Catalogue of the University of Wisconsin for 1896-97. 1897

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

CATALOGUE

OF THE

University of Wisconsin

FOR

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1897.

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CALENDAR.

ACADEMIC YEAR, 1896-7.

FIRST SEMESTER, September 30—February 13.

SECOND SEMESTER—February 15—June 24.

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 31.

Examination of Candidates for Admission, Thursday and Friday, June 17, 18.

Baccalaureate Address, Sunday, June 20.

Class Day, Monday, June 21.

Address to Law Class, Tuesday, June 22.

Alumni Day, Wednesday, June 23.

COMMENCEMENT, Thursday, June 24, 9 A. M.

SUMMER VACATION, June 25—September 28.

SUMMER SCHOOL opens July 5, closes August 13, six weeks.

ACADEMIC YEAR, 1897-8.

FIRST SEMESTER opens September 29, closes February 11.

Examinations for Admission, Tuesday and Wednesday, September 28 and 29.

Registration Days, September 27—29.

First Recitations, Thursday Morning, September 30.

Legal Holiday, Thanksgiving, November 25.

Christmas Recess, Friday, December 24—Monday, January 3, inclusive.

Examination Week, First Semester, February 7—11.

First Semester closes, Saturday, February 12.

SECOND SEMESTER opens Monday, February 14, closes June 23.

Registration Day, Second Semester, Monday, February 14.

Examination Days for Second Semester, Thursday and Friday, February 10, 11.

Legal Holiday, Monday, February 21.

Easter Recess, Thursday, April 14—Monday, April 18, inclusive.

Legal Holiday, Monday, May 30.

Examination Week, Second Semester, June 13—17.

Commencement, Thursday, June 23.

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NOYES, GEORGE HENRY, A. B., LL. B., *Special Lecturer on the Law of Common Carriers.* Milwaukee, Wis.

PIERCE, R. H., *Lecturer on Electrical Storage Batteries from an Engineering Point of View.* Chicago, Ill.

RANDOLPH, ISHAM, C. E., *Lecturer on the Chicago Drainage Canal.* Chicago, Ill.

SPERRY, H. M., Signal Engineer of National Switch & Signal Co., *Lecturer on Railroad Signaling.* Chicago, Ill.

SWENSON, MAGNUS, M. E., *Lecturer on the Modern Cotton Compressor.* Chicago, Ill.

THURSTON, ROBERT HENRY, C. E. PH. B., A. M. LL. D., Dr. Eng'g., Director of Sibley College, Cornell University, *Lecturer on the Development of the U. S. Navy and Merchant Marine.* Ithaca, N. Y.

THWAITES, REUBEN GOLD, Secretary of the State Historical Society of Wisconsin. *University Extension Lecturer on History.* Madison, Wis.

WADDELL, J. A. L., C. E., Consulting Engineer. *Lecturer on Bridge Engineering.* Kansas City, Mo.

LIBRARY STAFF.

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HANSON, JAMES CHRISTIAN, A. B., *Head Cataloguer.* 413 Lake St.

CODDINGTON, HESTER, *Cataloguer.* 429 Park St.

SMITH, R. EDWIN, *Librarian in Law Library.* 640 State St.

OLIVER, JAMES FREDERICK, *Assistant Librarian in Law Library.* 438 Lake St.

OTHER OFFICERS.

RILEY, EDWARD F., *Secretary of the Board of Regents.* Law Building. 13 W. Gilman St.

HIESTAND, WILLIAM DIXON, *University Registrar, and President's Secretary.* Law Building. 16 W. Gorham St.

BURD, LESLIE, *Clerk and Stenographer.* Office of the Board of Regents, Law Building. Oakland Heights.

LANDER, HELEN M., *Matron.* Ladies Hall.

ADAMS, LESLIE H., *Farm Superintendent.* Farm House.

MOORE, RANSOM ASA, *Assistant to the Dean of the College of Agriculture.* Room 6, Agricultural Hall. 207 Park St.

SANFORD, FANNIE G., *Stenographer*, President's Office. 811 State St.

HERFUTH, IDA, *Clerk and Stenographer*, Agricultural Experiment Station. 703 E. Gorham St.

STOUT, HARRIET V., *Clerk and Stenographer*, Farmer's Institute. 535 State St.

GLENN, MARY ALICE, *Stenographer*, University Extension Department. 615 State St.

STOCKETT, NORMAN, *Secretary of the Deans of the College of Law.* Law Building. 638 Lake St.

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.

1. The College of Letters and Science.
   The School of Economics, Political Science, and History.
   The Washburn Observatory.
II. The College of Mechanics and Engineering.
III. The College of Agriculture.
IV. The College of Law.
V. The School of Pharmacy.
VI. The School of Music.
VII. The Department of University Extension.
VIII. The Summer School.

The College of Letters and Science embraces:

A. Graduate Courses.
B. Undergraduate Courses.

Under the Course System.

1. 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 Special Course for Normal School Graduates.

Under the Group System.

A large number of Courses.

The College of Mechanics and Engineering embraces:

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

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 Civic-Historical Course.
II. Graduate Courses, leading to higher degrees.

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, 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 there have been five grants by the State 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; and the appropriation for the College of Engineering in 1889 of one per cent. of the railroad license tax.

Of the private gifts that have come to the University that of Dane County for the purchase of lands for the University farm, and that of Governor C. C. Washburn for the founding of the Washburn Observatory, 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 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, and the School of Music in 1895.

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.

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 Laboratory, 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 to which has been added during the present year a 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.

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 their 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 term and special reports of deficiency or failure on the part of individuals.

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 48,500 volumes and 12,000 unbound pamphlets.

The General University Library, including the department libraries catalogued therewith, contains over 43,000 volumes and

10,000 unbound pamphlets. More than 375 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 presentation to the secretary of 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 classical philology.

At the opening of the college year a course of lectures on 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 26,000 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 collection of over 15,000 volumes.

The library of the State Historical Society contains about 100,000 volumes and 80,000 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 facilities 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 legislature of 1895 made ample provision for a fire proof building for the library of the State Historical Society. 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. Plans for the Library have already been adopted and the foundation and first story are already in place.

The legislature of 1897 has extended the tax appropriated for the Library building so as to make it possible to complete at once the entire structure, including accommodations both for the State Historical Library and for that of the University.

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; the 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 anl photographs; a set of Davis's 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 micro-

scope, 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 laboatory 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 facilities for independent work. The laboratory is supplied at present with fifteen compound microscopes of late pattern, comprising 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 ocupies 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 topographico-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. This collection has been augmented by accessions obtained from the exhibitors at the World's Columbian Exhibition of 1893.

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 Milwaukee. 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 equipped 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 completed during the past year. 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. The University has built during the past season a Rowing Tank for the use of the University crew.

During the past year an Athletic Field of about eleven 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. Intercollegiate debates have been held during the present college year with the University of Minnesota and Northwestern University. 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 a German society, the Bildungsverein; 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 League. 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.

During the past college year Ladies' Hall has been entirely rebuilt and greatly enlarged. 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. As the University became a co-educational institution the building was devoted to the purposes of dormitory, and furnished rooms also for the Department of Music. The arrangement of the suites of rooms, which required four students to occupy one sitting-room, was extremely 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.

The kitchen is placed in the upper story of the new wing and the cooking there is done by gas and steam. 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 Principal 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. Students are admitted only on the expectation of remaining throughout the semester. 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. To secure rooms in advance, payment of room rent for the ensuing semester must be made to the Secretary of the Board.

No responsibility is assumed for those rooming in the city beyond that involved in good scholarship and general deportment.

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 themselves.

CHARGES AND FEES.

A full statement of charges and fees is given on pages 70–72.

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 14, 1898. 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 will occur on the Thursday preceding the last Wednesday in June. In 1897 the date will be Thursday, June 24.

There are two recesses or vacations during the college year, one at Christmas and one at Easter. The Christmas recess ordinarily begins wtih the morning of December 24th, and recitations will be resumed on the morning of January 3d. In 1898 the latter date falls on Monday and recitations will begin on Tuesday, Jan. 4. No regular class examinations occur at Christmas, and no new classes begin immediately after the Christmas recess. It is therefore impossible for students to enter the University at this time. Those who cannot 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:

Academic.

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 47.

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.

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., Professor of Philosophy and Pedagogy.
B. W. SNOW, Ph. D., Professor of Physics.
C. A. VAN VELZER, Ph. D., Professor of Mathematics.

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. By the Group System the undergraduate student is enabled to concentrate 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 specifically 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. The sexes 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 1896-1897 is Mr. Karl G. Hunkel, Ph. G., U. W. '94.

The Fred Pabst Fellowship.

Mr. Fred Pabst, of Milwaukee, has also generously established a pharmaceutical fellowship on a financial basis of $400 per annum for two years. The holder of this fellowship during this year 1896-1897 is Mr. W. O. Richtmann, Ph. G., U. W. '94.

The United States Pharmacopoeia Research Fellowship.

The committee on Revision of the U. S. Pharmacopoeia maintains a fellow in the School of Pharmacy, who is expected to conduct research in the line of revision of the Pharmacopoeia under the direction of the professor of pharmaceutical chemistry. Miss M. M. James, Ph. G., '96, was appointed.

UNIVERSITY SCHOLARSHIPS.

University scholarships, similar in aim to the fellowships, have been in recent years provided for graduates in the School of Economics, Political Science, and History. At the present time there are two Social Science Scholarships, yielding enough to defray the expenses of those who hold them while practically engaged in charitable and correctional work during the summer months.

Through the generosity of an alumnus of the University a Graduate Scholarship of the value of $250 is awarded annually in one of the literary departments of the University. This scholarship is held at present by Mr. J. B. Browder, a graduate student in the Ancient Classical Course.

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 fifty-seven have appeared; the Annual Report, now numbering thirteen, and the Bulletin of the Farmers' Institutes, of which ten 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, namely:

1. 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., Instructor 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 Elec-

trical Engineering, with an Introduction by Professor D. C. Jackson. Pp. 88, August, 1896.

In preparation:

A Comparative Test of Steam Injectors, by George Henry Trautmann, B. S., University of Wisconsin.

2. Economics, Political Science, and History Series; Volume I. 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.

In preparation:

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.

3. 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 Keyes to the Genera and Species of North American Mosses, by Charles Reid Barnes, Professor of Botany, and Fred DeForest Heald, recently Fellow in Botany. Pp. 211, January, 1897.
4. Philology and Literature Series. It is the intention soon to begin publication of this series.

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 publica-

tions 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. This work may be done at the University or elsewhere, but if it is not done at the University, or in connection with some institution of high rank, it will be assumed that a longer time and a larger nominal amount of study will be requisite to give the equivalent attainment, and the degree will not be conferred until three years after graduation.

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 Instruction. 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 is required before 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 satisfactry 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 colleges 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 chosen with the approval of the Committee on Graduate Studies as early as 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 twenty-five copies of the same in the Library of the University.

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.

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

Economics.

Professor Ely: Course 6, the Distribution of Wealth; Course 7, History of Economic Thought; Course 11, Public Finance; Course 12, American Public Finance.

Professor Scott: Course 8, Theories of Value; Course 9, Theories of Rent, Wages, Profit and Interest; Course 10, Theories of Production and Consumption.

Professors Ely and Scott: Economic Seminary. For 1896 the subject was The Scope and Methods of Economics.

Sociology.

Professor Raymond: Course 3, Elements of Sociology; Course 4, Historical Survey of Sociological Thought; Course 5, Telic Sociology; Course 6, Dynamic Sociology; Seminary in Sociology.

Assistant Professor Sharp: Course 11, Readings in German Social Philosophy.

Political Science.

Professor Parkinson: Course 5, Comparative Constitutional Law; Course 11, International Law.

Mr. Reinsch: Course 7, Introduction to the History of European Law; Course 9, History of Political Thought.

Dr. Sparling: Courses 14 and 16, Comparative Administrative Law; Course 17, Administrative Politics; Course 13, Municipal Government in Europe; Course 15, Municipal Government in the United States.

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

History.

Professor Turner: Course 7, Economic and Social History of the United States; Course 11, Constitutional and Political History of the United States, Colonial Period to War of 1812 (1896-97).

Professor Haskins: Course 8, Constitutional History of England; Course 9, History of Institutions, Greek and Roman; Course 10, History of Institutions, Later Roman, Mediæval, and Modern; Course 12.

Assistant Professor Coffin: Course 13, Advanced Modern European History.

Seminary work in History for graduates is conducted by all of the professors.

Greek.

Professor Smith: Course 14, Greek Seminary, the year being given to the study of Lyric Poetry; Course 11, Thucydides; Course 12, State Antiquities; Course 13, Greek Drama and Scenic Antiquities (Seminary); (Courses 11, 12, 13, omitted 1897-8.) Course 16, Journal Club (with Professor Kerr and Dr. Laird). The subject of seminary changes from year to year.

Assistant Professor Laird; Course 15, Greek Dialect (Seminary); Course 15, Comparative Greek Grammar; Course 3, Comparative Latin Grammar; Course 5, Sanscrit.

Latin.

Professor Slaughter: Course 13, Latin Seminary; the Roman Drama; Course 14, Latin Syntax.

Assistant Professor Laird: Course 12, Latin Grammar.

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 4a, Advanced Middle High German; Course 4b, Middle and Modern Low German; Course 5a, Old High German; Course 5b, Old Saxon; Course 6, Gothic; Course 7, Early Modern High German; Course 8, Philological Seminary.

French.

Professor Owen: Course 11, The Principles of Language.

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

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

Scandinavian.

Professor Olson: Course 4, Old Norse or Icelandic.

English.

Professor Freeman: Course 12, Shakespeare; Course 19, English Literature Seminary, given in 1897-98 to Coleridge.

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 21, Theory of Substitutions.

Professor Slichter: Course 18, Partial Differential Equations of Mathematical Physics. Course 19, Hydrodynamics.

Assistant Professor Skinner: Course 16, Quaternions.

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.

Physics.

Professor Snow and Assistant Professor Austin: Course 13, 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 8, 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 31, 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 24, Advanced Vegetable Anatomy.

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 10, Advanced Laboratory Work.

Electrical Engineering.

Professor Jackson: Course 4, with an advanced course in Alternating Currents; Course 5, Electric Light and Transmission of Power.
Assistant Professor Fortenbaugh: Course 6a, Electric Railways, with advanced courses.
Mr. Burgess: Course 2b, Electrolysis.
Course 7, Special Reading and Research. Course 8, Graduate Conference. Courses offered in Physics, Mathematics or Chemistry by Professor Davies, Professor Slichter, or Dr. Kahlenberg may be advantageously taken as minor studies in connection with major work in Electrical Engineering subjects.

Structural Engineering.

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

Machine Design.

Professor Jones: Course 6, Advance 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.

Pharmaceutical Chemistry.

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. (1896-7.)

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

Pharmacognosy.

Assistant Professor True: Course 5, Microscopical study of powdered drugs; Course 6, 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 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 page 70.

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, 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.
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.
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.
J. H. RAYMOND, PH. D., Professor of Sociology.
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, A. B., Instructor in Rhetoric.
SARA E. BOUDREN, Instructor in Gymnastics.
W. B. CAIRNS, A. M., Instructor in Rhetoric.
W. G. CASKEY, A. B., Instructor in Elocution.
L. W. DOWLING, PH. D., Instructor in Mathematics.
E. S. FERRY, B. S., Instructor in Physics.
W. D. FROST, M. S., Assistant in Bacteriology.
LUCY M. GAY, B. L., Instructor in French.
JESSIE GRIFFITH, M. L., Instructor in German.
J. M. HOWIE, A. B., Assistant in Mathematics.
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.
J. F. A. PYRE, B. L., Instructor in English Literature.
P. S. REINSCH, A. B., LL. B., Instructor in History.
HARRIET T. REMINGTON, M. L., Instructor in German.
OSCAR ROHN, B. S., Instructor in Gymnastics.

A. R. SEYMOUR, B. L., Assistant in French.
H. D. SLEEPER, Instructor in Music.
C. M. SMITH, B. S., Assistant in Physics.
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.

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 earlier examinations will be held on Thursday and Friday, June 17th and 18th, beginning at 9 o'clock A. M. The later examinations will be held on Tuesday and Wednesday, September 28th and 29th, 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 10 and 11, 1898.

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: Thomas's 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.

1. For General Reading and Composition Work.

1897—Shakespeare's As You Like It, Defoe's History of the Plague in London, Irving's Tales of a Traveller, Hawthorne's Twice Told Tales, Longfellow's Evangeline, George Eliot's Silas Marner.

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—Shakespeare's Twelfth Night, The Sir Roger de Coverley Papers in The Spectator, Irving's Sketch Book, Scott's Abbot, Webster's First Bunker Hill Oration, Macaulay's Essay on Milton, Longfellow's Evangeline.

1900—Shakespeare's A Midsummer Night's Dream, Defoe's History of the Plague in London, Irving's Tales of a Traveller, Scott's Woodstock, Macaulay's Essay on Milton, Longfellow's Evangeline, George Eliot's Silas Marner.

2. For thorough Study:

1897—Shakespeare's The Merchant of Venice, Burke's Speech on Conciliation With America, Scott's Marmion, Macaulay's Life of Samuel Johnson.

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 The Merchant of Venice, Milton's L'Allegro, Il Penseroso, Comus and Lycidas, Macaulay's Essay on Addison.

1900—Shakespeare's The Merchant of Venice, Milton's L'Allegro, Il Penseroso, Comus, and Lycidas, Webster's First Bunker Hill Oration.

. 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); Vergil, 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 Leading 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 four times a week 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 Years' 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 1898-9 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.

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 to the Elementary Greek Class.

As Greek is given in but few high schools, a special concession is made to those who wish to take the Ancient Classical Course in the University. An Elementary Greek Class is provided, for admission to which Greek will not be required. In Latin, four books of Cæsar and four orations of Cicero will be required. Otherwise the requirements will be the same as for the Ancient Classical Course. This preparation may be secured by taking the Modern Classical Course recommended by the State Superintendent through the first three years, substituting geometry in the place of German in the third year. Students who thus take the elementary Greek in the University must expect to take five years for completing the Ancient Classical Course.

Students fully prepared for the Modern Classical Course can also enter the Ancient Classical Course and graduate in four years. See statement on page 60.

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 pre-

pared 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 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 school under inspection.

Principals of accredited schools are requested to note the statements regarding English, German, Latin, and adaptive work under Terms of Admission.

ACCREDITED SCHOOLS.

For All Courses.

SCHOOL.	PRINCIPAL.
Ashland,	J. T. HOOPER.
Austin (Ill.)	B. F. BUCK.
Beaver Dam: Wayland Academy,	H. M. BURCHARD.
Beloit,	C. H. GORDON.
Chicago High Schools,	A. G. LANE.
Chicago: Harvard School,	J. J. SCHOBINGER, J. C. GRANT.
Delafield: St. John's Military Academy	REV. S. T. SMYTHE.
Detroit (Mich.): School for Boys,	FREDERICK WHITTON.
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: Lake Forest Academy,	CHARLES A. SMITH.
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.),	A. O. BARTO.
Racine College,	H. D. ROBINSON.
Rockford (Ill.),	B. D. PARKER.
Sheboygan,	J. E. RIORDAN.
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.

SCHOOL.	PRINCIPAL.
Appleton: Ryan High School,	F. E. McGOVERN.
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. W. PRINGLE.
Burlington,	J. M. TURNER.
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.
De Pere,	VIOLET M. ALDEN.
Dodgeville,	O. J. SCHUSTER.
Eau Claire,	M. S. FRAWLEY.
Edgerton,	H. A. ADRIAN.
Elkhorn,	C. D. KIPP.
Evansville,	H. F. KLING.
Evansville Seminary,	A. L. WHITCOMB.
Fort Atkinson,	A. W. WEBER.
Freeport, (Ill.)	W. D. HAWK.
Green Bay: East Side,	W. O. BROWN.
Green Bay: West Side,	A. W. BURTON.
Hudson,	S. B. TOBEY.
Joliet, (Ill.)	J. S. BROWN.
Lake Geneva,	A. F. BARTLETT.
Lancaster,	L. L. CLARKE.
Manitowoc: North Side,	H. J. EVANS.
Manitowoc: First Ward,	C. E. PATZER.
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.

School.	Principal.
Prairie du Chien,	J. A. Pratt.
Racine,	A. N. Ozias.
River Falls,	H. L. Wilson.
Stevens Point,	H. A. Simonds.
Superior: West End,	J. S. Griffin.
Waupaca,	F. E. Doty.
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 Years' Pharmacy, and Agricultural Courses.

Prescott,	James Goldsworthy.
Sparta,	J. W. Livingston.
Viroqua,	Taylor Frye.
Watertown,	C. F. Viebahn.

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

McGregor, (Ia.),	F. N. Williams.

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

Mauston,	A. H. Fletcher.

For Civic Historical, English, and Agricultural Courses.

Waukesha,	H. L. Terry.

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

Antigo,	C. O. Marsh.
Appleton: Third Ward,	W. F. Winsey.
Arcadia,	G. O. Banting.
Augusta,	L. W. Wood.
Black River Falls,	J. H. Derse.
Centralia,	S. M. Kyes.
Cumberland,	D. E. Cameron.
Durand,	J. W. Nesbit.
Fox Lake,	R. E. Rienow.
Grand Rapids,	Guy S. Ford.

School.	Principal.
Kenosha,	E. C. Wiswall.
Lodi,	R. E. Loveland.
Mayville,	L. S. Keeley.
Mazomanie,	O. M. Salisbury.
Medford,	J. H. Francis.
Menasha,	A. B. Dunlap.
Neillsville,	W. L. Morrison.
New Lisbon,	S. A. Bostwick.
New London,	De Witt Elwood.
New Richmond,	J. W. T. Ames.
Oconomowoc,	C. R. Cross.
Poynette,	H. S. Youker.
Prairie du Sac,	J. F. Bergen.
Reedsburg,	W. N. Parker.
Rhinelander,	C. M. Gleason.
Ripon,	A. E. Schaub.
Sauk City,	H. F. Lueders.
Shawano,	E. H. Reynolds.
Sheboygan Falls,	F. F. Showers.
Shullsburg,	O. E. Rice.
Spring Green,	W. H. Schultz.
Stoughton,	A. H. Sholtz.
Stoughton Academy,	K. A. Kasberg.
Sturgeon Bay,	E. E. Beckwith.
Sun Prairie,	James Melville.
West Bend,	L. E. Amidon.

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

Portage,	W. G. Clough.
Mondovi,	G. M. MacGregor.

For English and Agricultural Courses.

Chippewa Falls: Notre Dame School,	Sister M. F. Xavier.
Clintonville,	W. H. Hickok.
Elroy,	W. E. Utendorfer.
Hartford,	E. W. Pryor.
Horicon,	E. T. Johnson.
Jefferson,	W. J. Hammill.
Kewaunee,	M. McMahon.
Lake Mills,	A. B. West.

SCHOOL.	PRINCIPAL.
Milton Junction,	J. T. HEALY.
Necedah,	C. H. MAXSON.
Omro,	E. E. SHELDON.
Onalaska,	B. F. OLTMAN.
Oregon,	FRANKLIN GOULD.
Richland Center,	A. E. BRAINERD.
Sharon,	J. G. SKEELS.
Sinsinawa: St. Clara's Academy,	DOMINICAN SISTERS.
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.

