Bowen, *Sparta*, Student, Milwaukee Normal S.
Johnson Caroline Scribner, *Waukesha*, Teacher, Carroll Col. Acad.
Jonas, Emma Christina, *Beaver Dam.*, Student, U. W.

Kaasa, Edward Olson,	*Albert Lea, Minn.*, T'cher, Luther Acad.
Ketchum, Florence J.,	*Madison,* Student, U. W.
Kremers, John,	*Milwaukee,* Student, U. W.
Lawrence, Carl Gustavus,	*Canton, Ill.*, Instructor, Augustana Col.
Lawrence, Ernestine,	*Mason City, Ia.*, Ass't Prin., High Sch'l.
Lipe, Olive,	*Sharon,* Student, U. W.
Lyons, Mary,	*Kansas City, Mo.,* 6th Grade.
McCullogh, Robert Henry,	*Oak Park, Ill.,* Student, U. W.
McIntyre, Charles Wm.,	*Ft. Atkinson,* Prin., High S., Palmyra.
McNeel, James Herbert,	*Fond du Lac,* Student, U. W.
Maloney, Sara Mary,	*Milwaukee,* 4th and 5th Grades.
Mathems, Lucile,	*Madison.*
Meffert, Edward Persie,	*Wonewoc,* Student, U. W.
Meyer, Arthur William,	*Cedarburg,* Student, U. W.
Morris, Thomas S.,	*Madison,* Student, U. W.
Morrissey, Maurice,	*Fontana,* Prin. of Schools.
Moyle, Mary Alice,	*Yorkville,* Public School, Mt. Pleasant.
Mueller, Arthur,	*Milwaukee.*
Nash, Grace Edith,	*Tomahawk,* 4th Grade.
Nelson, Ingebor M.,	*Madison,* Ass't, High School, Neenah.
Parks, Perry Calhoun,	*Orangeburg, S. C.,* Student, U. W.
Persons, Warren Milton,	*Madison,* Student, U. W.
Pierpont, David,	*National Home,* Student, U. W.
Rendtorff, Edmund Joseph,	*Chicago, Ill.*
Rendtorff, Walter,	*Chicago, Ill.*
Rice, Nora Beatrice,	*Oshkosh,* 4th Grade, La Crosse.
Roseman, William W. P.,	*Mount Hope,* Student, U. W.
Rowe, Clarence Wallace,	*Janesville,* Student, U. W.
Ruebhausen, Ella E.,	*Watertown,* Ass't, High School.
Ruhnke, Richard,	*Ahnapee,* Student, U. W.
Ryan, Fern,	*Reedsburg,* Student, U. W.
Sabin, Kate Lucinda,	*Windsor,* Teacher, Milw.-Downer Col.
Schlundt, Charles F.,	*Two Rivers,* Student, U. W.
Schneider, Emma Cath.,	*Branch,* 6th Grade, Milwaukee. Pub S.
Sims, Joseph Thomas,	*Mosinee,* Prin., Graded School
Smith, Mary Emlae,	*Wausau.*
Smith, Sydney,	*Kansas City, Mo.,* 6th and 7th Grades.
Spaulding, Mary C.,	*Milton,* 5th, 6th and 7th Grades.
Spicer, Clinton Elbert,	*Cambria,* Prin., Graded School.
Spicer, Mayne Clifford,	*Osceola Mills,* 7th and 8th Grades.
Steinman, Jennie Agnes,	*Logan, O.*
Stiles, Alevia Eleanor,	*Eau Claire,* 3rd and 4th Grades.

Swezey, Goodwin Deloss,	*Lincoln, Neb.*,	Professor, Univ. of Neb.
Thomas, Nellie,	*Sheboygan Falls*,	Ass't, High School.
Thompson, George,	*Moscow*,	Student, U. W.
Thompson, James,	*Moscow*,	Student, U. W.
Thomson, Christina Irene,	*Oshkosh*,	Ass't, High School.
Tiffany, William Edward,	*Plainfield.*	
Townsend, Oliver Otis,	*Sandwich, Ill.*,	Pub. School, Franks, Ill.
Vernon, Florence Eugenia,	*Madison*,	Ass't, High School, Neenah.
Wakefield, Arthur Milan,	*Baldwin*,	Prin., Graded School.
Walker, Lon Cain,	*Lincoln, Neb.*	
Weber, Edith,	*Kansas City, Mo.*,	7th Grade.
White, Ida,	*Augusta*,	7th and 8th Grades.
Wilder, Ethel May,	*Eau Claire*,	1st Grade.
Wilke, Adelaide E.,	*Madison*,	Student, S. N. S., Whitewater.
Williams, Jeanette E.,	*Racine*,	2nd Grade.
Williams, William W.,	*Ottawa*,	Prin., High School, Viroqua.
Wojta, Joseph Frank,	*Manitowoc*,	Student, U. W.
Wood, La France Whitney,	*Augusta*,	Principal of Schools.
Woodbury, William W.,	*Sandwich, Ill.*,	Sup't of Schools.