After the year 1896-7 the courses at present conducted for normal graduates will no longer be given. In their place there will begin a new course designed especially for normal graduates and leading to the degree of Bachelor of Philosophy in Pedagogy. This course will include 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 79. 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.

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.

Tuition for non-resident students, per semester	$9.00
General expenses for all students, per semester	6.00

College of Agriculture.

Tuition for non-resident students, per semester	9.00
General expenses for all students, per semester	6.00
General expenses, Short Course and Dairy Course	5.00
Tuition for non-resident students, Short Course or Dairy Course	6.00
Lecture fee for non-resident Dairy Students	10.00

College of Law.

Matriculation fee, first year	75.00
Matriculation fee, second year	50.00
Matriculation fee, third year	25.00
Matriculation 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.

General fee for all students	$15.00

School of Music.

Persons who are members of other colleges or schools of the University make take the courses of music specified on page 129 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, first semester	$30.00
Room rent, heat, and light, second semester	20.00
Board in Ladies' Hall, payable to the Matron, per week	3.50

These fees are subject to change at the opening of the next 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.—The following laboratory fees are required: *Junior Year:* Chemical Laboratories, $20.00; Botanical Laboratory, $8.00; Pharmaceutical Technique, $10.00. *Senior Year:* Chemical Laboratory, $10.00; Botanical Laboratory, $8.00; Pharmaceutical Chemistry and Thesis, $35.00; Practical Pharmacy, $15.00; Pharmacognosy, $10.00.

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.

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.

Male students 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 per year is required, and $1 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 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 41-55, and for the announcement of special courses for graduates see the statements made under the Departments of Study on subsequent pages.

THE UNDERGRADUATE DEPARTMENTS

There are two general schemes or systems of study by which the bachelor's degree may be reached: the Course System (p. 76) and the Group System (p. 80), the fundamental idea in the one being variety and breadth of culture; in the other, concentration and thoroughness.

REQUIREMENTS FOR GRADUATION.

The requirements for graduation are the same in quantity under each system. The unit-hour is the standard for computing the amount of work required. This is equal to one hour of recitation or lecture per week for 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; and one synoptical lecture per week is required during the last two years, making 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, 132 unit-hours for the men and 128 for the women.

No student will be permitted to receive during the college year a credit toward graduation of more than eighteen hours per week 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 recitations per week for one semester.

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 repeating 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 Col-

lege 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.

A. THE COURSE SYSTEM.

The University offers, in the College of Letters and Science, six 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. 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. A course for normal graduates is established leading to the degree of Bachelor of Philosophy in Pedagogy.

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.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF ARTS.

Ancient Classical Course.

Freshman Year: Greek 4;* Latin 4; mathematics 4; rhetoric 2; Greek and Roman history 2; military drill 2; gymnastics 2; 36 unit-hours for the year.

Sophomore Year: Greek 4; Latin 2; German or French 4; physics 3; rhetoric 2; military drill 2; gymnastics 2; 34 unit-hours for the year.

Junior and Senior Years: Philosophy, two courses, 5 or 6, one semester; synoptical lectures 1, two years; thesis 2, one year; electives, enough to make 132 unit-hours.

*The figures refer to the number of hours required weekly throughout the year.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF LETTERS.

1. Modern Classical Course.

Freshman Year: German 4; Latin 4; mathematics 4; Greek and Roman history 2; rhetoric 2; military drill 2; gymnastics 2; 36 unit-hours for the year.

Sophomore Year: German 2; Latin 2; French 4; physics 3; rhetoric 2; military drill 2; gymnastics 2; elective 2; 34 unit-hours for the year.

Junior and Senior Years: Philosophy, two courses, 5 or 6, one semester; synoptical lectures 1, two years; thesis 2, one year; electives, enough to make 132 unit-hours.

Students prepared to enter the Modern Classical Course can enter the Ancient Classical Course and graduate with the degree of Bachelor of Arts by beginning Greek in Freshmen year, 5 hours per week, and continuing it 4 times per week through Sophomore and Junior years.

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

Freshman Year: Latin or German 4; mathematics 4; Greek and Roman history 5 (first semester); English history 5 (second semester); rhetoric 2; military drill 2; gymnastics 2; 34 unit-hours for the year.

Sophomore Year: German 4; French 4; science (physics, biology, or chemistry) 5; rhetoric 2; military drill 2; gymnastics 2; 34 unit-hours for the year.

Junior and Senior Years: Philosophy, two courses, 5 or 6, one semester; synoptical lectures 1, two years; thesis 2, one year. The remaining studies, sufficient to make 132 unit-hours, are elective, except that the equivalent of 12 hours per week for one year must be elected in history, economics, sociology, and political science.

3. English Course.

Freshman Year: German 4; English history 5 (first semester); Greek and Roman history 5 (second semester); mathematics 4; rhetoric 2; military drill 2; gymnastics 2; 34 unit-hours for the year.

Sophomore Year: German 4; English literature 3; physics 5, or biology 5, or chemistry 5; rhetoric 2; military drill 2; gymnastics 2; elective 2; 36 unit-hours for the year.

Junior and Senior Years: Philosophy, two courses, 5 or 6, one semester; English language and literature 5, two years. (This must include the course in Anglo-Saxon and middle English which must be taken in the Junior year.) Study of a language other than English and German 4 or 5, one year; synoptical lectures 1, two years; thesis 2, one year; elective studies enough to make 132 unit-hours.

REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE.

1. General Science Course.

Freshman Year: Biology 5; German 4; mathematics 4; rhetoric 2; military drill 2; gymnastics 2; 34 unit-hours for the year.

Sophomore Year: French 4; chemistry or mathematics 5 (if mathematics is chosen, chemistry must be taken in Junior year); physics 5; rhetoric 2; military drill 2; gymnastics 2; 36 unit-hours for the year.

Junior and Senior Years: History, philosophy, political science, or economics 5, one year; advanced French or German 3 to one year; advanced science 5, two years; synoptical lectures 1, two years; thesis 2, one year; elective studies enough to make 132 unit-hours.

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 Course, 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.

ELEMENTARY GREEK COURSE.

White's Beginners, Greek Book, Goodwin's Greek Grammar, Goodwin & White's Analysis (4 books), to be read (3 books, or an equivalent amount of the Odyssey), Collar & Daniell's Greek Prose Composition.

This course is preparatory to the Ancient Classical Course. See p. 63.

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 69 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.

COURSE OF STUDY.

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 2 courses of synoptic lectures and thesis; 18 hours per week required.

B. THE GROUP SYSTEM.

The object of the Group System is to give continuity, concentration, and thoroughness to the leading lines of study and at the same time to afford a wide (though of necessity only general) familiarity with the broad field of knowledge. The work of the four years is divided into two parts, the first consisting of a group of basal studies intended to furnish a solid foundation for the second part, which consists of (1) a leading line of study running through two years, constituting the major study of the student; (2) a series of assigned studies supplementary to it, selected by the professor in charge of the leading line; and (3) a series of elective studies sufficient to make up a full course. The basal group of studies will occupy the Freshman and Sophomore years and may in some instances extend into the Junior year. The work of the second part, the university group, will occupy the Junior and Senior years. These courses will be supplemented by synoptical lectures in the leading lines of study not otherwise taken, so that the student will possess some knowledge of their salient features.

THE BASAL GROUP.

Freshmen and Sophomore Years.

This group must embrace at least the equivalent of fifteen unit-hours of recitation or laboratory work per week during each of the first two years of the course, which must include the following:

1. A year's course (four hours weekly) in mathematics.
2. A year's course in physical or natural science with laboratory work.
3. A course in rhetoric, twice a week for two years.

4. Language study, sufficient, in addition to previous work, to give a reading knowledge of two languages besides English. If this is not accomplished by the close of the Sophomore year, language study must be continued.

Among the basal studies there should be at least one course running through a year especially preparatory to the major study contemplated in the last two years of the course.

UNIVERSITY GROUPS.

Junior and Senior Years.

The work of the last two years of the course must include at least the following:

1. *A Major Study* running consecutively through two years, constituting the leading study of the student. Extra work beyond the usual requirements of a full study will be expected, the precise amount and form of which will be determined by the professor in charge.

2. *An Assigned Minor Study,* to be named by the professor in charge of the major study, which it is intended to supplement. This will be equivalent to one full course for two years, and may be a single continuous study or a succession of courses selected from different groups.

3. *An Elective Minor Study.* This may be made up of a series of courses or of a single continuous study, and must be at least equivalent to a full study throughout the last two years of the course.

4. *Synoptical Lectures* will be required as ordered by the Faculty. At present, one per week is required.

The major studies are to be selected from the following groups:

1. Psychology, Ethics, Aesthetics, Logic, Pedagogy (Philosophical group).
2. Economics, Political Science, Sociology (Civic group).
3. History (Historical group).
4. English Language and Literature, Anglo-Saxon, Rhetoric (English group).
5. French, Italian, Spanish (Romance group).
6. German, Norse, Anglo-Saxon (Germanic group).
7. Greek, Latin, Hebrew (Classic group).
8. Mathematics, Astronomy, Physics (Mathematical group).
9. Botany, Zoology (Biology group).
10. Chemistry, Physics (Chemico-physical group).
11. Mineralogy, Petrography, Geology (Geology group).

SYNOPTICAL LECTURES.

The purpose of the synoptical lectures is to present the outlines of the leading branches taught in the University in such a way as to convey the maximum of important information in the minimum of time, so that the students may become familiar with the salient features of subjects which they are unable to take up as regular studies.

These lectures are under the general charge of a lecture committee of the Faculty and the courses to be given will be announced at the opening of the college year. There will be two series of courses, each lasting about twelve weeks. They will be given in the latter part of the first semester and the earlier part of the second. The lecture hour is 5 p. m. Each member of the Junior and Senior classes in the College of Letters and Science is required to elect one of these lectures per week.

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 42-56 of the catalogue.

PHILOSOPHY.

PROFESSOR STEARNS, PROFESSOR JASTROW, AND ASSISTANT PROFESSOR SHARP.

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. *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. *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 6 will be given in the collegiate year 1897-1898.

7. Advanced Analytical Psychology. *Second semester; Tu., Th., at* 10. Assistant Professor SHARP.

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.

14. Philosophical Seminary. *Throughout the year; fortnightly, Tu.,* 4-6. Required of Group students in Philosophy. Professor STEARNS, Professor JASTROW, and Assistant Professor SHARP.

15. Systematic Ethics. The greater part of the time is devoted to a study of Martineau's views as presented in his Types of Ethical Theory. This study of a representative intuitional theory will be supplemented by a course of lectures on utilitarianism. *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.

Note: The required two studies in Philosophy must be selected from courses 1, 2, 10, 15, 19 and 20. In special cases other philosophical studies may be substituted for these by consent of the Department.

It is urgently recommended that the required studies in Philosophy be taken in the Junior year.

PEDAGOGY.

PROFESSOR STEARNS.

1. History of Educational Theories and Institutions, Greek, Roman, and Modern; lectures, readings, and essays. *First semester; M., W., F., at* 9.

2. School Supervision. The making and administration of courses of study, examinations, promotions, inspections, etc. *First semester; Tu., Th., at* 9.

3. The Philosophy of Education. Lectures, readings, and discussions on the nature, forms and elements of education. *Second semester; M., W., F., at* 9.

4. The Herbartian Pedagogy. Herbart's Science of Education; Rein's Pedagogics; Lange's Apperception. *Second semester; twice a week; at* 8.

5. Methods and Management in Grammar and High School Grades. *Second semester; Tu., Th., at* 9.

6. Problems in Applied Psychology. The training of faculty, child study, mental and bodily defects, etc. *Second semester; Tu., Th., at* 10.

7. Modern Educational Systems. A comparative study of education in England, France and Germany. *First semester; three times a week.* For graduate students.

8. Child Study. *Second semester; twice a week.*

9. The Foundations of Pedagogy. A review of principles of psychology, logic, and ethics involved in the science of education. *First semester; twice a week.*

10. 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.*

11. School Work. Study by observation and practice of school work in the high school and in supervision will be provided for graduate students who desire it.

All students expecting to teach are recommended to take courses 1, 3, and 5. Those who do not take logic and ethics in their course in Philosophy should also elect 7.

Special courses for those intending to teach are offered in the departments of Greek, Latin, German, English, and History, to which the attention of students is called. In the sciences special instruction of this character is given in the Summer School, an announcement of which appears on subsequent pages.

ECONOMICS, MUNICIPAL GOVERNMENT, STATISTICS.

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

A full statement of the fifteen courses in these departments is given on pages 132-135 of the catalogue under the heading School of Economics, Political Science, and History. Course 1, The Elements of Economic Science, is repeated each semester, *Tu., Th., S., at* 8.

SOCIOLOGY.

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

A full statement of the thirteen courses offered in Sociology (including Antropology and Ethnology) is given on pages 135-138 of the catalogue.

POLITICAL SCIENCE.

PROFESSOR PARKINSON, MR. 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., and F., at* 9.

HISTORY.

PROFESSOR TURNER, PROFESSOR HASKINS, ASSISTANT PROFESSOR COFFIN, DR. LIBBY, MR. REINSCH AND MR. WENTWORTH.

A full statement of the sixteen courses in history is given on pages 142-145 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 Ancient and Modern Classical courses. *Throughout the year, Tu., Th.,* or *F., Sat., at* 9.

Required of Freshmen in the Civic-Historical Course. *First semester; M., Tu., W., Th., F., at* 10.

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

GREEK.

PROFESSOR SMITH, PROFESSOR KERR, ASSISTANT PROFESSOR LAIRD, AND MR. SHANNON.

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

2. *First Semester:* Lysias, Xenophon, Goodwin's Grammar. *M., Th., F., at* 9. Assistant Professor LAIRD.
   Second Semester: Selections from Herodotus. Homer's Odyssey VI.-XII. *M., Th., F., at* 9. Professor KERR.
   Greek Composition, *throughout the year; Tu., at* 9. Assistant Professor LAIRD. (Course 2 is required of Ancient Classical Freshmen.)

3. *First Semester:* Plato's Apology and Crito, a play of Euripides, Goodwin's Moods and Tenses. *M., Th., F., at* 10. Professor KERR.

   Second Semester: Thucydides VII., and the Philippics of Demosthenes or the Panegyricus of Isocrates, Jebb's Primer of Greek Literature. *M., Th., F., at* 10. Professor SMITH.

   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. *Throughout the year; M., F., at* 11. Professor SMITH or 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, Thucydides, study of meters. *M., W., F., at* 11. Professor SMITH.

   Second Semester: Demosthenes' De Corona, Aristotle's Politeia. *M., W., F., at* 11. Assistant Professor LAIRD. (Open to Juniors and Seniors.)

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

   Second Semester: Aristophanes' Clouds, Aristotle's Poetics, discussion of the Greek Drama. *M., W., F., at* 11. Professor SMITH. (Open to Juniors and Seniors; omitted in 1897-8.)

7. Advanced Greek Composition. *First semester: W., at* 12. Professor SMITH and Assistant Professor LAIRD. (Open to Juniors, Seniors, and Graduates.)

8. Plato. Selections from the Phaedo, Gorgias, Republic, and Laws, with readings from several of the shorter dialogues. 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 writings 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 1896-7.)

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

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. (Omitted 1897-8.)

12. Greek Antiquities, State and Private. One exercise a week, *throughout the year.* Professor SMITH. (Omitted 1897-8.)

13. Greek Drama. During the first semester the Oresteia of Æschylus will be critically 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 1897-8.)

[14. Lyric Poetry. Especial attention will be given to Pindar, and also to Bacchylides, if an edition of the recently discovered poems is published in time for the use of the class. Wide reading in the fragments of the other lyric

poets will also be required of the class. *Throughout the year, Sat.*, 9-11. 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.* Professor SMITH, KERR, and SLAUGHTER, and Assistant Professors LAIRD and SOBER.

[Courses 11, 13, 14 and 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 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 Grammar. History of the sounds and forms. *Throughout the year. Tu., Th.*, 9. Assistant Professor LAIRD.]

3. Latin Grammar. *First semester;* History of the sounds and forms. *Tu., Th.*, 8. Assistant Professor LAIRD.
Second Semester: Syntax; *Tu., Th.*, 8. Professor SLAUGHTER. Courses 2 and 3 will be given in alternate years. (1897-8, Course 2; 1896-7, Course 3.)

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

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

(Courses 2, 3, 4, 5 are intended primarily for graduates, but are open, by permission, to Juniors and Seniors.)

Note: The attention of students is directed to the course on Thought and Language given by Professors JASTROW and OWEN.

LATIN.

PROFESSOR SLAUGHTER, ASSISTANT PROFESSOR SOBER, 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; Tu., Th., at* 8 and 9. Professor SLAUGHTER.

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

5. Exercises in Writing Latin. Elective for Sophomores. *Weekly throughout the year; W., at* 2. Assistant Professor SOBER.

[6. Juvenal and Tacitus, with lectures on the Literature of the Empire. Open to Juniors and Seniors. *Throughout the year; Tu. and Th., at* 2. Assistant Professor SOBER.]

7. a Roman Archæology and Topography; lectures illustrated with lantern slides and photographs. (b) Introduction to Epigraphy. Open to Seniors and Graduates. *Throughout the year; Tu. and Th., at* 2. Assistant Professor SOBER. Courses 6 and 7 are given in alternate years. Course 6 will be given in 1897-8.

8. a Plautus (Captivi and Mostellaria,) Terence (Adelphi). Selections from the fragments of Ennius and Lucilius, Horace (Epistles II., 1). (b) Cicero de Oratore, Quintilian, Book X. *Throughout the year; M., W., F., at* 8. Professor SLAUGHTER.

[9. a Lucretius and Cicero (De Natura Deorum, I.) (b) Vergil and the Roman Epic. Lectures on the Literature of the Republic and of the Augustan Age. *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 9 will be given in 1897-8.

[10. Advanced Course in Writing Latin. *Weekly throughout the year; S., at* 8. Professor SLAUGHTER.]

11. Life of the Romans. Lectures, illustrated with lantern slides and photographs. *Weekly throughout the year.* Professor SLAUGHTER.

Courses 10 and 11 are given in alternate years. Course 10 will be given in 1897-8.

12. Latin Grammar. (See Comparative Philology, Course 3).

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. Lectures will be given on subjects connected with the interpretations, and on the Drama among the Romans. Particular attention will be given to the study of the place of the Roman Drama in the history of literature. To this end the tragedies of Seneca will be read and compared with the Greek originals and modern imitations. (Given in 1897-8); (c) Roman Historiography, Livy and Tacitus. (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 for 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. Professor SLAUGHTER.

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 Grammer. *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.

14. Historical Geography of Palestine. *Throughout the year. Once a week.* Mr. KELLY.

    No knowledge of Hebrew is required for this course.

15. History of Israel. Lectures on the history and literature of Israel. *Throughout the year. Once a week.* Professor WILLIAMS.

    No knowledge of Hebrew is required for this course.

Hellenistic Greek.

17. 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.

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

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

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

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

22. 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, 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. 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 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.

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; two hours a week.* 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. A course of lectures on the Linguistic Expression of Thought, being Part II of the course on Thought and Language (see courses of the Department of Philosophy.) These lectures will be given once a week during the second semester. They will count as 1-5 or as a Synoptic and will be open to Juniors and Seniors. They may be elected separately; but prior attendance on Part I is urged as a great advantage.

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 1895-6. 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; twice a week.* Alternates with Course 14. Given in 1896-7. Miss GAY.

[14. A continuation of 13. *Throughout the year; two hours a* 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, PROFESSOR OWEN, AND MISS GAY.

[1. Elementary. Translations into English of the Spanish exercises in Saur's Conversation Grammar and of texts to be assigned. *Throughout the year; three times a week.* Given during the year 1895-6. Professor OWEN.]

2. Advanced. Reading of selections from Cervantes (Don Quixote), from Calderon (El Magico Prodigioso), and from modern poets. *Throughout the year; two hours weekly.* Given in 1896-7. Assistant Professor GIESE.

ITALIAN.

ASSISTANT PROFESSOR GIESE, PROFESSOR OWEN, AND MISS GAY.

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 1896-7. Professor OWEN.

[2. Advanced. Dante and other classics. *Throughout the year; two hours a week.* Given in 1895-6. 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:* Grammar and Reader, *M., W., F., at* 12; *b:* Written and oral translation into Norse, *Tu., Th., at* 12. *Second semester, a:* 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, MISS GRIFFITH.

Required Studies.

English and Civic Historical Courses—

1. Grammar (Collar-Eysenbach'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, Miss GRIFFITH.

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 Bakterïen. *Freshman; M., W., Th., S., at* 10. Miss STERLING.
   (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. Walther's Meereskunde, Gore's Vorträge von Dubois-Reymond. 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., F., at* 11. Miss GRIFFITH.

Ancient Classical Course—

6. Grammar (Thomas'), Reader (Rosenstengel's), and Classical Readings. *Sophomore; M., W., F., S., at* 9. Assistant Professor Voss.

Modern Classical Course—

7. Reader of German Literature (Rosenstengel's), and Schiller's Wilhelm Tell (Buchheim's). *Freshman; M., Tu., W., Th., at* 12. Professor ROSENSTENGEL.

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

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*Hours and days on consultation.

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); Schiller's Wallenstein's Tod, (Breul's). *M. C. Junior; twice a week.** Assistant Professor Voss.

For Undergraduates and Graduates.

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

12. Conversation, Composition and Translation. *Tu., Th., at* 10, *F., at* 12. Professor ROSENSTENGEL.

13. Teachers' class. Review of and lectures on German grammar, and systematic practice in teaching German. (Thomas' 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.) *Twice 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.]

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*Hours and days on consultation.

GERMAN PHILOLOGY.

ASSISTANT PROFESSOR VOSS.

I. Intermediate Courses.

1. Elementary Middle High German. Paul's mhd. Grammatik und Bachmann's mhd. Lesebuch. *Twice a week. First semester.*
2. Studies in Old and Middle High German Literature. Lectures with readings from Max Mueller's German Classics, Vol. I. (A knowledge of Old or Middle High German is not required.) *Two hours. Second semester.*
3. History and Grammar of the Modern High German Literary Language, based on Behaghel's Die Deutsche Sprache and Kluge's Von Luther bis Lessing. (This course may well serve as an introduction to the study of German philology.) *Twice a week. First and second semester.*

II. Advanced Courses.

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

   b Middle and Modern Low German from an historical point of view. Luebben's mnd. Grammatik nebst Chrestomathie. Nerger, Grammatik des mecklenburgischen Dialekts, and reading of selections from Fritz Reuter's Ut de Franzosentid. (This course alternates with 4a.)

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

   b Old Saxon. Gallée-Behaghel, asaechs. Grammatik, and extracts from the Heliand, ed. Behaghel or Heyne. (This course alternates with 5 a.)

6. Gothic Grammar with readings from the Gospels. Braune's Gotische Grammatik. *Two hours. First semester.*

For Graduates.

7. Early Modern High German. Hans Sachs, Luther, Murner, Brant. Lectures and reading of selections from Braune's Neudrucke deutscher Litteraturwerke des XVI. und XVII. Jahrhunderts. *Two hours. First semester.*

8. Philological Seminary: The work of the Seminary is distributed over two 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. During the first year, in the Proseminary, Paul's Methodenlehre and Geschichte der germanischen Philologie, Sievers' Phonetik, Behaghel's Geschichte der deutschen Sprache, Kluge's Urgeschichte der germanischen Sprachen, and other important articles in Paul's Grundriss der germanischen Philologie are studied.

During the second year, in the Seminary proper, 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. *Twice a week, throughout the year.*

In the Seminary as well as in all the courses in German philology, German will be used exclusively.

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, MR. PYRE, AND MR. BAKER.

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. History of the English Language. A general course. *Second semester; M., W., F., at* 10. Open to all students. Mr. BAKER.

4a. 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, 11, *and* 12. 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. Associate Professor HUBBARD, Mr. PYRE, and Mr. BAKER.

7. Chaucer. History of the literature of the XIV. and XV. centuries. *First semester; M., W., F., at* 10. Associate Professor HUBBARD or Mr. BAKER.

[8. The Literature of the Elizabethan Period. *First semester; M., W., F., at* 10. Professor FREEMAN and Mr. PYRE. Given in alternate years; 1897-8, 1899-1900.]

[9. The Eighteenth Century. *Second semester; M., W., F. at* 10. Professor FREEMAN and Mr. PYRE. Given in alternate years; 1897-8, 1899-1900.]

10. The English Romantic Movement. *First semester; M., W., at* 10. Professor FREEMAN. Given in alternate years; 1896-7, 1898-9.

11. The Victorian Era. *Second semester; M., W., F., at* 10. Mr. PYRE. Given in alternate years: 1896-7, 1898-9.

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

[13. The Epic. Milton, Spenser. *First semester; M., W., at* 10. Professor FREEMAN. Given in alternate years; 1897-8, 1899-1900.]

[14. English Lyric Poetry. *Throughout the year; Tu., Th., at* 10. Professor FREEMAN. Given in alternate years; 1897-8, 1899-1900.]

15. The Novel. *Second semester; M., W., at* 11. Professor FREEMAN. Given in alternate years, 1896-7, 1898-9.

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

17. Literary Criticism. *Second semester; M., W., at* 12. Professor FREEMAN.

18. Poetics. *First semester; Tu., Th., at* 10. Mr. 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. 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 intending to teach English is called to Courses 1, 4, and 6.

RHETORIC AND ORATORY.

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

1. Rhetoric. Study of fundamental principles, analysis of themes, paragraph formation; with frequent exercises in the various forms of discourse, description of engineering structures and machines. Text-books; Abbott's How to Write Clearly, and Cairn's Forms of Discourse. *Three times a week during the year.* Assistant Professor KNOWLTON and Mr. CAIRNS.

2. Rhetoric. Analysis of themes, fundamental qualities of style, paragraph formation and study of literary types, with daily exercise in composition. Text-books: Abbott's How to Write Clearly, Cairns' Forms of Discourse. *Throughout the year.* The class meets in divisions: C. H. *Tu., Th., at* 9; Eng., *Tu., Fri., at* 10; M. C., *W., S., at* 11; G. S., *Tu., Fri., at* 10; A. C., *W., S., at* 10; Engineers, *M., W., F., at* 12. Assistant Professor KNOWLTON, Mr. CAIRNS, and Mr. BEATTY.

3. Rhetoric. To follow Course 2. 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.* Professor FRANKENBURGER, Assistant Professor KNOWLTON, Mr. CAIRNS and Mr. BEATTY.

[4. Advanced Rhetoric. Open to those who have completed Courses 2 and 3 above. Analysis of great essays, orations and debates, 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. To be given in 1898-9.]

5. Forensics. *First semester; M., W., F., at* 12. Elective. Professor FRANKENBURGER.

6. Lectures on the art of poetry and prose fiction. *Second semester; Tu.,* and *Th., at* 12. Professor FRANKENBURGER.

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

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

9. 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 2 and 3. Professor FRANKENBURGER, Assistant Professor KNOWLTON, Mr. CAIRNS, and Mr. BEATTY.

10. Elocution and Dramatic Reading. Bell's Principles of Elocution, with lectures and gesture; declamation with per-

sonal criticism; dramatic reading, Macbeth and Othello, or Julius Caesar and Hamlet. Open to those who have taken Course II or its equivalent. *Twice a week throughout the year.* Professor FRANKENBURGER.

11. 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.

12. 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.

13. Elocution. Reading and declamation with special reference to anaylsis 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.

14. 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.

15. 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. HOWIE, AND MR. RUNNING.

1. Algebra. Progressions, arrangements and groups, binomial theorem, theory of limits, undetermined coefficients, derivatives and series. Text-book: Van Velzer and Slich-

ter's University Algebra. *First semester; four times a week.* Professor VAN VELZER, Assistant Professor SKINNER, Dr. DOWLING, and Mr. HOWIE.

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; four times a week;* same divisions as Course 1.

3. Theory of Equations and Determinants. This course is a continuation of Course 1, but must be preceded by Course 2. *Twice a week for one year.* Assistant Professor SKINNER.

4. Analytic Geometry (elementary course). Straight line, conic sections, general equation 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. *First semester; twice a week.* 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.* Dr. DOWLING.

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 must be preceded by Course 5. *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 1897-8. Assistant Professor SKINNER.

[17. Theory of Functions. *Three times a week for one year* in alternate years. Professor VAN VELZER.]

18. Partial Differential Equations of Mathematical Physics. Based on Riemann's Lectures. *Twice a week for one year* in alternate years. This course will probably not be given in 1897-8. Professor SLICHTER.

[19. Theoretical Hydrodynamics. Lectures on fluid motion. *Twice a week for one year,* in alternate years. This course will be given in 1897-8. 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. 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, theory of numbers, and higher plane curves.

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. FERRY, MR. SMITH, AND MR. WILDER. MATHEMATICAL PHYSICS: PROFESSOR DAVIES.

1. General Lectures. Mechanics and heat, electricity and magnetism, acoustics, and optics. Required of students in the Ancient and Modern Classical, General Science, and Engineering courses. Also elective for students in the Civic Historical and English courses. Two lectures a week. *Throughout the year.* Two sections; *M., W., at* 12; *Tu., Th., at* 12. Professor SNOW. One recitation on Friday or Saturday by the class in smaller sections, at hours to be assigned. Professor SNOW and Mr. FERRY.

   This course is intended for those taking up the study for the first time, or for those who have studied it only in an elementary manner.

2. Introductory Laboratory Practice. An introduction to the theory and methods of physical measurements.

   This course is intended to accompany Course 1, and is required of all students who take Course 1, with the exception of those in the Ancient and Modern Classical courses. A knowledge of plane trigonometry, including the use of logarithms, is required for registration in this course. *Throughout the year; twice a week; hours to be assigned.* Assistant Professor AUSTIN, Mr. FERRY, Mr. SMITH and Mr. WILDER.

3. Advanced Laboratory Practice. Presupposes the completion of Courses 1 and 2, or their equivalents. Required of students in the Physics Group. *Throughout the year; three times a week.* This course may also be elected as a full study throughout the year. *Hours to be assigned.* Professor SNOW, Assistant Professor AUSTIN, and Mr. FERRY.

   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.

4. Thesis Work. Required of Seniors in the Physics Group. *Full study throughout the year.* Professor SNOW, Assistant Professor AUSTIN, and Mr. FERRY.

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.

5. 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. FERRY.

6. Theory of Heat. A full discussion of theories of matter, theory of gases, thermometry, dilatation, calorimetry, change of state, radiation, absorption, conduction, and thermodynamics. The experimental aspect of the subject will be strongly accentuated although the analytical method of treatment will be largely used. *Throughout the year; three times per week.* Mr. FERRY. [Given in alternate years; will not be given during the year 1897-8.]

7. Physical Optics. A survey of the principal theories of light with a full consideration of the details of the elastic-solid theory. The students perform before the class the most important of the classical experiments in crystalline refraction, interference, diffraction, and polarization, and present to the class in the form of dissertations the results of special reading on assigned topics. *Throughout the year; three times per week.* Mr. FERRY. [Given in alternate years.]

8. Introduction to the Study of Mathematical Physics. This course of lectures will treat of the fundamental equations of theoretical physics, and will be preparatory to the more advanced courses offered by Professor Davies in Mathematical Physics, and Professor Slichter in Applied Mathematics. *Throughout the year; three times per week.* Required of Juniors in the Physics Group. Assistant Professor AUSTIN.

9. 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.

10. Mathematical Theory of Sound. An exhaustive mathematical treatment of the subject of acoustics. This course presupposes the equivalent of Course 8. A knowledge of differential equations will also be required. *Throughout the year; M., W., F., at* 2. Professor DAVIES.

11. Mathematical Theory of Electricity and Magnetism. a. Elementary Theory. This course is offered to students who have completed Courses 1, 2, and 5 in Physics, and 2a in Electrical Engineering. It follows the treatment of the subject as given in Gray's Theory of Absolute Measurements of Electricity and Magnetism, or Mascart and Joubert's Electricity and Magnetism. *Four times a week throughout the first semester.* Professor DAVIES.

b. Advanced Theory. This is an amplification and continuation of the preceding course. General electro-magnetic theory will be entered into from the standpoint of the best recent experimental and mathematical work. The student is expected to do much collateral reading and to prepare a dissertation embodying the results of his work upon some special topic chosen or assigned in the early part of the semester. *Four exercises a week throughout the second semester.* Professor DAVIES.

12. Mathematical Physics. This course will supplement Course 8. 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.

13. 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, Assistant Professor AUSTIN, Mr. FERRY.

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

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 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 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.

   Organic analysis, determination of physical constants, special and research work with preparation of thesis. *Full study; second semester.* Assistant Professor HILLYER. For graduates and undergraduates.

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 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 bat-

teries; 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 designed 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 Course. The second year's course in physical chemistry will consist mainly of laboratory work in connection with which original articles will be assigned for reading and study. There will be occasional meetings in the lecture-room for such special demonstrations as may be required. The character of the laboratory work will as far as possible be chosen to meet the individual needs of the student. *Full study.* Dr. KAHLENBERG.

11. Research Work. 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.

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

Students wishing 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.

All students intending to take work in geology 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 a long course in geology. When possible it is advised that 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 Professor Van Hise, 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 and descriptive mineralogy are covered during the first semester. Williams' Elements of Crystallography is used as a text in the course

in 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 and also optical mineralogy, each student being supplied with a microscope for his own special use. 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 8-10 *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 first studied, then the simple blowpipe tests, but the greater part of the time is devoted to the examination and identification of 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, Tu., F., at* 12.

3. 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.

4. Crystallography for Students of Chemistry and Pharmacy. In the first semester of 1896 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.

[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 stratigraphy. 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 in 1895-6 and in alternate years thereafter. 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 in 1896-7 and in alternate years thereafter. 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 sections. Areas being studied in 1896-7, Wausau, Utley, Berlin, Montello, Moundville and Observatory Hill. *Field and laboratory work. Course continuous throughout the year.* Professor VAN HISE and Assistant Professor HOBBS.

8. Synoptical Lectures. The courses include mineralogy and petrology by Assistant Professor HOBBS, physical geology by Assistant Professor CLEMENTS, and the geological forces and the work they accomplish by Professor VAN HISE.

GEOLOGY.

PROFESSOR VAN HISE, AND ASSISTANT PROFESSORS HOBBS AND 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 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., at* 12. 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 and iron 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. 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 Palezoic 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 Dalles 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, in which are included 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, 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.

BIOLOGY.

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

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. BUNTING. 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. In the latter part of the second semester Amphioxus, and its relations to the Vertebrata, will be studied. *Throughout the year;* 11-1.

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.

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.

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 be given special attention.

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 and for Courses 30-32 if they are elected. The subject of the thesis should be selected during the Junior year, and the preliminary work begun.

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, Pteridophta and Spermaphyta. 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; hours on consultation.* 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. 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 necessary observations sometimes require extra time and work 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. Laboratory guide: Darwin and Acton's Physiology of Plants. *Daily; hours on consultation.* Professor BARNES.

19. Bryology. The large collections of mosses and of the literature relating to their 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. a. Taxonomy of Spermaphytes. Lectures, assigned readings and laboratory work on the classification of seed plants. *M., F., at* 11. Assistant Professor CHENEY.

b. Distribution of Plants. Lectures and assigned readings. *W., at* 11. Assistant Professor CHENEY.

Of Course 21 either a or b or both may be elected.

22. Botanical Microtechnique. A course designed primarily for pharmacy students of the two long courses, on special methods of collecting and preserving material for ana-

tomical studies; the use of the microtome, including processes of imbedding; the use of stains and reagents; and the preparation of permanent mounts. Laboratory work and assigned readings. *Second semester, Tu., Th.*, 11-1. Assistant Professor CHENEY.

23. Anatomy of Woods. A course designed for those who desire to acquaint themselves with the structural charcteristics of American woods, commonly used in construction work. Laboratory work with assigned readings. Students desiring to take this course should know how to use a compound microscope and should have had at least the equivalent of one semester's work in general botany. *First semester; twice a week.* Hours to be arranged on consultation. Assistant Professor CHENEY.

24. 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.

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 from the general biological standpoint, although special attention will be given to disease-producing germs in the latter part of the semester. It includes a study of various typical forms with the microscope and also with different culture media. Applicants must be thor-

oughly familiar with the compound microscope. *First semester; full study;* 11-1. Lectures or recitations *M., W., F.*, 11-12. In the study of the disease-producing organisms, McFarland's Pathogenic Bacteria will be used as a text. Professor RUSSELL and Mr. FROST.

31. Advanced Bacteriology. Students who have completed Course 30 may elect this course which is mainly laboratory work. The course is intended to supplement the general course, giving the student further experience in media making, physiological technique, and practical diagnostic work. During the latter part of the semester students are assigned special topics which must be reported upon giving results reached, together with digest of literature bearing on the subject. *Second semester; full study.* Professor RUSSELL and Mr. FROST.

32. Thesis work in Bacteriology. Students desiring to select their thesis in this department must take course 30 in the junior year or before, and select their subject for the 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 waters; and the disposition of sewage. *First semester; full study,* lectures and laboratory work. Required of Seniors in Sanitary Engineering. 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.

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.

ROSTER

of officers of the battalion for the year 1896-7.

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

Field Officers.—Lieut.-Colonel Allard Smith; Major R. E. Heine.

Staff Officers.—Captain and Adjutant E. T. Fox; Captain and Quartermaster O. Cole, Jr.

Non-commissioned Staff.—Sergeant-Major F. J. Gaenslen; Quartermaster-Sergeant J. B. Baldwin.

Company Officers.—Company A.—Captain F. H. Kurtz; First Lieutenant P. L. Allen; Second Lieutenant H. N. Carter.

Company B.—Captain H. F. Mehl; First Lieutenant T. B. Wadsworth; Second Lieutenant S. L. Emery.

Company C.—Captain F. A. Schroeder; First Lieutenant E. Freschl; Second Lieutenant C. Hambuechen.

Company D.—Captain C. A. Vilas; First Lieutenant H. K. Clark; Second Lieutenant J. H. Stauff.

First Sergeants.—J. H. Tillisch, W. S. Darling, C. A. Keller, M. W. Griffith.

PHYSICAL EDUCATION.

DR. ELSOM, MR. ROHN, AND MISS BOUDREN.

Through the liberal appropriation made by the Legislature in 1891, means were provided for the construction of a new Armory and Gymnasium. The building 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. Antropometric 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 grand stands, 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. Examinations on the subjects covered by these lectures is given at the end of the course.

During the past year Ladies' Hall has been enlarged and improved and now contains a well equipped gymnasium for the use of the women attending the University.

This room is two stories high, has a floor space 71x40 ft., and is provided with 27 dressing rooms containing 108 lockers. These dressing rooms connect with shower baths supplied with hot and cold water furnishing ample bathing facilities for all women taking gymnastics.

The gymnasium contains new apparatus including bar-stalls, benches, booms, saddles, window ladders, horizontal ladder, ver-

tical and inclined ropes, jumping standards, etc., and is under the immediate direction of an experienced instructor, a graduate of the Boston Normal School of Gymnastics.

An opportunity for systematic physical training is offered to the young women of the University in the gymnasium connected with Ladies' Hall. The object of the work is to secure a good physique, health, strength, self-control, self-reliance, grace.

The Swedish system of training is used and systematic class work in gymnastics is required of the young women of the Freshman and Sophomore classes, and special students ranking with these classes, on two days of the week, one hour each day. All work is done under the direction of the instructor.

Each student will undergo a thorough physical examination at the time of entering the department in order that the physical condition may be known. Examinations are also required at the end of the first and second years when a chart, showing change in development, as indicated by strength tests, will be furnished if desired.

Students must provide themselves with suitable costumes consisting of divided skirt and loose waist of dark blue serge, and gymnasium shoes. Write to the instructor for information before making the suit.

First Year.

Free movements, marching, running, exercises on single and double boom, bar-stalls, with and without benches, vertical ropes, recreative games, basket ball. Hygiene Lectures, second semester.

Second Year.

Continuation of work of previous year adding advanced work on vertical ropes, slanting ropes, window ladder, horse, basket ball and recreative games.

Acrobatism is discouraged.

The Tennis and Wheel Clubs afford ample opportunity for out door exercise during the season when one derives health, strength and inspiration from active life in the pure air and bright sunshine.

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 5.

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. Musical Composition. Two hours a week. *Throughout the year;* hours to be arranged. Mr. SLEEPER.
6. History of Music. Lectures. *Two hours a week. Throughout the year; Tu., Th., at* 3. Professor PARKER.

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.

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.
J. B. PARKINSON, A. M., Professor of Constitutional and International Law.
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.
J. H. RAYMOND, PH. D., Professor of Sociology.
VICTOR COFFIN, PH. D., Assistant Professor of European History.
O. G. LIBBY, PH. D., Instructor in History.
P. S. REINSCH, A. B., LL. B., Instructor in Political Science.
F. C. SHARP, PH. D., Assistant Professor of Philosophy.
E. D. JONES, PH. D., Instructor in Economics and Statistics.
C. T. WENTWORTH, A. M., Fellow in History.
B. H. MEYER, B. L., Fellow in Economics.
S. E. SPARLING, PH. D., Assistant in Public Administration.
B. E. FERNOW, LL. D., Special Lecturer on Forestry.
P. W. AYRES, PH. D., Special Lecturer on Pauperism.
C. M. HUBBARD, Special Lecturer on American Charities.

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. 45.

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. The Master's degrees and the degree of Doctor of Philosophy are conferred for work done in the School under the general regulations of the University. (See pp. 47-49.)

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. 58. The requirements for graduation in the courses are as follows:

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

Sophomore Year: German 4; French 4; science (physics, biology, or chemistry) 5; rhetoric 2; military drill 2; gymnastics 2; elective 2.

Junior and Senior Years: Philosophy two courses, equivalent to 5 or 6, one semester; synoptical lectures 1, two years; thesis 2, two semesters. The remaining studies, sufficient to make 132 unit-hours, are elective, except that the equivalent of twelve hours per week for one year must be elected in history, economics, and political science.

3. Work under the Group System for students who desire to take economics, political science, or history as one of their major studies. (See pp. 80-82.)

4. 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 University. 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 18 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.

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

6. Numerous special lectures are given as occasion offers. During the present year the following lectures have been or will be given in connection with the course on American Charities:

PROFESSOR A. O. WRIGHT, The Present Condition of Charities and Correction in Wisconsin.

MR. CLARENCE SNYDER, The Wisconsin State Board of Control.

REV. WM. WOODMANSEE, illustrated lecture on The Children's Home Society of Wisconsin.

PRINCIPAL F. G. KRAEGE, The Wisconsin State Industrial School for Boys.

DR. PHILIP W. AYERS, Some lectures on three or more present problems of charitable work.

DR. 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 Churches and Charitable Work.

ECONOMICS.

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

1. The Elements of Economic Science. A study of the leading facts of the industrial revolution and modern industrial history in the first part of the semester, followed by a study of the nature and leading principles of political economy. Ely's Outlines of Economics and Hobson's Evolution of Modern Capitalism. *Repeated each semester: Tu., Th., S., at* 8. Professor SCOTT and Mr. MEYER.

2. The Classical Economists. Adam Smith, Ricardo, and J. S. Mill. Study of characteristic parts of the works of these authors with lectures and class discussions. *Second semester; M., W., F. at* 8. Professor SCOTT.

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.

5. The Financial History of the United States. The financial legislation and experience of the United States, including the finances of the Colonies and the Revolutionary epoch. (Not given 1897-8.)

6. 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, competition, 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.

7. 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 1897-8).

4. Economic Problems. The work will be opened with the study of socialism, employing as the text-book, Dr. 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 sweat-

ing system, tenement house problem, the church and social reform, labor organizations, etc. *Repeated each semester; Tu., Th., S., at* 9. Dr. JONES.

8. 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.

9. 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.)

10. Theories of Production and Consumption. Theories of social prosperity as seen in the writings of economists on the subject 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.

11. 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.

12. 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.

13. 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.

14. Senior Seminary. The Seniors who write theses on economic topics meet in this Seminary for the presentation and discussion of reports on their respective topics. *Second semester; alternate weeks on Wednesday evenings at* 7. Professor SCOTT.

15. 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 1897-8 is: The Scope and Methods of Economics.

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, and Dr. JONES.

SOCIOLOGY.

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

1. Anthropology. An elementary course on man as the unit of society, and on the evolution of society and social institutions. The general purpose of the course is to point out how man has developed into his present social state, what the influences were which caused this development, and how these influences themselves have evolved. The general subjects discussed are: first, the antiquity of man, and the place man occupies in nature; second, the origin and early development of institutions which have made man what he is, and upon which contemporary society is based, such as language and writing, the arts of life and of pleasure, religion and science, mythology and history, the family and social structure. Tylor's Anthropology is used as a guide, supplemented by lectures and assigned readings. *First semester; M., W., F., at* 11. Professor RAYMOND.

2. Ethnology. A course on the races of mankind, with special reference to the social institutions of various peoples. The physical and mental differences of races are discussed; the various peoples of the world are classified;

and the most important ethnographic problems are considered. Keane's Ethnology is used by the class, supplemented by lectures and the investigation of assigned topics. *Second semester; M., W., F., at* 11. Professor RAYMOND.

3. Elements of Sociology. A course on the structure and functions of contemporary society. Existing society is studied as an objective reality, the student's own world being his laboratory. The course begins with a series of elementary lectures on the methods of scientific social study; the relation of the individual to society; the social organism; the physical and psychical bases of society; the social forces; the field of sociology, and its relation to social reform. Meanwhile the individual members of the class have been assigned certain social institutions for personal observation and study, upon which they report fully to the class. The purpose is to bring out prominently the leading features in the associated life of human beings as it actually exists. Small and Vincent's Introduction to the Study of Society is used as a laboratory guide, supplemented by lectures, assigned readings and reports. *First semester; M., W., F., at* 10. Professor RAYMOND.