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SUMMER SCHOOL OF LIBRARY SCIENCE.

Students in 1897.

Bell, Martha W.,	*Beloit.*	
Brownrigg, Lilian Frances,	*Manistee, Mich.*,	Manistee Pub. S. Lib.
Currier, Lillian,	*River Falls*,	Lib'n, River Falls Nor. S.
Doolittle, Hattie Amanda,	*Beaver Dam*,	Lib'n, Williams Free Lib.
Dousman, Mary Ella,	*Milwaukee*,	Ass't, Milwaukee Pub. Lib.
Gerend, Frances Emily,	*Sheboygan*,	Lib'n, Public Library.
Gruwell, Ida,	*Marion, Ind.*,	Lib'n, Public Library.
Harter, Lyle,	*Huntington, Ind.*,	Public School Lib.
Lesure, Madge,	*Menomonie*,	Student, Pratt Inst. Lib. S.
McNeil, Anne Holmquist,	*Milwaukee*,	Ass't, Public Library.
McIntosh, Margaret,	*Milwaukee.*	
McNair, Bessie,	*Lancaster.*	
Raymond, Alice,	*Grand Rapids*,	Lib'n, T. B. Scott Lib.
Richards, Mary McClellan,	*Clark's Hill, Ind.*	
Silverthorn, Nellie Celestia,	*Wausau*,	Lib'n, Public Library.
Smith Elizabeth,	*De Pere*,	Lib'n, Public Library.

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SUMMARY OF STUDENTS.

GRADUATES—128

Fellows and Scholars	23
Graduates in Residence	83
Graduates studying *in absentia*	22

COLLEGE OF LETTERS AND SCIENCE—947

Fellows and Graduates	102

Senior Class—146

Ancient Classical Course	13
Modern Classical Course	34
English Course	12
Civic Historical Course	49
General Science Course	36
Philosophical Course	2

Junior Class—172

Ancient Classical Course	19
Modern Classical Course	26
English Course	49
Civic Historical Course	15
General Science Course	34
Philosophical Course	29

Sophomore Class—166

Ancient Classical Course	21
Modern Classical Course	34
English Course	35
Civic Historical Course	27
General Science Course	49

COLLEGE OF LETTERS AND SCIENCE—Continued.

Freshman Class—192	
Ancient Classical Course	23
Modern Classical Course	24
English Course	64
Civic Historical Course	38
General Science Course	43
Special Students	100
Adult Special Students	69

COLLEGE OF MECHANICS AND ENGINEERING—227

Fellows and Graduates	19
Senior Class—35	
Civil Engineering Course	11
Mechanical Engineering Course	11
Electrical Engineering Course	13
Junior Class—31	
Civil Engineering Course	7
Mechanical Engineering Course	10
Electrical Engineering Course	14
Sophomore Class—60	
Civil Engineering Course	25
Mechanical Engineering Course	19
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Freshman Class—66	
Civil Engineering Course	23
Mechanical Engineering Course	22
Electrical Engineering Course	21
Special Students	16

COLLEGE OF AGRICULTURE—277

Graduates		5
Long Course		8
Short Course	Second Year	42
	First Year	114
Dairy Course	Second Year	2
	First Year	106

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Senior Class	27
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Junior Class	83
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SCHOOL OF PHARMACY—61

Fellows and Graduates	2
Four Years' Course	9
Three Years' Course	34
Two Years' Course	16

SCHOOL OF MUSIC—141

Collegiate	Third Year	12
	Second Year	30
	First Year	43
Academic		56
TOTAL NUMBER OF STUDENTS		1,835
Twice enumerated 68, leaving as actual number		1,767

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In former catalogues the category of special students included two classes of students: 1. Students who entered the Freshman class in one course, afterwards transferred to another, and were irregular in their studies. 2. Students who entered the Freshman class on the same terms as other students, but who were not candidates for a degree and therefore did not follow the regular course of study. The former class is now included with the regular students and the latter is placed in a separate list. Under the former classification there would be in the 4th year 3 specials; 3d year 16; 2d year 34; 1st year 63; which numbers would have been added to the classes.

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