4. Historical Survey of Sociological Thought. An attempt to trace the gradual development of sociological thought from antiquity through the Hebrews, Greeks, Romans, and mediæval writers down to our own times. The sociological teachings of a few classical writers, as Plato, Aristotle, and Cicero, are considered as types of ancient social thought. Mediæval thought is briefly discussed, taking writers like St. Augustine and St. Thomas Aquinas as types, with a view to explaining the slow growth of sociology. An attempt is made to trace the influence of each writer and each period upon succeeding thought. The later developments of sociological thought are treated at greater length, the larger part of the course being devoted to the discussion of the teachings of the most important modern sociological writers, as Vico, Comte, Spencer, DeGreef, Ward, Tarde, Durkheim, Novicow, Giddings, and Small. Lectures, supplemented by assigned readings. *Second semester; M., W., F., at* 10. Professor RAYMOND.

5. Telic Sociology. A study in social ideals. Starting with the conception that ideals are to social science what hypotheses are to physical science, an endeavor is made to discover, by induction and deduction, what ought to be in society. Lectures, supplemented by assigned readings and reports. *First semester; M., W., F., at* 9. Professor RAYMOND.

6. Dynamic Sociology. A study in social forces. The natural agencies which are making for social amelioration are considered, and man's proper attitude toward them. Attention is then directed toward artificial agencies,—forces which man himself may put in operation to retard or accelerate social evolution. Lectures, supplemented by assigned readings and reports. *Second semester; M., W., F., at* 9. Professor RAYMOND.

7. 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 special 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. *M., W., Th., at* 2. Dr. JONES.

8. 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 Chicago, formerly of Cincinnati. 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.

9. 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 1897-8.)

10. Social Ethics. *Second semester; Tu., Th., at* 8. Assistant Professor SHARP.

11. 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.

12. 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 1897-8.)

13. Seminary in Sociology. Designed particularly for graduate students, seniors writing theses on sociological subjects, 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. As far as possible the subjects are chosen along one general line of thought each year, so that the meetings of the seminary have a certain continuity. During the present year the general subject has been the Sociological Teachings of Herbert Spencer. For 1897-8 the general line of study will be English Social Movements, including studies in the Labor Movement, the Christian Socialist and Fabian Movements, the Social Settlement Movement, etc. *Monday evenings throughout the year, from* 7:30 *to* 9:30. Professor RAYMOND.

STATISTICS.

1. General Course. This course aims to present first, a discussion of the nature, advantages and difficulties of statistics, methods of census-taking, tabulation, etc.; sec-

ond, a systematic view of the most suggestive and useful social statistics available. Statistics are presented and analyzed which bear upon such subjects as the population and its movements, including birth, death, marriage, and immigration; statistics of agriculture, price, wages, rent, mortgages, cities, occupation, crime, education, talent, accident, etc. *Second semester, M., W., F., at* 9. Dr. JONES

2. 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, M., W., at* 9.

POLITICAL SCIENCE.

PROFESSOR PARKINSON, MR. REINSCH, AND DR. SPARLING.

1. 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* 11. Mr. REINSCH.

2. 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; Tu., Th., at* 12. Mr. REINSCH.

3. Constitutional Law. An outline of the growth of constitutional law in the United States prior to the adoption of the present constitution, followed by a study of the constitution itself, not simply as a document, but in action, and in the light of the highest judicial interpretation. *Both semesters; M., W., F., at* 9. Professor PARKINSON.

4. Constitutional Law. Designed to follow, or at least to supplement, Course 3. A closer study of the more important parts of the constitution, with emphasis on the amendments—their nature, scope, and influence as a bill of rights—and on the growth of our unwritten con-

stitution. The examination of leading cases will be made prominent. Open to graduates and other advanced students. *Both semesters; Tu., Th.*, at 9. Professor PARKINSON.

5. Comparative Constitutional Law. Designed to follow Courses 3 and 4. A comparative study of the constitutions of some of the leading states of the world, of their more striking features, and of the trend in constitution making. Lectures, co-operative topical work, and class discussions. Open to graduates and other advanced students. *Second semester; Tu., Th., at* 10. Professor PARKINSON.

6. 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; M., W., at* 12. Mr. REINSCH.

7. 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; M., W., at* 12. Mr. REINSCH.

8. History of English and American Law. The development of legal institutions as an expression of social and political progress. *First semester; Tu., Th., at* 12. Mr. REINSCH.

9. 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. Open to students of suitable preparation. *M., W., at* 11. Mr. REINSCH.

10. International Law. An examination of the nature and sources of international law, and a study of its growth, improvement and present status, as brought about by the extension of commerce and civilization. *First semester; M., W., F., at* 10. Professor PARKINSON.

11. International Law. Designed to follow Course 10. More attention will here be given to the subject of diplomacy—including a study of treaties—and to the rights and ob-

ligations of neutrals, and the methods of setting international disputes other than by war. Open to graduates and to other advanced students. *Second semester; M., W., at* 10. Professor PARKINSON.

12. Elements of Administration. An introductory course to the general field of administrative study. The aim is to outline the theoretic and historic development of the Elements of Administration and of Administrative Law. A topical and bibliographical outline will be furnished the student to serve the place of a text. Lectures, readings and topics. *First semester; Tu., Th., at* 8. Dr. SPARLING.

13. Municipal Government in Europe. A comparative study of the modern method of municipal organization and administration in the chief states of Europe. The essential principles and facts of the modern rural and urban administrative systems will be studied. *First semester; M., W., F., at* 8. Dr. SPARLING.

14. Comparative Administrative Law. A comparative study of the Central Administration of Germany, France, England, and the United States. The development of the underlying principles and methods of administrative organization as seen in the administrative law of these states. *First semester; Tu., Th., S., at* 9. Dr. SPARLING.

15. Municipal Government in the United States. An outline of the town and county systems in the different states will precede the study of the organization and administration of the larger cities. The essential facts of rural and urban life will be viewed from the standpoint of administration. *Second semester; M., W., F., at* 8. Dr. SPARLING.

16. Comparative Administrative Law. Following Course 14, the legal relations of the administration to individual rights and duties will be studied in the checks provided to prevent its encroachment upon the rights of the citizen. The methods and technique of administrative control as employed in Germany, France, England, and the United States. The administrative courts of Germany and France. Official relations, etc. *Second semester; Tu., Th., S., at* 9. Dr. SPARLING.

17. Administrative Politics. A detailed study of the more important political questions that fall within the field of

administration. The selected problems will refer particularly to questions that involve the extension of the administrative activity of the state into new fields. Conflict of public and private control; state control of railroads, etc. *Second semester; Tu., Th., at* 8. Dr. SPARLING.

18. Senior Seminary. Open to those who select topics in political science for their senior thesis, and designed for the presentation and discussion of reports upon them. *Fortnightly throughout the year.* Professor PARKINSON, Mr. REINSCH, and Dr. SPARLING.

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. WENTWORTH.

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 Ancient Classical and Modern Classical courses. *Throughout the year; Tu., Th., at* 9; *F., S., at* 9. (b) For Freshmen in the Civic Historical course. *First semester; M., Tu., W., Th., F., at* 10. (c) For Freshmen in the English course. *Second semester; M., Tu., W., Th., F., at* 8 *and* 12. Professor HASKINS and Dr. LIBBY.

2. English History. Political and social history of England from the earliest period to the present time. Text-book, lectures, topics. For Freshmen in the Civic Historical and English courses. (a) English course. *First semester; M., Tu., W., Th., F., at* 9 *and* 12. (b) Civic Historical course. *Second semester; M., Tu., W., Th., F., at* 12. Assistant Professor COFFIN and Mr. WENTWORTH.

3. History of the Middle Ages. Political and social history of continental Europe from the barbarian invasions to the Renaissance. *Throughout the year; M., W., F., at* 11. Designed for Sophomores and Juniors; should precede Courses 5, 6, and 10. Professor HASKINS.

4. 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 1812 to the present time. *Second semester; Tu., Th., at* 11. Professor TURNER.

5. Modern European History. Beginning with the Renaissance and extending to the French revolution. Text-book, co-operative topical work, and lectures. *Throughout the year. M., W., F., at* 10. Assistant Professor COFFIN.

6. History of the Nineteenth Century. This course covers the period from 1789 to the present time, and is designed to enable the student to understand current events by showing their connection with recent history. Text-book, lectures, topics. *Throughout the year; Tu., Th., at* 10. Assistant Professor COFFIN.

7a. 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 4 or its equivalent. Not given in 1897-8. *Throughout the year; M., W., F., at* 12. Professor TURNER.

[b Economic and Social History of the United States, to 1789. Must be preceded by course 4 or its equivalent. Given in 1897-8. *Throughout the year; M., W., F., at* 12. Professor TURNER.]

8. Constitutional History of England. An advanced course designed for those who have had course 2 or its equivalent. *Throughout the year; Tu., Th., at* 12. Professor HASKINS.

[9. History of Institutions. *First semester;* Selected topics in the early history of institutions; Greek political institutions and ideas. *Second semester;* Roman institutions. *Tu., Th., at* 11. Open to graduate students and Seniors of suitable preparation. Given in 1897-8. Professor HASKINS.]

10. 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 1896-7. Professor HASKINS.

11. 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. During the year 1895-6, the work was devoted to the period 1815 to 1850. In 1896-7 the period 1845 to 1875 was studied. For 1897-8, the work will be chosen from the period beginning with colonization, and closing with 1789. *Throughout the year; M., Tu., W., at* 2:10. Open to graduate students and by permission, to Seniors of suitable preparation. Professor TURNER.

12. Seminary in Mediæval History. In 1896-7 the work was devoted to a critical study of the capitularies of Charlemagne and related documents. In 1897-8 the first semester will be given to exercises in the interpretation of diplomatic texts; in the second, various problems in the early history of universities will be taken up. *Throughout the year; S., at* 9. Professor HASKINS.

13. Seminary in Modern European History. Open only to those who have had course 5 or its equivalent. In 1896-7 work was devoted to an investigation of the personal government of Charles I. of England. *Weekly during second semester; S.*, 11-1.

14. Historical Conference. For conference, consideration of papers, and criticism of current historical literature. For graduates. *Fortnightly throughout the year; F.*, 3-5.

15. Methods of history teaching with special reference to the work of secondary schools. For Juniors and Seniors of suitable preparation. *Weekly during the second semester; F., at* 2. Professors TURNER and HASKINS.

[16. Methods of Historical research and criticism. Special attention is given to bibliographical tools, to the chief collections of historical material, to the nature of the assistance furnished by auxiliary sciences, and to the elements of historical criticism. The course is designed as an introduction to historical research and will be accompanied by practical exercises on the part of the members of the class. For graduates and Seniors of suitable preparation. Given in 1897-8. *Weekly throughout the year.* Professor HASKINS.]

The courses in the department of History are divided into three groups. Courses 1 to 5 are planned so as to afford an in-

troductory survey of the general field of history sufficient for the purposes of the average undergraduate. 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 10 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, respectively; they are open to undergraduates of sufficient advancement and are also suited to the early years of graduate study. The remaining courses—except course 15, which is a special course for those intending to teach history in secondary schools—are designed to afford training in original research in representative field of history; they are open to advanced students under conditions which vary in the different courses.

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.
A. M. CHURCHILL, Student Assistant, Meteorology.
ESTHER GORDON, 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 accessible 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 two 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 sideral 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 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.
C. F. Burgess, B. S., Instructor in Electrical Engineering.
F. J. Hartwell, B. S., Instructor in Engineering.
B. D. Frankenfield, B. S., Assistant in Electrical Engineering.
A. H. Ford, E. E., Fellow in Electrical Engineering.
Michael Bonn, Foreman of Foundry.
William Lottes, Foreman of Blacksmith Shop.
Irwin Mutchler, Assistant in Wood Shop.
F. A. Schroeder, 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.
A. A. KNOWLTON, A. M., Assistant Professor of Rhetoric.
W. D. FROST, M. A., Assistant in Bacteriology.
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.
C. A. VAN VELZER, PH. D., Professor of Mathematics.
LUCY M. GAY, B. L., Instructor in French.
LOUIS KAHLENBERG, PH. D., Instructor in Chemistry.
SUSAN A. STERLING, M. L., Instructor in German.
E. S. FERRY, B. S., Instructor in Physics.

Special Lecturers.

J. A. L. WADDELL, C. E., Consulting Engineer, Kansas City, Mo.
ISHAM RANDOLPH, C. E., Chief Engineer Chicago Sanitary District. Lecturer on the Chicago Drainage Canal.
W. N. MERRIAM, Metallurgical Engineer, Milwaukee. Lecturer on The South African Mines.
J. N. BARR, Supt. Motive Power C. M. & St. P. Ry., Milwaukee. Lecturer on Railroad Engineering, "A Screw Loose."
R. H. THURSTON, C. E., LL. D., Director of Sibley College Cornell University. Lecturer on Development of the U. S. Navy and Merchant Marine.
H. M. SPERRY, Signal Engineer of National Switch & Signal Co., Chicago, Ill. Lecturer on Railroad Signaling.
MAGNUS SWENSON, M. E., Lecturer on the Modern Cotton Compressor, Chicago, Ill.,

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 18 and 19, beginning at 9 a. m. The later examination will be held on Tuesday and Wednesday, September 29 and 30, 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, fractinal, 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: Gage or Avery, with laboratory work.

PHYSIOLOGY: Martin's The Human Body (briefer course).

BOTANY: Gray's Lessons, with plant analysis and description.

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 reuqirements 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 carfully 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 42,000 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, 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; with a variety of minor and accessory apparatus. The laboratory contains a large model of Stephenson's link motion, in connection with the piston, crosshead, connecting-rod, and crank of engine.

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 and a Ewing magnetic bridge), 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 de-

sired 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 arrangement with the director of Washburn Observatory 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, siderial and meantime clocks, zenith telescopes, a transit instrument of the broken type, chronometers, an altazimuth, a universal instrument of the German type, spherometic 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. A tour by the Senior class is provided for just before Commencement which is utilized in visiting electrical, mechanical, and other engineering plants under construction or operation. 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. 70.

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*, 1*, (5)†, or German, 9, (5); Rhetoric, 1, (3); Mathematics 1 (5); Topographical Engineering, 1, (3½); Mathematics, 8, (5).

SECOND SEMESTER.—French, 1, (5), or German, 9, (5); Rhetoric, 2, (3); Mathematics, 2 and 3, (5); Perspective Drawing, (1); Shop-work, 1, 3, 6, (5); Topographical Engineering, 2a, (2).

Sophomore Year.

FIRST SEMESTER.—Mathematics, 3, 4, 5, (6½); Physics, 1, 2, (5); Chemistry, 1, (5); Mineralogy, 1, (2); Topographical Engineering, 2b, (2½).

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*The language of the Freshman year must be the same as that offered for the entrance examination.

†The figure in parentheses denotes the number of hours per week. For descriptions of the various courses see subsequent pages.

SECOND SEMESTER.—Mathematics, 4, (3½); Physics, 1, 2, (4); Chemistry, 2, (2); Machine Design, 3, (3); Mechanics, 1, (5); Topographical Engineering, 3, (3½).

Junior Year.

FIRST SEMESTER.—Mechanics, 2, 3b, 5, (9½); Steam Engineering, 6, 8, (3); Structural Engineering, 1, 2a, (4); Railway Engineering, 1, 2, (5).

SECOND SEMESTER.—Mechanics, 4b, (4); Astronomy, 5, 6, (4); Structural Engineering, 2b, 5a, 7a, (8½); Railway Engineering, 3, (2); Topographical Engineering, 4, (2); Topographical Engineerin, 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.

SECOND SEMESTER.—Structural Engineering, 4, (3); Railway Engineering, 6, (2); Rivers and Canals, 1, (1½); Municipal Engineering, 2, 4, (4½); Geology, 5, (2); Laws of Corporations and Contracts, (1); Elective, (4), in Railway, Structural, Geodetic, Topographic, or Municipal Engineering; Thesis; Topographical Engineering, 5, two weeks (120 hours).

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, 2, 3b, 5, (9½); Steam Engineering, 6, 8, (3); Structural Engineering, 1, 2a, (4); Railway Engineering, 1, 2, (5).

SECOND SEMESTER.—Mechanics, 4b, (4); Structural Engineering, 2b, 5a, 7a, (7½); Railway Engineering, 3, (2); Chemistry, 3, (5); Topographical Engineering, 4, (2); 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); Topographical Engineering, 5, two weeks (120 hours); Thesis.

Graduate Courses.

For graduate students and students desiring to specialize, opportunity is afforded in the elective courses and in courses arranged on consultation 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, 8, (5); German, 9, (5), or French, 1, (5); Rhetoric, 1, (3); Shop-work 1, 2, (2½).

SECOND SEMESTER.—Mathematics, 2 and 3, (5); Mathematics, 8, first nine weeks, (5); German, 9, (5), or French, 1, (5); Rhetoric, 2, (3); Shopwork, 2, 3, 4, (2½); Machine Design, 1, last nine weeks, (5).

Sophomore Year.

FIRST SEMESTER.—Mathematics, 3, 4, (5); Physics, 1, 2, (5); Chemistry, 1, (5); Machine Design, 2, (3); Shop-work, 5, 6, (3).

SECOND SEMESTER.—Mathematics, 4, 6, (5); Physics, 1, 2, (5); Mechanics, 1, (5); Chemistry, 2, (3); Machine Design, 3, (3).

Junior Year.

FIRST SEMESTER.—Mechanics, 3a, 4a, 5, (6½); Steam Engineering, 1, 2, 7, (5); Machine Design, 4, (6); Shop-work, 7, (3½).

SECOND SEMESTER.—Steam Engineering, 2, 3, 7, (8); Machine Design, 5, (7); Shop-work, 8, 9, (5); Contracts, (1).

Senior Year.

FIRST SEMESTER.—Steam Engineering, 3, 7, (6); Machine Design, 6, (7); Electrical Engineering, 1, (5); Shop-work, 10, (3).

SECOND SEMESTER.—Hydraulic Engineering, 1, 2, (4); Machine Design, 6, (7), for eight weeks; Steam Engineering, 3, 7, (5); Shop-work, 11, (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, 2, (3); Shop-work, 5, 6, (3).

SECOND SEMESTER.—Mathematics, 4, 6, (5); Mechanics, 1, (5); Physics, 1, 2, (4); Chemistry, 2, (4); Machine Design, 3, (3).

Junior Year.

FIRST SEMESTER.—Mechanics, 3a, 4a, (5); Physics, 5, (3); Electrical Engineering, 1, (5); Machine Design, 4, (6); Shop-work, 7, (2½).

SECOND SEMESTER.—Mechanics, 5, (1½); Steam Engineering, 4, 7, (5); Electrical Engineering, 1, 2, (5); Machine Design, 5, (7); Shop-work, 8, 9, (3).

Senior Year.

FIRST SEMESTER.—Steam Engineering, 5, 7, (5); Electrical Engineering, 2b, 3, 4, 6b, (11); Machine Design, (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 more fully explained in pages 149 to 152.

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.

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

3. Special Elementary Course for Engineers, essentially as follows: Roman du'n 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 MISS GRIFFITH.

5. Dippold's Science Reader, Rosenthal's Elektrische Erscheinungen, and Siemen's Elektrische Telegraphie. Required of Freshmen in Engineering. *M., Tu., W., F., at* 11. Miss GRIFFITH.

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.

ASSISTANT PROFESSOR KNOWLTON, MR. CAIRNS, AND MR. CASKEY.

1. Rhetoric and Composition. Text-books: Abbott's How to Write Clearly, and Cairns' Forms of Discourse. *Throughout the year; M.,W., F., at* 11 and 12. Assistant Professor KNOWLTON and Mr. CAIRNS.
   Required of Freshmen in Engineering.

2. 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. FERRY, MR. SMITH AND MR. WILDER.

1. General Lectures. *Throughout the year; M., W., at* 12. *Also one recitation, F., or S., hour to be assigned.* Professor SNOW.
   Required of Sophomores in Engineering.

2. Introductory Physical Laboratory Practice for Electrical, Civil, and Mechanical Engineering. *First semester; Tu., Th.,* 9-1. *Second semester; W., F.,* 2-4. Assistant Professor AUSTIN, 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.

5. 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. FERRY.
   Required of Juniors in Electrical Engineering.

CHEMISTRY.

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

1. Descriptive Organic Chemistry. Lectures and laboratory work. *First semester; M., Tu., W., Th., F.,* 2-4. Professor DANIELLS and Dr. HILLYER.

2. (a) Qualitative Analysis, to Easter recess.

(b) Quantitative work in the determination of the equivalence of elements and quantitative analysis. Gas Analysis, or Sanitary Water Analysis. Laboratory work after Easter recess.

Or (c) Descriptive Organic Chemistry, lectures and laboratory work, last nine weeks of second semester.

Second semester: M. E., *Tu., Th.,* 11-1; *Tu.,* 2-4; E. E., *M., Th.,* 2-4; *F.,* 2-6; C. E., *first eight weeks, M.,* 2-4; *T., Th.,* 11-1, *and* 2-4. Professor DANIELLS, Assistant Professor HILLYER, Mr. LINCOLN, and Mr. BASSETT.

Required of Sophomores in Engineering.

GEOLOGY.

PROFESSOR VAN HISE, AND ASSISTANT PROFESSORS HOBBS AND 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 MR. RUNNING.

1. Algebra. The 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 and Assistant Professor SKINNER.

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., at* 8 *or* 9 (136 *hours in class room*). Professor SLICHTER and Assistant Professor SKINNER.

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 and Assistant Professor SKINNER.

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 Church's Descriptive Geometry for the Civil Engineering course. Assistant Professors MACK and SMITH.

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.

Civil Engr'g Section. *M., Tu., W., Th., F.*, 8-10; First four weeks.

Required of Freshmen in Engineering.

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. *First semester* (108 *hours in draughting room*); *M., W., F.*, 8-10. Assistant Professor MAURER.

Required of Juniors 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. *Second semester* (*3 hours per week for* 16 *weeks in class room*); *Tu., Th., F., at* 10; (32 *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 applications 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 drawing 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-book, Reinhard's 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. *Second semester; Tu. and Th.*, 8-10. 4th to 10th week.

Required of Freshmen in Civil Engineering.

(b) The construction and adjustments of the transit, sextant, and plane table are first studied; after which practical problems in land surveying and profile leveling 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 attained, and also to point out errors. Text, Raymond's Plane surveying. Taught partly 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, 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. } *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. This work is supplemented by a course of four lectures by Dr. Davies, his subject the present year being the field work of the U. S. C. & G. survey in Wisconsin. 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. It is intended that the triangulation shall be connected with the primary triangulation of the U. S. Coast and Geodetic Survey. The equipment available for this field work includes one alt-azimuth instrument reading to six tenths of a second; three theodolites reading to ten seconds; six heliotropes; one Kern precise level outfit; one base line apparatus; one sounding apparatus and other instruments needed in such work. Survey begins third Monday preceding commencement and continues for two weeks (120 hours). Professors WHITNEY, SMITH, TURNEAURE, and DAVIES.

Required of Juniors and Seniors in Civil Engineering.

6. Advanced Geodesy. Includes the preparation of a map from the field notes of Course 5, 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, also a general study of the Economics of Geodesy. 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.

7. 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.

8. 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.

9. Mining Surveying. 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.*]

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. Class-room 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* 9; 32 *hours in the class room.*

Required of Seniors in Civil Engineering.

RIVERS AND CANALS.

PROFESSOR WHITNEY.

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 9 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 sipes, 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 AND ASSISTANT PROFESSOR RICHTER.

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 and Boilers. 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. The general subject of combustion and its application to steam boilers is studied, the theoretical and practical efficiency of these is developed, and rules for the design of boilers, chimneys, etc., are given. 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. 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.

4. 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* 3, 74 *hours.* Professor BULL.

Required of Juniors in Electrical Engineering.

5. 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. *M.,* 8-10; *Tu., Th.,* 10.

Required of Seniors in Electrical Engineering.

6. 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.* Professor BULL.

Required of Juniors in Civil Engineering.

7. 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 in 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.

8. 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.

9. 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.

10. 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, MR. FRANKENFIELD, AND MR. FORD.

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 Text-book on Electromagnetism and the Construction of Dynamos, Vol. I.

   First semester; M., W., F., at 10; *M., Tu., Th.*, 2-6.

   Second semester; first seven weeks, S., at 12; *M., Tu., Th.*, 2-6; *S.*, 8-12 (82 *hours in class room and* 86 *hours in laboratory and draughting room*). Assistant Professor FORTENBAUGH, Mr. FRANKENFIELD, and Mr. FORD.

   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; construction and working of primary and secondary batteries, and their commercial use. Comparative and efficiency tests of various commercial types of batteries are made by the students in the laboratory. Text-books: Carhart's Primary Batteries and Niblett's Secondary Batteries. *Last eleven weeks of second semester; M., W., F., at* 9, *in class room, and M., Tu., Th.*, 2-6, *in laboratory* (33 *hours in class room and* 44 *hours in laboratory*). Assistant Professor FORTENBAUGH and Mr. BURGESS.

   Required of Juniors in Electrical Engineering.

   (b*) Electrolysis and Electrometallurgy. The theory and application of electrolysis and electrometallurgy. The treatment of ores, electrolytic separation and refining of metals, electrotyping and electroplating are treated from the practical side. Text-book: Gore's Electrolytic Separation of Metals. Must be preceded by courses in chem-

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* Courses 2b, 3 and 6 are intended exclusively for students who expect to enter the field of practical electrical engineering and construction. The instruction is thoroughly practical. Students desiring to enter the field of teaching, or, for other reasons, desiring a further theoretical training, may substitute for these the elective courses in Mathematics and Mathematical Physics, 18, 7, and 9. These electives should be chosen at the beginning of the Junior year.

istry and Course 2a. *First half of first semester; M., W., F., at* 11, *in class room, and M., W.,* 2-6, *in laboratory* (27 *hours in class room and* 36 *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 half of first semester. M., W., F., at* 11. *Laboratory work M., W.,* 2-6 (27 *hours in class room and* 36 *hours in laboratory*). Mr. BURGESS.

Elective for Seniors and graduate students 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 Text-book on Electromagnetism and the Construction of Dynamos, Vol. II. (87 *hours in class room and* 96 *in laboratory and draughting room.*) *First semester; M., W., F., at* 12; *F.,* 2-6; *S.,* 8-12. *Second semester; first nine weeks; M., W., F., at* 9; *F., S.,* 8-12. Professor JACKSON, Mr. FRANKENFIELD, and Mr. FORD.

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.

Required of Seniors and elective for 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

*See foot note on page 179.

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. *First half of second semester; M., Tu., W., Th., F., at* 12 (45 *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; Tu., at* 11. (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 semester; M., W., F., at* 10 (54 *hours in class room*). Professor JACKSON.

Elective for Seniors and graduate students in Electrical Engineering.

7. Graduate Work. Advanced work as assigned after consultation. Professors JACKSON and FORTENBAUGH.

The courses admitted as graduate study which will be offered during the college year 1897-8 are Courses 2b, 3, 4, 5 and 6 described above; a two hour course continuing through the year, by Professor Jackson, on Polyphase Currents and the Design of Induction Motors; 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.

8. 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 de-

voted 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 familiarizing 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 the 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 semes-*

ter; M., W., F., at 10; 48 *hours in class room.* Professor TURNEAURE.

Required of Seniors in Civil Engineering.

3. Designs of Water Supply and Sewerage Systems. Complete designs and estimates of water supply and sewerage systems, 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.

5. Building Superintendence. A short course in design and construction of minor buildings, together with principles of construction of more important buildings to aid students in the supervision of contract work of this nature. *Second semester;* 16 *hours in class room.* Professor WHITNEY.

Elective for Seniors in Civil Engineering.

6. Biology of Water Supplies. In Biology, Course 33 is offered to graduate students and students in sanitary engineering. For a description of this course see p. 168.

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. *Second semester; last nine weeks, M., Tu., W., Th., F.,* Section I., 8-10; Section II., 2-4. *Daily* (90 *hours draughting*). Professor JONES and Assistant Professor MACK.

Required of Freshmen 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. *First semester;* Section I., *M., W., F.*, 10-12, Section II., *Tu., Th., S.*, 10-12. Assistant Professor MACK.
Required of Sophomores in Mechanical and Electrical Engineering.

3. 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 materials and the interpretation of results 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 Sophomores in Engineering.

4. 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.

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 of 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. The foregoing principles are applied to the design of a complete machine. During the first part of the work the particular machine to be designed is studied in the class room with regard to the requirements that it must fulfill, the forms of its parts, and the methods of constructing them. Complete working drawings are made. After the class work relating to the machine has been completed, subjects relating to machine construction will be assigned the students, together with references to the technical journals for reading, and a digest of the matter required. Lectures and general discussions in class will accompany the journal reading. *First semester;* M. E. class, *W., F., at* 9; draughting, *M., Tu., W., Th., F.,* 11-1. E. E. class, *Tu., Th.,* 9; draughting, *Tu., Th.,* 2-6. 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.

SHOP-WORK.

PROFESSOR KING, MR. HARTWELL, MR. MUTCHLER, MR. SCHROEDER, 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., F.*, 2-4; *S.*, 11-1; *S.*, 8-1 (40 *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., F.*, 2-4; *S.*, 11-1; *S.*, 8-1 (40 *hours*). Professor KING, Mr. HARTWELL, and Mr. SCHROEDER.

Required of Freshmen in Mechanical and Electrical Engineering. Required of Freshmen in Civil Engineering. *Second semester, daily*, 2-4 (30 *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; *S.*, 11-1; *S.*, 8-1 (30 hours). Professor KING, Mr. HARTWELL, and Mr. SCHROEDER.

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. *First semester; M., F.*, 9-12; *and Tu.*, 9-11; *S.*, 8-2; (40 *hours*). Professor KING, Mr. HARTWELL, and Mr. SCHROEDER.

Required of Sophomores 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., F.*, 9-12, *and Tu.*, 9-11; *S.*, 8-12 (68 *hours*). Required of Sophomores in Mechanical and Electrical Engineering. Professor KING, Mr. HARTWELL, and Mr. SCHROEDER.

7. a 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 (40 *hours*). Professor KING, Mr. HARTWELL, and Mr. SCHROEDER.

b Forge Work. Training in the fundamental features of forge practice, as drawing, upsetting, bending, welding, tool making, and tempering. *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 (50 *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. *Second semester; W., F.*, 2-6; *S.*, 10-12 (60 *hours*). Required of Juniors in Mechanical Engineering. *Tu., Th.*, 2-6 (50 *hours*). Required of Juniors in Electrical Engineering. Professor KING and Mr. HARTWELL.

9. Machine Construction. Attention is given to the cost of production. *Second semester; W., F.*, 2-6; *S.*, 10-12 (120 *hours*). Required of Juniors in Mechanical Engineering. *Tu., Th.*, 2-6 (68 *hours*). Required of Juniors in Electrical Engineering. Professor KING and Mr. HARTWELL.

10. 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. HARTWELL, and Mr. LOTTES.

Required of Seniors in Mechanical Engineering.

11. 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. *Second semester; Th.*, 2-6; *F.*, 11-1 *and* 2-6 (180 *hours*). Professor KING and Mr. HARTWELL.

Required of Seniors in Mechanical 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.
J. A. CRAIG, 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.
GEORGE MCKERROW, Superintendent of Farmers' Institutes.
R. A. MOORE, Assistant to Dean. In charge of Short Course.
J. W. DECKER, AGR. B., Instructor in Veterinary Science.
J. P. LAWS, 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., Associate Professor of Political Economy.
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.
W. C. WELLS, Instructor at Butter-Worker.
CHAS. BUSH, Instructor at Separators.
C. S. BULLARD, Instructor at Separators.
U. S. BAER, Instructor in Cheese Making.

JULIUS BERG, Instructor in Cheese Making.
MARK SMITH, Instructor in Pasteurizing.
A. B. SAYLES, Instructor in Farm Dairying.
H. L. SHOCKLEY, Assistant Instructor in Farm Dairying.
A. P. JONES, Instructor in Agricultural Physics and Mechanics.
FREDERICH CRANEFIELD, Instructor in Green House Practice.
M. ASH, Instuctor in Horticulture.
J. W. STEVENSON, 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.
J. A. CRAIG, Animal Husbandry.
F. W. WOLL, Assistant Chemist.
H. L. RUSSELL, Bacteriologist.
E. H. FARRINGTON, Dairy Husbandry.
J. W. DECKER, Dairying.
LESLIE H. ADAMS, Farm Superintendent.
MISS IDA HERFURTH, Clerk and Stenographer.
MISS E. M. CLOSE, Clerk and Librarian.

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—H. C. TAYLOR, Orfordville.

Regular Assistants.

C. P. GOODRICH, Ft. Atkinson (Dairy Expert).
R. J. COE, Ft. Atkinson.
G. C. HILL, Rosendale.
W. C. BRADLEY, Hudson.
C. THORP, Burnett.
L. E. SCOTT, Neenah.

Occasional Assistants, in Order of Work Performed.

ALEX. GALBRAITH, Janesville (Horse Expert).
KENNEDY SCOTT, Rio.
C. E. TOBEY, Sparta.
G. J. KELLOGG, Janesville.
A. J. EDWARDS, Ft. Atkinson.
C. H. HAMILTON, Ripon.
M. T. ALLEN, Waupaca.
A. SELLE, Mequon.
F. H. MERRELL, Portage.
W. D. BOYNTON, Shiocton.
E. C. ALSMEYER, De Forest.
E. J. SCOFIELD, Hanover.
CHAS. MEYER, Kewaunee.
MRS. JENNIE A. JAMISON, Neenah (Cooking School Teacher).
PROF. F. W. TAYLOR, Lincoln, Neb.
C. L. HILL, Rosendale.
J. R. WATSON, Sussex.
MISS MARY L. CLARKE, Milwaukee (Cooking School Teacher).

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. In 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 Horticultural-Agricultural Physics building, just completed, 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 Experiment 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 26-36; 154-159.

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 24.

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 1897 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.

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, for course, ...	$6 00
Incidental fee, payable by all students, for term, . . .	5 00

III. Dairy Course.

Tuition for residents of the State of Wisconsin, ...	FREE
Tuition for non-resident students, including lectureship fee,	$16 00
Incidental fee, payable by all students, for term, . . .	5 00
Laboratory fee, ...	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 $65.00 for the term for fees, room, board, washing, and necessary books.

The expenses of the Dairy students will vary from $65.00 to $75.00 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 posses 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 Horticultural-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. Thirteen reports and sixty 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. Craig.

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. Laws.

Twelve lectures on Dairying by Dr. Babcock.

Seventy-two hours' practice in Farm Dairying and Dairy laboratory by Mr. Sayles.

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. Craig.

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. Laws.

One hundred and twenty hours at work bench and forge by Prof. C. I. King.

Twelve lectures on Agricultural Economics by Prof. Scott.

Twelve lectures in Bacteriology 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. Laws 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 Craig on breeding and selection of dairy stock.

(8) Course in dairy bookkeeping by Professor Farrington.

2. Milk Testing. This embraces instruction in the laboratory by Dr. Babcock 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 student 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 Buttermaking 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 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 AND ASSISTANT PROFESSOR WOLL.

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.
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 and Assistant Professor WOLL.

AGRICULTURAL PHYSICS.

PROFESSOR KING.

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 CRAIG.

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 CRAIG.

2. Breeding. Priciples 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 CRAIG.

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 will be used as a text-book. *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 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 CRAIG.

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, with 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 Investigations 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 legume tubercles; the germ theory of disease in man, domestic animals, and plants; the general principles of fermentation and decomposition, and their application to practical agriculture. *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 when the student 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 1896-7 institutes lasting two days each were held at the places named below:

List of Institutes Held During the Season 1896-7.

County.	Place.	County.	Place.
Adams	White Creek.	Eau Claire	Brackett.
Barron	Barron.	Fond du Lac	Calumetville.
Brown	Flintville.	Fond du Lac	Fond du Lac.
Brown	Green Bay.	Fond du Lac	Rosendale.
Brown	Wrightstown.	Fond du Lac	Van Dyne.
Buffalo	Mondovi.	Grant	Cassville.
Burnett	Grantsburg.	Grant	Fennimore.
Calumet	Hilbert.	Grant	Glen Haven.
Chippewa	Cadott.	Green	Monroe.
Chippewa	Chippewa Falls.	Green	New Glarus.
Chippewa	Eagleton.	Green Lake	Markesan.
Clark	Greenwood.	Iowa	Dodgeville.
Columbia	Columbus.	Iowa	Highland.
Columbia	Lodi.	Iowa	Rewey.
Columbia	Rio.	Jackson	Hixton.
Crawford	Bell Center.	Jackson	Melrose.
Dane	Deerfield.	Jefferson	Johnson's Creek.
Dane	Mt. Horeb.	Jefferson	Lake Mills.
Dane	Sun Prairie.	Jefferson	Rome.
Dodge	Neosho.	Juneau	Mauston.
Dodge	Randolph.	Kenosha	Salem.
Door	Sturgeon Bay.	Kewaunee	Ahnapee.
Dunn	Downsville.	Kewaunee	Luxembourg.
Dunn	Menomonie.	La Crosse	West Salem.
Eau Claire	Augusta.	Lafayette	Argyle.

County.	Place.
Lafayette	Gratiot.
Langlade	Antigo.
Lincoln	Merrill.
Lincoln	Tomahawk.
Manitowoc	Francis Creek.
Marathon	Unity.
Marinette	Pound.
Monroe	Warrens.
Monroe	Sparta.
Monroe	Wilton.
Oconto	Abrams.
Oconto	Oconto.
Oconto	Oconto Falls.
Outagamie	Appleton.
Outagamie	Seymour.
Ozaukee	Pt. Washington.
Pepin	Durand.
Pepin	Pepin.
Pierce	River Falls.
Pierce	Rock Elm.
Polk	Clear Lake.
Polk	St. Croix Falls.
Portage	Amherst.
Racine	Kansasville.
Racine	North Cape.
Rock	Evansville.
Rock	Janesville.
Rock	Orfordville.
St. Croix	Baldwin.
St. Croix	Roberts.
Sauk	Baraboo.
Shawano	Wittenberg.
Sheboygan	Oostburg.
Sheboygan	Plymouth.
Trempealeau	Galesville.
Vernon	Hillsboro.
Vernon	Retreat.
Walworth	Darien.
Walworth	East Troy.
Walworth	Genoa Jct.
Washburn	Shell Lake.
Washington	Kewaskum.
Waukesha	Eagle.
Waukesha	Menomonee Falls
Waupaca	Iola.
Waupaca	Manawa.
Waupaca	Waupaca.
Waushara	Poy Sippi.
Waushara	Wautoma.
Waushara	Wild Rose.
Winnebago	Eureka.
Winnebago	Winneconne.
Wood	Auburndale.
Wood	Nasonville.
Wood	Centralia.

In addition to the regular institute work cooking schools of two lectures each were held in connection with the institutes, at the following points:

Durand,	Menomonie,	Fond du Lac,	Fennimore,
Chippewa Falls,	Sparta,	Waupaca,	Dodgeville,
River Falls,	Baraboo,	Janesville,	Appleton.

Location of Institutes.

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. 10, the last issued, contains a stenographic report of the closing institute held at Watertown in March, 1896. 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 Justice of the Supreme Court of Wisconsin, Professor of Constitutional Law.

J. H. CARPENTER, LL. D., Jackson, Professor of Partnership and Bailments.

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, and Study of Cases.

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 Lecturers.

G. H. NOYES, A. B., LL. B., Special Lecturer on the Law of Common Carriers.

H. B. FAVILL, A. B., M. D., Special Lecturer on Medical Jurisprudence.

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 1896, now instruct about 10,000 students a 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 Ox-

ford, 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 any state and any courts 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, is 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.

Preliminary Course.

It is urged upon all those whose general education is not ample, to take a preliminary course of study in those branches which are most nearly related to law and most serviceable in legal practice, before entering upon the strictly professional course. To facilitate this, students, who give evidence of sufficient ability, and are above the age of eighteen years and pass a satisfactory examination in the higher studies taught in accredited high schools, will be permitted to take up a select course framed from the following branches: elementary law, history,

economics, political science, English literature, rhetoric, elocution and legal Latin, preparatory to entering the three years' law course.

It is the policy of the University to raise the standard of admission to the College of Law as far as consistent with existing educational conditions.

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.

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 sustance, 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 successfuly.

1. For General Reading and Composition Work.

1897—Shakespeare's As You Like It, Defoe's History of the Plague in London, Irving's Tales of a Traveller, Hawthorne's Twice Told Tales, Longfellow's Evangeline, George Eliot's Silas Marner.

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—Shakespeare's Twelfth Night, The Sir Roger de Coverley Papers in The Spectator, Irving's Sketch Book, Scott's Abbot, Webster's First Bunker Hill Oration, Macaulay's Essay on Milton, Longfellow's Evangeline.

1900—Shakespeare's A Midsummer Night's Dream, Defoe's History of the Plague in London, Irving's Tales of a Traveller, Scott's Woodstock, Macaulay's Essay on Milton, Longfellow's Evangeline, George Eliot's Silas Marner.

2. For thorough Study:

1897—Shakespear's The Merchant of Venice, Burke's Speech on Conciliation With America, Scott's Marmion, Macaulay's Essay on the Life of Samuel Johnson.

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 The Merchant of Venice, Milton's L'Allegro, Il Penseroso, Comus and Lycidas, Macaulay's Essay on Addison.

1900—Shakespeare's The Merchant of Venice, Milton's L'Allegro, Il Penseroso, Comus and Lycidas, Webster's First Bunker Hill Oration.

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

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.

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 follows:

Junior Year.

First semester. Elementary Law. Lectures, text-book studies, case study, embracing definitions, history, sources of the Common Law, its development, and modification. Under the topic of Written or Statute Law, the subject of Statutes and the canons of interpretation. *Two hours a week*, 15 *weeks*. Text-book: "Bryant's Outlines of Law."

The Principles of Contracts form the subject of the work of one professor for this entire year. *Two hours a week.* Text-book: Keener's Selections on Contracts.

Domestic Relations, or the laws regulating the relation of husband and wife, parent and child, master and servant, guardian and ward. Lectures and examination on text-books and leading cases are given weekly. Under this head the common law as to the status of the wife, the modern equity doctrines and the legislation known as "Married Women's Acts," relating to her property rights, are carefully considered. *One hour a week.*

Commercial Paper. *One hour a week.* Text-book: Tiedeman on Commercial Paper.

The Law of Real Property. The common law and that part of the English system that constitutes the basis of American land law systematically studied. Tiedeman is used as a text-book, accom-

panied with lectures and the study of select cases which are assigned each week. The different topics are taken up in the same order as found in Tiedeman, and the work of the junior year goes to the subject of Trusts. *One hour of each week throughout the year.*

Courts and Jurisdiction in England and America. The elementary law of Jurisdiction, and the Jurisdiction of the Federal Courts. *One hour a week for ten weeks.*

Common-law Actions and Pleading. Text-book study and examinations based on Stephens on Pleading. *One hour a week, twelve weeks.* This study includes exercises in drafting of pleadings.

Wambaugh's Study of Cases. *One hour a week.*

Wambaugh's Cases on Agency. *Two hours a week.*

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. As the class advances in studies in procedure, the cases are conducted in conformity to common-law practice and pleading.

Written examinations at the close of topics or end of semester are required throughout the course.

Second semester. Administrative Law and Taxation. In the latter topic the constitutional principles, the procedure in assessment, levy, collection, seizure of personal property, sale of lands and subsequent proceedings, and the actions arising out of taxes and tax-titles specially treated. *One hour a week, twelve weeks.*

The Law of Contracts. *Two hours a week.* Text used: Keener's Selections on Contracts.

The Law of Public Offices and Officers. Lectures and examniations of cases. Mechem and Throop as text-books, with notes by professor. *One hour a week, twelve weeks.*

Real Property. The study is pursued the same as indicated in the work for the first semester. *One hour a week.*

Municipal Corporations. Lectures, examinations, and cases, with Dillon's treatise for text-book. *One hour a week.*

Common-law Pleading, continued. *One hour a week, twelve weeks.*

Common-law Practice. *One hour a week, eight weeks.*

Equity Jurisprudence. *One hour a week, eight weeks.*

Commercial Paper, continued. *One hour a week.*

Damages, Beale's Cases. *One hour a week.*

Middle Year.

First semester. Real Property. The study is pursued throughout the year on the same plan as during the Junior year, the work commencing with the subject of Trusts, and ending with the subject of Title by Devise, with special work in the form of lectures and leading cases on the subject of Title by Public Grant in the United States, and on the subject of Mining Law. *One hour each week throughout the year.*

Private Corporations. Clark on Corporations, Wisconsin statutes, and cases. *One hour a week.*

Equity, Jurisprudence, continued. *Two hours a week, fourteen weeks.*

Equity Pleading and Practice. *One hour a week, sixteen weeks.*

Code Pleading. *Two hours a week, fourteen weeks.*

Law of Sales. Text: Williston's select cases on sales. *Two hours a week.*

Partnership. *One hour a week.*

Municipal Corporations. Lectures, examinations, and cases. Dillon on Municipal Corporations. *One hour a week, twelve weeks.*

Evidence. Text: Jones on Evidence. *One hour a week for six weeks.*

The Law of Insurance. Case study, text books, and lecturer's notes.

Second semester. Real Property. The study is pursued throughout the second semester on the same plan as that stated for the first semester, but the work on the subjecs of Title by Public Grant and Mining Law comes in this semester. *One hour a week.*

Equity Jurisprudence, continued. *One hour a week, eighteen weeks.*

Code Pleading. *Two hours a week, eight weeks.*

Criminal Law and Procedure. *Two hours a week.* Text: Clark on Criminal Law, Washburn's Manual of Criminal Law.

Private Corporations, continued. *One hour a week.*

Equity Practice in Federal Courts. *One hour a week, eight weeks.*

Eminent Domain. *One hour a week, ten weeks.*

Evidence. *One hour a week.* Text: Jones on Evidence.

Senior Year.

First semester. Constitutional Law. Lectures and study of leading cases. *One hour a week.*

Pleading and Practice in Extraordinary Remedies. *One hour a week, six weeks.*

The Law of Evidence. Lectures, cases, and examinations. *One hour a week.*

The Practice in Creditors' Suits and Supplementary Proceedings. *One hour a week, six weeks.*

Practice on Writs of Error and Appeals. *One hour a week, eight weeks.*

The Practice in Inferior Courts. *One hour a week, eight weeks.*

Banking, Insurance, Voluntary Assignments. Elliott on Insurance. Lectures and cases. *One hour a week.*

Probate Law. *Two hours a week.* Lectures and select cases.

The Law of Wills. For the first fourteen weeks, one hour each week. Cassoday on Wills is used as a text-book, but the work is carried on largely by lectures and the reading of leading cases, assigned each week. Students are recommended to read, also, either Redfield or Schouler on Wills.

The Law of Torts. Special lectures and case study in connection with Bigelow on Torts as a text-book. The work commences at the end of the first fourteen weeks of the first semester, and continues throughout the rest of the Senior year. *One hour each week.*

Actions for Foreclosure and Procedure. *One hour a week, six weeks, and assigned work.*

International Law. *One hour a week for eight weeks.*

Trusts, and Procedure relating thereto. *One hour a week for eight weeks.*

Patent-Law. *One hour a week, six weeks.*

The Law of Estoppel. *One hour a week, six weeks.*

Second semester. Constitutional Law, continued. Lectures and leading cases. *One hour a week.*

The Law of Evidence and Trials. Lectures, cases, and examinations. *One hour a week.*

Banking, Insurance, and Voluntary Assignments. Lectures and cases. *One hour a week.*

Select Cases in Equity Procedure. *One hour a week, ten weeks.*

Legal History. Lectures and special studies. *One hour a week, ten weeks.*

International Law, Public and Private. *One hour a week, eight weeks.*

The Law of and Pleadings in Estoppel. *One hour a week, six 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.*

Select Wisconsin Cases in Law of Contracts and Personal Property. *Two hours a week.*

The Law of Torts. The work is pursued throughout this semester on the same plan as indicated in the work of the first semester. *One hour each week.*

Procedure. Methods in different systems contrasted. *One hour a week, eight weeks.*

The Trial of Actions. *One hour a week for twenty weeks.*

Legal Ethics. Lectures. *One hour a week, six weeks.*

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 is 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.

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 are equal, and in many respects superior, to any 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 here 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 University 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 this privilege. The site of the University buildings is one of the most beautiful places 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 of law books and reports. This, it is expected, will be soon greatly enlarged. 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 over 100,000 volumes and 80,000 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 44,000 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.

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.

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 year, 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, making a complete record of each case, 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.

ADMISSION TO THE SENIOR CLASS.

Candidates who have studied elsewhere, and can pass examination upon the studies of the Junior year and Middle year, or their equivalent, can enter the 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.

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.

EXPENSES, ETC.

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 inquires 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 necessary, 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, M. S., Professor of Chemistry.
J. C. Elsom, M. D., Professor of Physical Culture and Director of the Gymnasium.
D. B. Frankenburger, A. M., 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.
E. S. Ferry, B. S., Instructor in Physics.
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.
W. O. RICHTMANN, PH. G., Fred Pabst Fellow in Pharmaceutical Chemistry.
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. Most of the instructional force in these departments of study have had practical experience in pharmacy, and are in thorough sympathy with the needs and requirements of the professional pharmacist.

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 both of the School of Pharmacy and also 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 outlines on pp. 49-55.

Detailed information about studies in the Four Years' Course and in the College of Science and Letters can be found on pp. 83-130.

The School of Pharmacy is on 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 improvements 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, communition, extraction, filtration, crystallization, drying, etc. Batteries and apparatus to study the electrical conductivity of solutions have also been purchased.

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 accomodate 72 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 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 of 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.

HERBARIUM.

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 have 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 49,000 books and 12,000 pamphlets. About 400 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 62. 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, 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 1896-7 is Mr. Carl G. Hunkel, Ph. G., U. W. '94

The Fred Pabst Fellowship.

Mr. Fred Pabst, of Milwaukee, has also generously established a pharmaceutical fellowship on a financial basis of $400 per annum for two years. The holder of this fellowship during the year 1896-7 is Mr. W. O. Richtmann, Ph. G., U. W. '94.

The United States Pharmacopoeia Research Fellowship.

The Committee on Revision of the U. S. Pharmacopoeia maintains a fellow in the School of Pharmacy, who is expected to conduct research in the line of revision of the Pharmacopoeia under the direction of the professor of pharmaceutical chemistry. The holder of this fellowship during the year 1896-7 is Miss Martha M. James, Ph. G., U. W. '96.

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.

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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.

Senior Year.

Chemistry, 5; Pharmaceutical Chemistry, 1, 2; Pharmaceutical Botany, 2; Pharmacognosy, 1, 3; Practical Pharmacy, 1 and 2; Thesis.

Lectures on Pharmaceutical Jurisprudence and First Aid to the Injured. [1896-7.]

Synoptical lectures in Mineralogy, Paleontology, and Geology. [1897-8.]

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, 3 and 4; Pharmaceutical Technique; Electives.

Senior Year.

Pharmacognosy, 1 and 2; Practical Pharmacy, 1 and 2; Thesis; Electives.

FOUR YEARS' COURSE.

Freshman Year.

Biology, 1; German, 9; Mathematics, 1, 2; Rhetoric, 2; Gymnastics, Military Drill.

Sophomore Year.

French, 3; Chemistry, 1; Physics, 1, 2; Rhetoric, 3; Gymnastics, Military Drill; Electives.

Junior Year.

Pharmaceutical Chemistry, 1 and 3; Pharmaceutical Botany, 2, 3, and 4; Pharmaceutical Technique; Electives.

Senior Year.

Pharmaceutical Chemistry, 5 and 6; Pharmacognosy, 1 and 2; Practical Pharmacy, 1 and 2; Thesis; Elective.

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.

With regard to Synoptical Lectures and rules of the Group system, compare pages 80-83 of the general catalogue.

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 Mr. LINCOLN. 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.

Organic analysis, determination of physical constants, special and research work with preparation of thesis. *Full study; second semester.* Assistant Professor HILLYER. For graduates and undergraduates.

8. Physical Chemistry. 1. *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. *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.

2. Laboratory Practice. 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 equilib-

rium. Ostwald's Physico-chemical Measurements. This course supplements Course 1 and together with it makes a full study. Required. Dr. KAHLENBERG.

11. 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.

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

Students wishing 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.

PHARMACEUTICAL CHEMISTRY.

PROFESSOR KREMERS, MR. HUNKEL, AND MR. RICHTMANN.

1. Pharmaceutical and Pharmacognostical Chemistry. This course will consist 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. *Tu., W., F.* 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, Mr. HUNKEL, and Mr. RICHTMANN.

3. Reviews with critical reading of the text of the U. S. Pharmacopœia as far as chemicals are concerned. *M.* and *F.* Mr. HUNKEL and Mr. RICHTMANN.

4. Nitrogen derivations 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. BUNTING.

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.

The recitations 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. BUNTING. 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 on later pages. For other courses in Biology see pp. 119-125.

PHARMACEUTICAL BOTANY.

ASSISTANT PROFESSOR CHENEY.

1. General Morphology of Plants. Corresponds to course 20 on p. 122. 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 on p. 121. 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: Strassburger's Practical Botany. *Daily; hours on consultation.*

3. A. Taxonomy of Spermaphytes. Corresponds to course 21 on p. 122. Lectures, assigned readings and laboratory work on the classification of seed plants. Twice a week. *M., F., at* 11.

B. Distribution of Plants. Lectures and assigned readings, Once a week. *W., at* 11. Assistant Professor CHENEY.

Of course 3 either A or B or both may be elected.

4. Botanical Microtechnique. Corresponds to course 22 pp. 122. A course designed primarily for students of the three and four year courses, on special methods of collecting and preserving material for anatomical studies; the use of the microtome, including processes of imbedding; the

use of stains and reagents; and the preparation of permanent mounts. Laboratory work and assigned readings. Twice a week, second semester. *Tu., Th.*, 11-1.

5. Anatomy of Woods. A course designed for those who desire to acquaint themselves with the structural characteristics of American woods commonly used in construction work. Laboratory work with assigned readings. Students desiring to take this course should know how to use a compound microscope and should have had at least the equivalent of one semester's work in general botany. *Two-fifths; first semester.* Hours to be determined upon consultation with those desiring to take the work.

6. 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 from the general biological standpoint, although special attention will be given to disease-producing germs in the latter part of the semester. It includes a study of various typical forms with the microscope and also with the various culture media. Applicants must be thoroughly familiar with the compound microscope. *First semester; full study.* Lectures or recitations. *M., W., F.*, 11-12. Professor RUSSELL and Mr. FROST.

2. Advanced Bacteriology. Students that have completed Course 1 may elect this course, which is mainly laboratory work. The course is intended to supplement the general course, giving the student further experience in media making, physiological technique and practical diagnostic work. During the latter part of the semester students are assigned special topics which must be reported upon, giving results reached, together with digest of literature bearing on the subject. *Second semester; full study.* Professor RUSSELL and Mr. FROST.

PHRARMACOGNOSY.

ASSISTANT PROFESSOR TRUE.

1. Lectures. Brief introduction on development of pharmacy with especial reference to remedies used. 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 concerning time of collection, chemical composition, uses, etc. This course supplements the work done in the laboratory with the drugs themselves.
   First semester, one-fifth; second semester, two-fifths.
   Required of all seniors.

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 furnished 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.
   First semester, four-fifths; second semester, three-fifths.

3. Laboratory work for two-year students. A shorter course in which the same aims are pursued and like methods are used is offered for those in the two-year course.
   First semester, one-fifth; second semester, three-fifths.

4. 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 less microscopic study is expected.
   Three-fifths course during first semester. Two lectures and two hours laboratory work per week. Elective.

5. Microscopical Study of Powdered Drugs. The object of this course is to furnish and abundantly illustrate the methods of identifying powdered drugs and of detecting

adulterations of the same. This course presumes a knowledge of whole crude drugs as well as of the general histology of types of the higher plants.

Time to be arranged individually.

An elective for advanced students.

6. 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. Elective.

7. Advanced laboratory work and thesis adapted to the individual.

PHYSICS.

GENERAL PHYSICS: PROFESSOR SNOW, ASSISTANT PROFESSOR AUSTIN, MR. FERRY, MR. SMITH AND MR. WILDER.

1. General Lectures. Mechanics and Heat, Electricity and Magnetism, Acoustics and Optics. Two lectures a week. *Throughout the year.* Two sections; *M., W., at* 12; *Tu., Th., at* 12. Professor SNOW. One recitation on Friday or Saturday by the class in smaller sections, at hours to be assigned. Professor SNOW and Mr. FERRY.

This course is intended for those taking up the study for the first time, or for those who have studied it only in an elementary manner.

2. Introductory Laboratory Practice. An introduction to the theory and methods of physical measurements.

This course is intended to accompany Course 1. A knowledge of plane trigonometry, including the use of logarithms, is required for registration in this course. *Throughout the year; twice a week; hours to be assigned.* Assistant Professor AUSTIN, Mr. FERRY, Mr. SMITH and Mr. WILDER.

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.

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 such cases in which difficulties are liable to occur.

3. 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.

4. 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. Chrystallography for Students of Chemistry and Pharmacy. In the first semester of 1896 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, 1896-7.

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 combatting 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, 1896-7.

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.
H. D. SLEEPER, Voice.
JOHN LUEDERS, Violin, 'Cello, Mandolin, Zither, and other orchestral instruments.
ANNIE M. LYON, Mandolin, Guitar, and Banjo.
ELIZABETH M. KEELEY, Harp.
NETTIE M. GALE, Secretary, French and German Pronunciation.

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.

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 reresents, 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 Pedal 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 graduation 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. Counterpoint.

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 enghteenth 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 work 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 atttractive 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, supplimented 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. The active chorus now numbers 200 members. Very successful performances of Handel's *Messiah*, Haydn's *Creation*, and Mendelssohn's *Elijah* 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.

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 NETTIE M. GALE, Secretary, 16 E. Mifflin St.,
Madison, Wis.

UNIVERSITY EXTENSION DEPARTMENT.

STAFF.

CHARLES KENDALL ADAMS, LL. D., President of the University.
JEROME H. RAYMOND, PH. D., Secretary, and Professor of Sociology.
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.

GENERAL INFORMATION.

The University of Wisconsin conceives its duty to be to aid in every practicable way in the education of the people. It endeavors to perform this duty, primarily, by affording all possible facilities for the acquisition of knowledge by those who come to the University and attend its regular sessions. But not all persons can come to the University. The University, therefore, endeavors to perform its duty, secondarily, by doing what it can to bring some portion of university education to those who cannot come to the University. This extramural instruction has now become distinctly recognized as a part of the work of the University under the name University Extension. It is not an equivalent for resident University study, in which there is a time element and a place element for which no substitute can be found in University Extension; but it offers as many as possible of the advantages of University instruction to those who can not come to the University.

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 on subjects which they treat in their regular classes. These lectures, however, are so arranged as to interest the general public. Technical terms are omitted as far as possible and efforts are made to render the lectures as attractive as possible to ordinary men and women who are not, and perhaps never have been, college students. 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, University Extension lectures are delivered in courses. Each course consists 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 comprised in the course treat different parts of the same general subject. The purpose of delivering the lectures in courses is to concentrate attention upon one subject. Experience has shown that a person who attends a course of six University Extension lectures has received far more than six times the benefit of one lecture.

The University Extension Department will be glad to hear from any person, committee, church, or other organization interested in University Extension. Arrangements can be made at almost any time for one of the University Extension lecturers to deliver a course of lectures in almost any town.

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 the mastery of the whole 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.

Discussion should be encouraged in the class. Here we find the real teaching, that personal contact between lecturer and students which enables the lecturer to transmit to students the real University spirit and method. Here, indeed, the most permanent Extension work is done, and the disadvantages of non-resident study are most nearly overcome.

In some courses an extra class has been organized for special reading, demonstration and study under the direction of the lecturer. This method will be followed whenever the nature of the subject renders it advisable and the time at the disposal of the lecturer permits the additional work.

A series of questions will be set at each lecture. The answers to these the student may write out at home with the aid of his books. At least three days before the next lecture, he should mail all his answers to the lecturer, who will correct the paper and return it at the lecture, with such comments on the margin as are needed. The lecturer may at his option require also an essay on some topic selected by the student with his aid.

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.

STUDENTS' ASSOCIATIONS.

Each center is urgently advised to form a Students' Association, on the plan of the local Chautauqua circle, as a supplement to the lectures, classes and private reading. The Students' Association should meet weekly or bi-weekly for a discussion of the subject considered in the lectures. In the natural sciences especially, it should begin to hold meetings for mutual discussion at least a month before the lectures begin. Students should early begin to read so that they may grasp some general principles and be able to understand the scientific terms. The Stu-

dents' Association in each center should hold sessions concurrently with the lectures, and continue after the close of the lectures, until the entire subject has been considered.

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. If five or six local centers in neighboring towns, even in the most distant localities, unite upon some one available lecturer, each center may secure a course otherwise impossible, and have only a small sum to pay as its proportion of the lecturer's traveling expenses.

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. There is nothing more injurious to University Extension than to have the notion gain currency in a community that the movement is being "run" by one church or clique. 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. Of course the form of local management is a thing that each center decides for itself. But the persons intrusted with it should be chosen with special care, since upon its constitution depends very largely the success of the movement, especially in securing the active support and interest of the entire community. Usually it has been found convenient to have a Local Committee of from ten to twenty or twenty-five members. Upon it should be represented, if possible, every element and interest in the community.

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.

Various methods are employed by local centers to obtain financial support. Among these may be mentioned:

1. The sale of course tickets by personal canvass.

2. A guarantee fund, available in case of a deficit, each guarantor being then called on for his proportion of the entire amount.

3. Paid up subscriptions may be taken in advance, and held as a reserve fund.

4. Subscription shares. Under this plan a number of persons take shares, paying for each share a certain sum, say five dollars, each shareholder being admitted free to all courses given during the year.

5. A permanent society may be formed, with regular annual dues.

6. Courses of a more popular character often leave in the treasury a surplus which may be used to carry on further work.

7. Some public-spirited citizen, financially able to do so, may often be found to guarantee the payment of the necessary expenses, in case of a deficit.

8. Endowment. It is hoped that it will not be long before many local centers will be permanently endowed by public benefactors who appreciate the importance of University Extension.

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 the University Extension Department, should be addressed to

JEROME H. RAYMOND, *Secretary*,
Madison, Wis.

COURSES OF LECTURES.

The following is the program of courses for 1897-8:

Professor Jerome H. Raymond: An Introduction to Sociology; A Group of Social Philosophers; Social Aspects of the Labor Movement.

Mr. 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.

Professor Charles Forster Smith: Greek Life; Greek Literature.

Professor John C. Freeman: English Life and Literature; Studies in Shakespeare; Great Epics of the World.

Mr. James F. A. Pyre: Types of English Poetry; American Writers and American Culture.

Professor George C. Comstock: Astronomy.

Professor Harry L. Russell: General Course in Bacteriology.

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 hours 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 degreee, 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.

Wherever 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. Anthropology. Two-fifths.
2. Ethnology. Two-fifths.
3. Elements of Sociology. Three-fifths.
4. 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.
2. Review course in New Testament Greek. Three-fifths.

IX. FRENCH.

1. French for Beginners. Five-fifths.

X. GERMAN.

1. German for Beginners. Five-fifths.

XI. 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.

XII. RHETORIC.

1. Rhetoric. Two-fifths.
2. Advanced Rhetoric. Two-fifths.

XIII. 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.

XIV. ASTRONOMY.

1. General Astronomy,—elementary. Three-fifths.
2. General Astronomy,—advanced. Three-fifths.
3. Elementary Mathematical Astronomy. Three-fifths.

XV. 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.

XVI. GEOLOGY.

1. Geographic Geology. Three-fifths.

XVII. PHYSIOLOGY.

1. Human Physiology. Five-fifths.

XVIII. BOTANY.

1. Comparative Anatomy of Plants. Three-fifths.

XIX. BACTERIOLOGY.

1. General course in Bacteriology. Three-fifths.
2. Relation of Bacteriology to Practical Agriculture. Two-fifths.

XX. MUSIC.

1. Elementary Harmony. Four-fifths.
2. Advanced Harmony. Three-fifths.
3. Counterpoint. Three-fifths.
4. History of Music. Four-fifths.

All correspondence should be addressed to

JEROME H. RAYMOND,
Secretary, University Extension Dept.,
University of Wisconsin,
Madison, Wis.

WISCONSIN SUMMER SCHOOL,

AND

SUMMER SCHOOL OF LIBRARY SCIENCE.

STAFF OF INSTRUCTION.

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.

E. A. BIRGE, PH. D., Sc. D., *Professor of Zoology.*—Physiology and Zoology.

W. W. DANIELLS, M. S., *Professor of Chemistry.*—Chemistry.

J. C. FREEMAN, PH. D., *Professor of English Literature.*—English Literature.

C. S. SLICHTER, M. S., *Professor of Applied Mathematics.*—Mathematics.

B. W. SNOW, PH. D., *Professor of Physics.*—Physics.

F. J. TURNER, PH. D., *Professor of American History.*—History.

E. K. VOSS, PH. D., *Assistant Professor of German Philology.*—German.

CORNELIA MARVIN, Armour Institute of Technology, Chicago.—Library Science.

ELIZA J. SKINNER, Armour Institute, Assistant in Library School.

SUMMER SCHOOL. Session four weeks, July 12-Aug. 6. Fee $10.00.

LIBRARY SCHOOL. Session six weeks, July 5-Aug. 13. Fee $15.00.

The tenth annual session of the Wisconsin Summer School will be held at the University for four weeks, from July 12 to August 6, inclusive. Owing to the meeting of the National Educational Association at Milwaukee, July 6 to 9, inclusive, it has been thought best to shorten the session of the School this year. It will therefore begin the Monday following the close of that session and continue for four weeks only. The charge for tuition will be ten dollars. Next year the six weeks' session will be resumed, and the School considerably enlarged, for which provision was made at the last session of the legislature.

FOR WHOM DESIGNED.

While established originally for the assistance of teachers and those preparing to teach in grammar and high school grades, the Summer School is by on 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 the 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 48,000 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 four weeks' session is $10.00, which entitles the student to all privileges of the School, except that 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.

DEPARTMENTS OF INSTRUCTION.

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 pedagogy. 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. A second course in Psychology, more advanced in character and requiring at least four hours' work per day of those taking it, will be offered if there are a sufficient number of applicants for it.
3. In Pedagogy two courses will be offered. The first 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.
4. The second course will relate to the foundations of pedagogy in psychology, logic and ethics. Some of the more important principles which have direct practical applitions in teaching will be discussed and developed and their bearings upon school work brought out.

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. A period of European history, selected in consultation with the class, will be taught for the purpose of illustration, and of deepening the knowledge of a limited field. The course is designed primarily for teachers. Six times a week throughout the term.
2. The Elements of American History. Lectures designed to present the larger aspects of the development of the United States. The lectures will not deal with American history in detail, but will suggest the underlying forces and the causal relations between the most significant events in the development of the nation. This general survey will serve as an introduction to more detailed study, and will suggest new points of view to the teacher. Six hours a week throughout the term.
3. Advanced work on a limited field of American history will be given, if there is demand for it.

ENGLISH LITERATURE.

PROFESSOR FREEMAN.

The courses offered have in view the needs of persons who intend to teach literature in High Schools or to complete their preparation for college or 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) A Study of Narrative Poetry. Chaucer's Prologue to the Canterbury Tales, Skeat's Edition (25 cents), (6) A study of the Epic. Spencer, The Fairy Queen, Book I. Kitchin's Edition (60 cents).
2. The Drama. Shakespeare, The Merchant of Venice, 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. History of the English Language. Lounsbury or Emerson.

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. Behaghel, Die Deutsche Sprache. An introduction to the study of German from an historical point of view.
2. Middle High German. Introductory Course.
3. Classical readings and review of Grammar.

Courses 1 and 2 are intended for teachers of German, Course 3 for students who are to enter the University and others who are interested in the study of German.

Ample opportunity will be given in all three courses to gain facility in speaking and writing German.

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.
4. Elementary Analytic Geometry. This course will be given if a sufficient number apply.

Examinations will be given at the close of the courses. Credit in a University course will be granted for Courses 3, 4, and part of Course 1. Credit for admission to the University will be granted for Courses 1 and 2.

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.

It is the object of the Department of Physics to give such work 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 knowledge with the subject. A knowledge of an elementary text-book, such as Gage, Carhart and Chute, or Avery, will be a useful preparation for the course. Two courses will be given in the subject:

1. A course of lectures will be given daily in which the various branches of the subject will be taken up and discussed as fully as the time will permit. Owing to the prominence now occupied by electricity, more attention will be devoted to the study of this subject than to the others which will also be treated. Throughout the entire course the needs of the teacher will be kept in mind, and the experiments with which the lectures are illustrated will be, in the main, such as can be performed with limited apparatus before a class in the high school.
2. 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.

These courses may be profitably taken by students of the classical courses of the University.

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 basis are first analysized 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, mush-rooms, 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 subjects. 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 BIRGE.

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 knowl-

edge 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 Comparative Anatomy. The study in laboratory of the amoeba, hydra, earthworm, clam, crayfish, grasshopper, and frog, with the addition of such other types as the students are able to take. Huxley and Martin's Elementary Biology, Marshall and Hurst's Elementary Zoology, Dodge's Biology, or Colton's Zoology may be used as laboratory handbooks. No student should devote less than two hours per day to this course, and a satisfactory result will hardly be reached unless three or four hours are given. The laboratory work will be accompanied with such recitations as may seem desirable.

3. 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. Courses 2 and 3 may be taken together and can be elected by students of the classical courses in the University as a short course in zoology.

SUMMER SCHOOL OF LIBRARY SCIENCE.

The third annual session of the School will be held at Madison July 5th-Aug. 13, 1897, a six weeks' term. This School was established and maintained for two years by the generosity of the Hon. J. H. Stout of Menomonie, Wis. It is at present sustained by the Wisconsin Free Library Commission.

The course will be under the direction of Miss Cornelia Marvin, in charge of Reference work and Bibliography in the School of Library Science, Armour Institute of Technology, Chicago, Ill.

Instruction.

The course will include both lectures and laboratory work and will be designed as an introduction to library methods for those persons who may wish an elementary knowledge of the subject, and also for assistants in libraries and for librarians of small libraries. No text book will be used, but practical work will be given to each student in the branches of library economy necessary in a small library. The simpler methods of classifying, cataloguing, lending, and caring for the books will be taught, and no previous knowledge of the subject will be assumed.

Special attention will be devoted to reference work, instruction being given in the use of reference books in various subjects for teachers and librarians.

The broader side of library work will be emphasized and methods of arousing interest in the library discussed.

Other subjects to be considered, aside from the technical work of accessioning, classifying, cataloguing, etc., will be children's reading, libraries and schools, traveling libraries, public documents, and preparation of a finding list.

Programme.

A knowledge of subjects taught or discussed may be gained from the following provisional outline of subjects:

Accession.
Serials.
Book numbers.
Shelf-list.
Cataloging.
Binding.
Repairing.
Loaning.
Bookbuying.
Accession details.
Copyright.
Pamphlets.

Cataloging Supplies.
Classification.
Printed finding lists.
American Library Association and State Library Associations.
Library schools.
Libraries and University extension.
Traveling libraries.
Home libraries.
Library legislation.
Library laws.
Reference lists.
Periodical indexes.
Atlases, Dictionaries, Encyclopædias.
Hand-books of general information.
Hand-books of history.
Hand-books of literature.
Special encyclopædias.
American Library Association Catalogue.
Reference methods.
Reading for the young.
Buying for school libraries.
Classifying school libraries.
Cataloging school libraries.
Loan system for school libraries.
Binding and repairing.

This programme will be changed, if necessary, to suit the requirements of pupils.

Libraries.

All the libraries in Madison, comprising over 160,000 works and nearly 100,000 pamphlets, will be open for the use of the students of the Summer School.

The Library Bureau will make an exhibit of modern library appliances.

Expenses.

The uniform rate of tuition is $15.00 for the term. All moneys received in excess of expenditures will be set aside as a sustaining fund for the future support of the School. For other expenses, including cost of board, see page 272.

For further information, address Dr. E. A. Birge or Mr. F. A. Hutchins, Madison, Wis., Miss Cornelia Marvin, Armour Institute, Chicago, Ill., or Miss L. E. Stearns, Public Library, Milwaukee, Wis.

DEGREES CONFERRED.

COMMENCEMENT, 1896.

BACHELOR OF ARTS.

Ancient Classical Course.

John Brown Amazeen,
Erwin Charles Cornelius,
Charlotte Brockway Freeman,
Durante Carlyle Gile,
Reginald Hall Johnson,
David R. Jones,
George Henry Miller,
Walter Hodge Sheldon,
Grant Showerman,
Mary Spence.

Hebrew Group.

Richard Albert Ruddick,
James E. Thomas.

BACHELOR OF LETTERS.

Modern Classical Course.

Willard Grosvenor Bleyer,
Eva Huling Bostwick,
Caro Louise Bucey,
Ida May Bushnell,
Dottie Josephine Edgren,
Dora Luella Haviland,
Georgie H. Hayden,
Fannie Jewell Holcombe,
Victoria James,
Frank Warren Lucas,
Annie Elizabeth Main,
Ellen Lucy Maine,
Amund Kittelsen Reindahl,
Edith Porter Robinson,
John Bell Sanborn,
Blanche Shearer,
Mary Isabella Thorp,
Martha Florence Torgerson,
Margerethe Urdahl,
Georgie Irene Virgin,
Anna Warning,
Emma Clara Wehmhoff,
Addiemae Wootton.

English Course.

Rosalia Bohrer,
Winnifred Eleanor Harmon,
James Thomas Healy,
Martha Bertina Henderson,
Thomas John Jones,
Amelia Wilhelmina Kuhnhenn,
Fannie Knapp Medberry,
Alexander Gunn Paul,
Susie Marie Peters,
Irma Reel,
Everett Adelbert Reynolds,
Martin Phillip Rindlaub, Jr.,
Hiram Arthur Sawyer.

Civic Historical Course.

Lewis Losey Alsted,
Albert Barton,
Carl Lotus Becker,
T. Thurston Blakely,
Ezra Roy Burgess,
Mary Louise Carlton,
William James Conway,
Louis Albert Copeland,
Francis Vincent Cornish,
Jessie Catharine Craig,
Rose Dengler,
Cyrus Washington Dolph,
Jacob Fehr, Jr.,
William Somerville Frame,
Grace Fulton,
Martin James Gillen,
August John Giss,
Thomas Howard Grosvenor,
Albert Hedler,
Harriet Eugenia Hoover,
William Henry Johns,
Clara Gladys Jones,
Michael William Kalaher,
Delos Oscar Kinsman,
Mabel McCoy,
Joseph Lowe McNab,
David William Maloney,
James Henry Maybury,
George Scott Moody,
Harry Jennings Noyes,
George Edwin O'Neil,
Susan Melvina Porter,
John Robertson Richards,
Frank Joseph Rowan,
Albert Henry Schmidt,
William Lincoln Smithyman,
Shirley Brooks Tarrant,
Thomas S. Thompson,
Iva Alice Welsh.

Hebrew Group.

Herman Frederick Arnold Obenhaus.

History Group.

William Josephus Hocking, Charles Austin Phelps,
Louis Merrick Ward.

Mathematics Group.

Anna Lillian Jones.

Philosophy Group.

Elizabeth Church Smith.

BACHELOR OF SCIENCE.

General Science Course.

Julia Cora Bennett,
Charles Edwin Blomgren,
Charles Henry Bunting,
Arthur Elwood Coe,
Ralph Peabody Daniells,
James Curtiss Gordon,
Harry Alexis Harding,
Thomas R. Lloyd Jones,

George Katzenstein,
Henry Stanton McCard,
Oliver Eugene Rice,
Harlow Orville Shockley,
Charles Day Stuart,
Vernon Andrew Suydam,
George Farnsworth Thompson,
John Weinzirl.

Mathematics Group.

William Duane Tallman,
Calla Phoebe Westover.

Physics Group.

Charles Marquis Smith,
George Walker Wilder.

Zoology Group.

Benjamin James Ochsner.

Agricultural Course.

Joseph Alexander Jeffrey.

Civil Engineering Course.

Edward Crosby Bebb,
Edwin Stanton Ela,
Conrad Collipp Lloyd,
Arthur Maldaner,
Henry Montague Tripp.

Mechanical Engineering Course.

Charles John Carlsen,
Arthur Lawrence Goddard,
Charles Walter Hart,
Charles Henry Parr,
William Robert Powrie,
Carl Henry Ramien,
George Henry Trautmann,
Frederick Dauchy Warner,
Charles Henry Williams,
Oliver Brunner Zimmerman.

Electrical Engineering Course.

Charles Irvine Burkholder,
Lloyd William Golder,
Charles Beecham Hayden,
Luther Erwin Lemon,
Allen Harry Palmer,
Jay Hugh Perkins,
Peter Eugene Reedal,
George Porter Robinson,
Harry Hurson Ross,
Fred William Ruka,
Henry Holton Scott,
Leonard George Van Ness,
William Henry Williams.

GRADUATES IN PHARMACY.

Gunerius Ellsworth Bilstad,
Arthur Enest Bossingham,
Ernest Frederick Freytag,
Martha Morris James,
Edward John Melzner,
John William Schempf,
William Robert Schumann.

Bachelor of Science in Pharmacy.

Edward Alvin Iverson,
Edwin Robert Ladwig,
Louis Dunning Sumner.

BACHELOR OF LAWS.

Charles Albert Adamson,
William Ware Allen,
Joseph Bullen Alexander,
William John Anderson,
Frederick William Arthur,
Amund Belland,
Hobart Stanley Bird,
Ernest Joseph Bjorkman,
Max Gardner Booth,
George Waldemar Borchsenius,
Edward R. Bowler,
Timothy M. Bowler,
Aaron Martin Brayton,
Martin Arthur Buckley,
George Joseph Carroll,
William Joseph Carroll,
John Terence Casey,
Lucius Kurtz Chase,
John Melvin Clifford,
William Penn Collins,
Charles Asa Coon,
Charles Francis Crane,
Gerhard Melvin Dahl,
Lewis Anthony Dahlman,
Patrick Daly,
Myrvin Davis,
Richard John Dawson,
Edward Wallace DeBower,
Herbert Francis DeBower,
Fred William Dicke,
Harry Fellows Dickinson,
Guy Phelps Dodge,
James E. Dodge,
William Charles Donovan,
Charles M. Dow,
Alva Frank Drew,
James Thomas Drought,
Jesse Edgren,
Peter Martin Ellingson,
Percy Spencer Elwell,
John Winter Everett,
Frank David Eyerly,
Nelson Hadley Falk,
Josias Edwin Florin,
Charles Fisher Freeman, Jr.,
Charles Nathan Freeman,
Lewis Elmer Gettle,
Charles Henry George,
John Verner Green,
Gilbert Cyrus Grism,
Charles H. Hall,
Pierson Loveridge Halsey,
Avery Thomas Hanson,
Charles Albert Hardy,
John Charles Hart,
Gustavus Nathaniel Heineman,
Robert Mead Higby,
August Charles Hoppman,
Henry Allen Huber,
John William James,

Fred Leslie Janes,
John H. Janssen,
Carl Smith Jefferson,
Francis Henry Johnston,
John Thomas Jones,
Louis Albert Karel,
Edward Leo Kelley,
Charles Edwin Kelsey,
Fred John Knoell,
Nicholas Konrad,
Ernest John Rudolph Kuechle,
Fred Kull,
Nels Albert Ladd,
Henry Lebeis, Jr.,
William Charles Leitsch,
Joseph Henry Liesenfeld,
Pearl Lincoln,
Edward Loew,
Ardath Waldo Loy,
Charles Lincoln Lukes,
Maurice Aloysius McCabe,
John Wasson McDonald,
Joseph Ernst Messersmith,
Lewis Charles Minich,
Nicholas Joseph Monahan,
John Mand Nelson,
Thomas Paine Nelson,
John Albert Oaks,
Michael A. O'Brien.
Herman Erick Oleson,
Erick John Onstad,
Franklin Frederick Orth,
Willard Bela Overson,
Harry Lee Potter,
John Price, Jr.,
Richard Bruno Ramien,
Edward Martin Rice,
Charles Gilbert Riley,
Louis W. Runkel,
Edward Simon Schmitz,
Oscar Schlothauer,
Adolph George Schwefel,
Thomas P. Silverwood,
Albert Horace Smith,
Frederick James Smith,
Frank Hugh Spencer,
Calvert Frederick Spensley,
Willett Main Spooner,
Frederick William Suhr,
John Suhr,
Arthur Austin Tempke,
William Oliver Thomas,
Charles Homer Tenney,
Andrew Theodore Torgerson,
Frank Tyler Tucker,
Gilbert E. Vandercook,
Ralph Charles Vernon,
Ray D. Walker,
Ernest Farwell Ward,
Daniel Webster Wilbur,
William Wilkie,
William Henry Woodard,
William Leonard Woodward,
Lucian Robson Worden.

MASTER OF ARTS.

James Ernest Barbour, A. B. (Coe College), in Economics and Sociology—*Thesis: "Robert Owen, his philosophy, works, and influence."*

Florence Augusta Cornelius, B. L. (Univ. of Wis.), in Latin and Greek—*Thesis: "Cicero's treatment of the locus communis in his rhetorical works."*

Harriet Emeline Crandall, B. A. (Univ. of Wis.), in English—*Thesis: "The distribution of the logical pauses in Shakespeare's blank verse."*

Abigail Kate Wolcott, A. B. (Elmira College), in Latin—*Thesis: "The first two years of preparatory Latin instruction."*

John Dorsey Wolcott, A. B. (Univ. of Wis.), in Greek and Latin—*Thesis: "The ἅπαξ εἰρημένα of Thucydides."*

MASTER OF LETTERS.

William Monroe Balch, B. L. (Univ. of Wis.), in Economics and Sociology—*Thesis: "Theories of industrial liberty."*

Mildred Lewis Harper, B. L. (Univ. of Wis.), in English—*Thesis: "The social and political movements of the first half of the nineteenth century as reflected in contemporary fiction."*

Edith Kathryn Lyle, B. L. (Univ. of Wis.), in Philosophy and French—*Thesis: "Evolution and materialism."*

Susan Adelaide Sterling, B. L. (Univ. of Wis.), in German—*Thesis: "Die Sprache des Hans Sachs an einer seiner Fabeln erlaeutert."*

MASTER OF SCIENCE.

Frederic Elmer Bolton, B. S. (Univ. of Wis.), in Pedagogy, Philosophy and Psychology—*Thesis: "The development of courses of study in the public schools of the United States."*

Lellen Sterling Cheney, B. S. (Univ. of Wis.), in Botany and Bacteriology—*Thesis: "A revision of the North American species of the genus Amblystegium."*

Fred De Forest Heald, B. S. (Univ. of Wis.), in Botany and Zoology—*Thesis: "On the toxic effect of dilute solutions of acids and salts upon plants."*

James Barkley Pollock, B. S. (Univ. of Wis.), in Botany—*Thesis: "On the variations in the water content of trees."*

Edmund Joseph Rendtorff, B. S. (Univ. of Wis.), in Mathematical Physics and Electrical Engineering—*Thesis: "A vortex theory of the electro-magnetic field."*

Theodore Running, B. S. (Univ. of Wis.), in Mathematics—*Thesis: "Two systems of line co-ordinates."*

Herman Schlundt, B. S. (Univ. of Wis.), in Chemistry and Mineralogy—*Thesis: "On complex tartrates of nickel, cobalt and iron, and certain alkaline solutions of the heavy metals."*

MECHANICAL ENGINEER.

Edwin Hugh Ahara, B. S. (Univ. of Wis.)—*Thesis: "An automatic adding and printing machine."*

ELECTRICAL ENGINEER.

Robinson Crowell, A. B. (Stanford Univ.)—*Thesis: "The form of alternating current curves."*

Arthur Hillyer Ford, B. S. (Univ. of Wis.)—*Thesis: "Some tests on commercial telephone transmitters."*

Budd D. Frankenfield, B. S. (Univ. of Wis.)—*Thesis: "Speed regulation of direct current motors."*

Arthur Rodney Sawyer, A. B. (Stanford Univ.)—*Thesis: "Tests of insulated wires."*

DOCTOR OF PHILOSOPHY.

George Henry Alden, A. B. (Harvard Univ.), in History, Political Science, and Economics—*Thesis: "New governments west of the Alleghanies before 1780."*

Helen Page Bates, A. B. (Wellesley College), in Economics, History, and Historical Jurisprudence—*Thesis: "State irrigation in the Australian colonies."*

James H. Hamilton, A. M. (Univ. of Indiana), in Economics, Sociology, and American History—*Thesis: "Savings banks."*

Harry Huntington Powers, A. M. (Univ. of Wis.), in Economics, French and Biology—*Thesis: "Wealth and happiness."*

Samuel Edwin Sparling, A. B. (Univ. of Indiana), in Public Administration, Economics, and American History—*Thesis: "Municipal history of the city of Chicago."*

HONORS IN SPECIAL STUDIES.

Carl Lotus Becker, in American History—*Thesis: "The national nominating power."*

Willard Grosvenor Bleyer, in English—*Thesis: "The relation of Pre-Raphaelitism in art and literature to the Oxford movement in the English church."*

Harry Alexis Harding, in Bacteriology—*Thesis: "On the causal connection between bacteria and the production of silage."*

Charles Walter Hart, in Steam Engineering—*Thesis: "An investigation of internal combustion engines."*

William Josephus Hocking, in American History—*Thesis: "The fall of the federal party from power, 1800."*

Clara Gladys Jones, in American History—*Thesis: "The Ohio and Indiana land companies."*

David William Maloney, in Economics—*Thesis: "Agricultural prices in the United States, 1870-1894."*

Charles Henry Parr, in Steam Engineering—*Thesis: "An investigation of internal combustion engines."*

Martin Philip Rindlaub, in English—*Thesis: "The element of mysticism in Hawthorne."*

Grant Showerman, in Latin—*Thesis: "Character studies in Cicero's Letters."*

William Duane Tallman, in Mathematics—*Thesis: "Duality in geometry."*

George Henry Trautman, in Steam Engineering—*Thesis: "A comparative test of steam injectors."*

John Weinzirl, in Bacteriology—*Thesis: "The bacterial flora of cheddar cheese and its relation to the ripening process."*

George Walker Wilder, in Physics—*Thesis: "The counter electromotive force of the electric arc."*

GRADUATES.

Number of University Graduates, 1854-1896,	3,064	1896,	280
Ancient Classical Course,	340		12
Modern Classical Course,	351		24
English Course,	193		13
Civic Historical Course,	129		45
General Science Course,	489		22
Normal Course (1865-68),	25		—
Engineering Courses,	232		29
Law Course,	1,150		124*
Pharmacy Courses,	143		10
Agricultural Course,	12		1

*Twenty-eight of these students completed their work and received their diplomas as of the Class of '96 in December 1896. Their names are included in the list of students as well as in the list of graduates.

STUDENTS.

GRADUATE STUDENTS.

FELLOWS.

Baker, Myron Eugene, A. M., . . . 627 University Ave.
Fellow in English Literature, Room 2, University Hall.

Bleyer, Willard Grosvenor, B. L., . . 625 Langdon St.
Alumni Fellow in English Literature.

Buckley, Ernest Robertson, B. S., . 408 W. Washington Ave.
Fellow in Geology, Room 36, Science Hall.

Bunting, Charles Henry, B. S., . . . 614 Langdon St.
Fellow in Biology, Room 43, Science Hall.

Chynoweth, William Henry, A. M., . . 511 W. Main St.
Honorary Fellow in Hebrew.

Copeland, Edwin B., Ph. D., ... 613 Francis St.
Honorary Fellow in Botany.

Flom, George Tobias, M. A., . . . 231 W. Gilman St.
Honorary Fellow in Germanic Philology.

Ford, Arthur Hillyer, E. E., . . . 706 University Ave.
Fellow in Electrical Engineering, Machine Shop.
North Hall.

Meyer, Balthasar Henry, B. L., . . . 311 Brooks St.
Fellow in Economics, Room 50, University Hall.

Quantz, John Oscar, A. B., ... 134 Bruen St.
Fellow in Philosophy, Room 34, Science Hall.
North Hall.

Running, Theodore, M. S., ... 420 Lake St.
Fellow in Mathematics, Room 1, University Hall.

Sawin, Albert Monroe, M. S., ... 314 Lake St.
Honorary Fellow in Mathematics.

Shannon, Charles Henry, A. B., . . . 314 Mills St.
Fellow in Greek, Room 34, University Hall.

Showerman, Grant, A. B., ... 522 State St.
Fellow in Latin, Room 52, University Hall.

Wentworth, Charles T., A. M., ... 543 State St.
Fellow in History, Room 50, University Hall.

AUGUST UIHLEIN FELLOWSHIP IN PHARMACEUTICAL CHEMISTRY.

Hunkel, Carl George, Ph. G., . . . 403 W. Mifflin St.

UNITED STATES PHARMACOPOEIA RESEARCH FELLOWSHIP.

James, Martha Morris, Ph. G., . . . 217 Langdon St.

FRED PABST FELLOWSHIP IN PHARMACEUTICAL CHEMISTRY.

Richtmann, William Oscar, Ph. G., . 1124 W. Johnson St.

JAPANESE FELLOWSHIP IN ECONOMICS.

Shiozawa, Masasada, A. B., ... 412 Lake St.

GRADUATE SCHOLARSHIP IN GREEK AND LATIN.

Browder, Jonathan, Baily, M. A., . . University Heights.

ROCKFORD COLLEGE FELLOWSHIP IN ECONOMICS.

Sabin, Mary Senath, A. B., . . . University Heights.

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GRADUATES IN RESIDENCE.

Allen, Katherine, A. M., University of Wis., *Madison.*
Latin, Greek and English Literature.

Bassett, Victor Hugo, A. B., Knox College, *Madison.*
Chemistry.

Becker, Carl Lotus, B. L. Univ. of Wis., *Madison.*
History and Economics.

Bolton, Herbert Eugene, B. L., Univ. of Wis., *Madison.*
History, Economics, and Administration.

Bristol, Elsey Lois, B. L. Univ. of Wis., *Madison.*
English Literature and History.

Brooks, John Crafts Wright, Graduate West Point Military Academy, *Madison.*
Electrical Engineering.

Burgess, Charles Frederick, B. S., University of Wis., *Oshkosh.*
Electrical Engineering.

Cairns, William B. A. M., Univ. of Wis., *Madison.*
English Literature, Anglo-Saxon, and Rhetoric.

Carpenter, Mary Frances, B. L., Smith College, *Madison.*
Hebrew and New Testament Greek.

Chynoweth, Edna B. L., Univ. of Wis., *Madison.*
English Literature, Anglo-Saxon, and History.

Decker, John Wright, Agr. B., University of Wis., *Madison.*
New Testament Greek.

Doane, Charles Francis, B. S., Kansas State Agr. College, *Louisville, Ky.*
Animal Husbandry, Dairying, and Bacteriology.

Doremus, Joseph Andrews, A. B., Gates College, *Dubuque, Ia.*
Political Science and Mathematics.

Eckles, Clarence Henry, B. S. A., Iowa State Agricultural College, *Ames, Ia.*
Dairy Bacteriology.

Ferry, Ervin Sidney, B. S., Cornell Univ., *Madison.*
Chemical Physics.

Fischer, Richard, B. S., Univ. of Mich., *Madison.*
Chemistry.

Frankenfield, Budd, B. S., Univ. of Wis., *Madison.*
Electrical Engineering, and Mathematical Physics.

Fraser, Georgine Zetelle, B. S., Wellesley College, *Baltimore, Md.*
Economics and History.

Freehoff, Joseph, C. B. S., Univ. of Wis., *La Crosse.*
Sociology and Economics.

Frost, William Dodge, M. S., U. of Minn., *Madison.*
Botany.

Giss, August J., University of Wis., *Sauk City.*
History and Economics.

Goddard, Arthur Laurence, M. S., U. of Wis., *Madison.*
Mechanical Engineering.

Griffith, Jessie, M. L., University of Wis., *Fond du Lac.*
Greek and Latin.

Haley, Louis Coleman, B. A., U. of Wis., *Madison.*
New Testament Greek.

Harding, Harry Alexis, B. S., U. of Wis., *Brodhead.*
Bacteriology and Chemical Practice.

Hartwell, Frank Isham, B. S. in M. E., U. of Wis., *Madison.*
Mechanical and Electrical Engineer.

Hayden, Charles Beecham, B. S., in E. E., U. of Wis., *Madison.*
Electrical Engineering.

Herfurth, Sabena Mildred, B. L., U. of Wis., *Madison.*
German and French.

Howie, John M., A. B., Cotner University, *Madison.*
Mathematics.

Ishikawa, G. Sardakuni, Graduate of Anglo-Japanese College, *Tokio, Japan.*
Political Economy and Sociology.

Ishikubo, Gisaburo, Graduate of College of Tokio, *Mochidamura, Japan.*
Economics, Political Science, and History.

Jolliffe, William Morley, B. S., Lawrence Univ., *Waupaca.*
Mathematics and Physics.

Kellogg, Helen Julia, B. L., Univ. of Wis., *Madison.*
Latin.

Kelly, Frederick Thomas, B. S., U. of Wis., *Mineral Point.*
Hebrew and New Testament Greek.

Kinsman, Delos Oscar, B. L., U. of Wis., *Platteville.*
Economics and History.

Knauth, Reinhard Gideon, A. B., Univ. of Mich., *Detroit, Mich.*
German, Economics, and English Literature.

Lincoln, Azariah Thomas, B. S., Univ. of Wis., *Montfort.*
Physical Chemistry and Geology.

McIver, Matthew Nelson, Ph. B., Beloit College, *Glen Haven.*
American History and Political Economy.

Meisnest, Frederick William, B. S., Univ. of Wis., *Madison.*
German and Anglo-Saxon.

Melzner, Edward J., Ph. G., Univ. of Wis., *Fort Atkinson.*
Pharmaceutical Chemistry and Bacteriology.

Morse, Joseph Fairbanks, A. B., Amherst College, B. D., Yale Divinity School, *Madison.*
Psychology and Economics.

O'Connor, Charles J., A. B., Univ. of Wis., *Madison.*
Greek and Latin.

Pentecost, William Lewis, B. S., Mass. Agr'l College, *Worcester, Mass.*
Dairying and Bacteriology.

Porter, Susan Melvina, B. L., U. of Wis., *Janesville.*
History and Economics.

Pyre, James Francis Augustine, B. L., Univ. of Wis., *Madison.*
English Literature.

Raymond, Josephine Hunt, B. L., N. W. U., *Madison.*
Sociology and Economics.

Regan, Susan Pierce, B. L., Univ. of Wis., *Madison.*
History and Latin.

Reinsch, Paul Samuel, A. B., LL. B., U. of Wis., *Madison.*
History, Political Science, and Economics.

Remington, Harriet Trayne, M. L., U. of Wis., *Madison.*
German.

Rice, Ernest Joseph Axtell, A. B., Gates College, *Neligh, Neb.*
Economics and Sociology.
Rohn, Oscar, B. S., University of Wis., *Madison.*
Geology.
Romadka, Charles Aloysius, A. M., Georgetown Univ., *Milwaukee.*
Mechanical Engineering.
Sanborn, John Bell, B. L., Univ. of Wis., *Madison.*
History, Economics, and Political Science.
Schreiner, Oswald L., B. S., in Pharmacy, Univ. of Wis., *Madison.*
Physical Chemistry.
Seymour, Arthur R., B. L., Univ. of Wis., *Madison.*
French.
Sheldon, Walter Hodge, Univ. of Wis., *Madison.*
Histology and Physiology.
Smith, Charles Marquis, B. S., U. of Wis., *Madison.*
Physics.
Smith, Mary Allegra, B. L., Univ. of Wis., *Madison.*
Greek and English Literature.
Smith, Walter McMynn, A. B., U. of Wis., *Madison.*
Anglo-Saxon.
Sober, Hiram Allen, A. B., Univ. of Mich., *Madison.*
Greek and Latin.
Sterling, Susan Adelaide, M. L., U. of Wis., *Madison.*
German.
Taylor, Henry Charles, B. S. A., Iowa Agr. College, *Wilsonville, Ia.*
Sociology, Economics, and History.
Thomas, Benjamin, B. S., Univ. of Wis., *Madison.*
Hebrew and New Testament.
Troyer Albert Melville, M. A., U. of Neb., *Lincoln, Neb.*
Animal Husbandry.
Urdahl, Thomas Klingenberg, M. L., Univ. of Wis., *Madison.*
Political Economy and History.
Weinzirl, John, B. S., Univ. of Wis., *Eau Galle.*
Dairy Bacteriology and Chemical Practice.
White, Harry K., M. L., Northwestern U., *Sparta.*
History, Economics, and Political Economy.
Wilder, George Walker, B. S., U. of Wis., *Madison.*
Electricity and Magnetism, and Theory of Heat.
Wilke, Otto John, A. B., Wartburg College, *Madison.*
Hebrew, New Testament Greek, and Arabic.
Williams, William Watkin, B. S., Lawrence U., *Ottawa.*
Philosophy and Sociology.

GRADUATES STUDYING IN ABSENTIA.

Allen, Andrews, B. C. E., *Wilmington, Del.*
Civil Engineering.
Andrews, Marilla, B. L. (Eng.), *Evansville.*
English Literature and Economics.
Angle, Edward John, B. S., M. D., *Lincoln, Neb.*
Vertebrate Anatomy.
Bliss, George Walker, B. L., *Dallas City, Ill.*
English Literature and History.
Burgess, Caroline Viola, B. L., *Hitchcock, S. D.*
History and English Literature.
Burton, Corwin Burton, B. S., *New York, N. Y.*
Electrical Engineering.
Connor, Mary Frances, B. L., *Token Orbek.*
American History and English Literature.
Doudna, Pearl E., A. B., *Colorado Springs, Col.*
Applied Mathematics, Physics, and Astronomy.
Ford, Frederick Hillyer, B. S., *Waupun.*
Electrical Engineering.
Gale, Zona, B. L., *Milwaukee.*
English Literature and History.
Hancock, Lemuel Morris, B. M. E., *Nevada City, Col.*
Mechanical Engineering.
Hatherell, Rosalia, B. S., *River Falls.*
Zoology.
Hayden, Mary Estelle, B. L. (Eng.), *Sun Prairie.*
History and English Literature.
Lawrence, Carl Gustavus, B. L., *Canton, S. D.*
Modern European History.
Marshall, Ruth, B. S., *Madison.*
Zoology.
Stecker, Henry Freeman, M. S., *Burlington, Ia.*
Mathematics, Applied Mathematics, and Astronomy.
Thatcher, James Leonard, B. L. (Eng.), *Little Falls, Minn.*
Pedagogy.
Tormey, James Albert, B. L., *Winona, Minn.*
Sociology and History.
Wray, James Glenn, B. S., *Chicago, Ill.*
Electrical Engineering.

UNDERGRADUATES.

COLLEGE OF LETTERS AND SCIENCE.

Senior Class.

Andrews, Ross Everett,	*Mukwonago,*	Eng.
Arbuthnot, John,	*Woodman,*	G. S.
Atkinson, William Austin,	*Beloit,*	A. C.
Averill, Maud Mary,	*Whitewater,*	Eng.
Averill, Florence Mildred,	*Whitewater,*	Eng.
Bacon, John Harwood,	*La Crosse,*	M. C.
Beddall, Marcius Melvin,	*Clear Lake, Wash.,*	C. H.
Benedict, Mertie Harriett,	*Arcadia,*	G. S.
Bertels, Mollie,	*Green Bay,*	A. C.
Blynd, George Theophilus,	*Weyauwega,*	A. C.
Bolton, William Lawrence,	*Racine,*	A. C.
Borden, James Benjamin,	*Milton,*	A. C.
Boughton, Clement Abner,	*Stoughton,*	G. S.
Brand, Bessie Goodrich,	*Madison,*	M. C. Sp.
Brazeau, Theodore Walter,	*Grand Rapids,*	C. H.
Buck, Guerdon Conde,	*Platteville,*	G. S.
Burkholder, Abram Hess,	*Madison,*	Eng. Sp.
Butt, Cyrus Marion,	*Viroqua,*	C. H.
Cairns, Gertrude Maud,	*Ellsworth,*	M. C. (Eng.)
Cantwell, Joseph Michael,	*Madison,*	C. H.
Case, Henry Cadby,	*Milwaukee,*	C. H.
Chandler, Albert James,	*Ladoga,*	C. H.
Chase, Susan Frances,	*Madison,*	C. H.
Chase, Albert Guy,	*Ladoga,*	C. H.
Cheney, Rosa Mabel,	*River Falls,*	Eng.
Clausen, Fred Harold,	*Fox Lake,*	C. H.
Clawson, Sadie Marie,	*Brodhead,*	C. H.
Cochems, Henry Frederick,	*Sturgeon Bay,*	C. H.
Comstock, Elizabeth,	*Madison,*	G. S.
Comstock, Elting H.,	*Milwaukee,*	G. S. (Math. Group.)
Cramer, Mary Alison,	*Madison,*	M. C.
Crooker, Orrin Edson,	*Helena, Mont.,*	G. S. Sp.
Cushing, Alice,	*Wauwatosa,*	C. H.
Dickie, Robert Bruce,	*North Freedom,*	Eng.
Downer, George Ford,	*Lake Geneva,*	C. H.
Dutcher, Adelaide,	*Madison,*	G. S.
Edwards, Clarence Bushnell,	*Lancaster,*	C. H.
Ernst, Marie Antoinette,	*Watertown,*	A. C. (Classic.)
Esterly, George Burton,	*Bathgate, N. D.,*	G. S.

Evans, Evan Alfred,	*Spring Green,*	C. H.
Fairchild, Arthur Wilson,	*Green Bay,*	M. C.
Ferguson, Herbert Thomas,	*Waupun,*	C. H.
Fish, Florence,	*Florence, O.,*	C. H.
Ford, William Brown,	*Sparta,*	G. S.
Gallagher, Sadie Ellen,	*Madison,*	Eng.
Gannon, Walter Scott,	*Cedarburg,*	C. H.
Gardner, Bertha Lucile,	*Platteville,*	A. C.
Gault, John Henry,	*Poynette,*	C. H.
Gilbertson, Julius,	*Eau Claire,*	C. H.
Goetsch, Hattie Louise,	*Watertown,*	M. C.
Green, Bertha Mae,	*Middleton,*	C. H.
Gunther, Laura Marion,	*Madison,*	Eng.
Hager, Albert Ralph,	*Sterling, Ill.,*	G. S.
Harvey, William Thomas,	*Racine,*	G. S. Sp.
Hastreiter, Rolland Frederick,	*Madison,*	G. S.
Hayes, William Arthur,	*Ahnapee,*	Eng.
Higgins, Allen Fitch,	*Sturgeon Bay,*	G. S. (Zool.)
Hollis, Andrew Phillip,	*Wellington, O.,*	G. S.
Houlan, Marion Cecilia,	*Milwaukee,*	Eng.
Howe, Grace,	*Rhinelander,*	Eng.
Hoyt, Heber Bishop,	*Waterloo,*	C. H.
Hughes, Walter Wellington,	*New Lisbon,*	C. H.
Hunt, May,	*Oneida, N. Y.,*	Eng.
Jackman, Ralph Willmarth,	*Janesville,*	C. H.
Jones, Renette,	*Arena,*	Eng.
Karel, John Colonel,	*Madison,*	Eng. Sp.
Kellogg, Louise Phelps,	*Milwaukee,*	C. H. (Hist.)
King, Elizabeth Weston,	*Spring Green,*	C. H.
Kingsford, Albert Samuel,	*Rushford, Minn.,*	Eng.
Kronshage, Ernest Hildebrand,	*Boscobel,*	A. C. Sp.
Laflin, Mamie Luella,	*Milwaukee,*	M. C.
Lea, Charles W.,	*Waupaca,*	H. Sp. (Econ.)
Leith, Charles Kenneth,	*Madison,*	G. S.
Libbey, Charles Arthur,	*Oshkosh,*	C. H.
Liebenberg, Herman Henry,	*Madison,*	G. S. (Math.)
Lockney, Henry,	*Waukesha,*	C. H.
Luby, Clarence Joseph,	*Hurley,*	C. H.
Lyon, Frank Emory,	*Sun Prairie,*	Eng. Sp.
McCulloch, Isabelle Jane,	*Janesville,*	C. H.
McGilvra, Avis Aurelia,	*Baraboo,*	M. C.
McLenegan, Annie Susan,	*Beloit,*	Eng.
McNaney, Elizabeth Moulton,	*Milwaukee,*	Eng.

McVicar, Agnes Edna,	*Madison,*	M. C.
McVicar, Katharine Eunice,	*Madison,*	M. C.
Mabbett, Leora Esther,	*Edgerton,*	G. S. (Math.)
Mann, William Henry,	*Marinette,*	M. C.
Marlow, John Anthony,	*Decorah, Ia.,*	M. C.
Maynard, Clara Elgar,	*Platteville,*	Eng.
Melville, Naomi Earhart,	*Davenport, Ia.,*	M. C.
Monahan, Barney Andrew,	*East Troy,*	Eng.
Montgomery, Charles Carroll,	*Omaha, Neb.,*	A. C.
Mulberger, Arthur,	*Watertown,*	A. C.
Murat, Leroy John Nicholas,	*Stevens Point,*	C. H.
Nash, Guy,	*Centralia,*	G. S.
Nash, Nellis I.,	*Centralia,*	C. H. (Econ.)
Niederman, Ella May,	*Milwaukee,*	Eng.
O'Brien, Rosa Anna,	*Elkhorn,*	M. C.
Odland, Lewis,	*Madison,*	Eng.
Oestreich, Otto August,	*Kewaunee,*	C. H.
O'Neill, Albert B.,	*Rosendale,*	Eng.
Osborne, Laura Alma,	*La Crosse,*	M. C.
Page, Harlan Kingsburg,	*Baraboo,*	A. C.
Page, Jay Wright,	*Honey Creek,*	C. H.
Palmer, Elizabeth Marshall,	*Madison,*	Eng. Sp.
Park, Ernest Sprague,	*Des Moines,*	G. S. Sp.
Parkinson, Fay,	*Madison,*	M. C.
Parsons, Frederick Francis,	*Berlin,*	C. H.
Pengra, Charlotte Elvira,	*Madison,*	G. S. (Math.)
Perkins, Henry Addison,	*Sioux City, Ia.,*	C. H.
Pitman, Anna Maria,	*Madison,*	A. C.
Pound, Martha Edith,	*Madison,*	M. C. Sp.
Pray, Helen Louise,	*Stevens Point,*	M. C.
Pray, Katharine Rebecca,	*Stevens Point,*	M. C.
Rehn, Valentine Lawrence,	*Marshall,*	C. H.
Risjord, Gullick Nelson,	*Mount Horeb,*	C. H.
Rogers, John Jay,	*Milwaukee,*	G. S.
Rowan, Emma Frances,	*Sparta,*	G. S.
Schreiber, Lucile Howard,	*Madison,*	A. C.
Serl, Elmer Willis,	*Delavan,*	Eng.
Sheldon, Walter Hodge,	*Madison,*	G. S.
Smelker, Roy C.,	*Dodgeville,*	C. H.
Smieding, George,	*Racine,*	G. S.
Smith, Edna E.,	*Amherst,*	Eng.
Smith, Ernest Bradford,	*Madison,*	M. C.
Smith, Grant,	*Madison,*	G. S.

Smith, Marietta Baldwin,,	*Racine,*	C. H.
Smith, William Noble,	*Madison,*	C. H.
Spence, Caroline Devereaux,	*Fond du Lac,*	A. C.
Spence, Gertrude,	*Fond du Lac,*	A. C. Sp.
Stavrum, Ernst Arthur,	*La Crosse,*	M. C.
Stedman, Clara Antoinette,	*Berlin,*	M. C.
Tallman, George Kemp,	*Janesville,*	C. H.
Tarnutzer, Andrew David,	*Sauk City,*	G. S.
Thiel, William Fernando,	*Schlesingerville,*	C. H.
Thomas, Sarah Jennie,	*Waukesha,*	A. C.
Thorson, Thorval John,	*Scandinavia,*	G. S.
Tillotson, Earl Clarence,	*Baraboo,*	M. C.
Towne, Ezra Thayer,	*Waupun,*	Eng.
Waite, Ossian Thomas,	*Oshkosh,*	C. H.
Walch, James Alexander,	*Centralia,*	Eng.
Wild, Robert,	*Milwaukee,*	A. C.
Wright, David Howard,	*Madison,*	G. S. Sp.
Wright, Grace Anna,	*Janesville,*	M. C. Sp.
Wolf, Charles Lewis,	*Sharon,*	M. C. Sp.
Wolff, Henry Charles,	*Evansville,*	G. S. (Math.)
Zweifel, Arabella Virginia,	*Calumetville,*	M. C.

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Junior Class.

Ableiter, Theodore Louis,	*Boscobel,*	M. C.
Alexander, Albert Fred,	*Menomonie,*	G. S.
Allen, Eldreth G.,	*Madison,*	G. S. (Physics.)
Allen, Mary Olivia,	*Milwaukee,*	G. S.
Bailey, Grace Ethel,	*Sun Prairie,*	C. H.
Barker, Mary Rogers,	*Janesville,*	C. H.
Berg, Theodore,	*Appleton,*	C. H.
Bird, Louise Marie,	*Madison,*	M. C.
Black, Robert Franklin,	*Frankfort, S. D.,*	A. C. Sp.
Blumer, Edward,	*Farmer's Grove,*	G. S.
Blyman, Charles,	*Oshkosh,*	A. C. Sp.
Borgers, Albert Lewis,	*Madison,*	Eng. Sp.
Bosshard, Otto,	*La Crosse,*	C. H.
Bowers, Ray,	*Delavan,*	G. S.
Briesen, von Elizabeth Johanna,	*Columbus,*	M. C.
Bump, Mary Evelyn,	*Wausau,*	C. H. Sp.
Burns, Leslie Rush,	*Oakfield,*	G. S. Sp.
Burnton, Harriot,	*Fond du Lac,*	M. C.
Burton, Anna Livingston,	*Livingston,*	G. S.

Cairns, Rolla Ullin,	*Madison,*	G. S. Sp.
Carlton, Alice Elizabeth,	*Madison,*	C. H.
Cary, Irving Boyd,	*Milwaukee,*	A. C.
Case, Jessie Marvin,	*North Greenfield,*	G. S.
Chapman, Agnes,	*Watertown,*	M. C.
Chapman, Bertha Estelle,	*Plainfield,*	Eng.
Charleton, Fannie,	*Madison,*	Eng.
Chase, Milfrid Earl,	*Madison,*	G. S. Sp.
Church, May Elizabeth,	*Milwaukee,*	C. H.
Clark, Myrtes Estella,	*Mayville,*	Eng.
Colver, Harley Ross,	*New Lisbon,*	C. H.
Compton, Frank Elbert,	*Grand Rapids,*	C. H.
Copp, Helen Louise,	*Madison,*	M. C. Sp.
Corscot, Catharine May,	*Madison,*	A. C. Sp.
Cory, Walter Bennet,	*Viroqua,*	C. H. Sp.
Dacy, Alice Beatrice,	*Woodstock, Ill.,*	C. H.
Darrow, William,	*Yellowstone,*	G. S. Sp.
Davies, Joseph Edward,	*Watertown,*	M. C.
Davis, David John,	*Racine,*	G. S.
Donnelly, Christopher Andrews,	*Mecker's Grove,*	Eng.
Duke, Hugo Sylvester,	*Madison,*	Eng. Sp.
Ela, Emerson,	*Rochester,*	M. C.
Elver, Elmore Theodore,	*Madison,*	C. H.
Enteman, Karl Ernest,	*Hartland,*	C. H.
Fabrick, Glen Ray,	*Madison,*	G. S.
Forrest, Harry Gustavus,	*Manitowoc,*	C. H.
Fortier, Camile A. Hermand,	*Florence,*	G. S.
Fowler, Roy Edward,	*Wauwatosa,*	G. S.
Freeman, Mary Louise,	*Madison,*	M. C.
Gay, Robert James,	*Madison,*	G. S.
Gierhart, Henry Shockley,	*Argyle,*	C. H.
Glenn, Clara Abigail,	*Viroqua,*	C. H.
Goodell, Kate Louise,	*Viroqua,*	M. C.
Gordon, Esther,	*Brodhead,*	G. S.
Graham, Grace,	*Tomah,*	M. C.
Greenbank, Grace,	*Madison,*	M. C.
Griffin, Hattie Josephine,	*Madison,*	A. C.
Grover, Arlene Edna,	*Madison,*	M. C.
Gugel, Frank Henry,	*Madison,*	Eng. Sp.
Gunthrop, Pauline Priscilla,	*Austin, Ill.,*	C. H.
Hageman, Charles Frederick,	*Mauston,*	A. C.
Hancock, Edward Lee,	*Shullsburg,*	G. S. (Math.)
Hanks, David Arthur,	*Madison,*	M. C.

Hardy, Horace Whitney,	*Grand Rapids,*	C. H.
Harvey, Richard Guille,	*Racine,*	A. C.
Hay, William Henry,	*Oshkosh,*	C. H.
Hegg, Clara Ellida,	*Decorah, Ia.,*	C. H.
Higgins, James Martin,	*Madison,*	A. C. Sp.
Hirschberg, Joseph Gustav,	*Milwaukee,*	C. H.
Houghton, Laura Lizzie,	*Los Angeles, Cal.,*	M. C. Sp.
Huff, Mary Bashford,	*Boscobel,*	Eng.
Huntington, Amelia Ecklor,	*Durand,*	Eng. Sp.
Huntley, Maud,	*Elroy,*	A. C. Sp.
Hurlbut, Sadie Elizabeth,	*Elkhorn,*	M. C.
Irish, James William,	*Madison,*	Eng.
Joannes, Charles Eugene,	*Green Bay,*	M. C.
Keech, Bessie Margaret,	*Waupun,*	C H. (Hist.)
Knudtson, Knudt,	*Moscow,*	G. S. Sp.
Kunz, Edessa Luella,	*Poynette,*	C. H.
Lee, Jessamine,	*Vermillion, S. D.,*	Eng. (Eng.)
Linde, Clarissa Augusta,	*Oshkosh,*	M. C. (Hist.)
Link, George Martin,	*Leon,*	G. S. (Math.)
Lipe, Olive,	*Sharon,*	Eng. Sp.
Loeper, Addie W.,	*Prairie du Chien,*	C. H.
Luetscher, George Daniel,	*Sauk City,*	Eng.
McCulloch, Harriett E.,	*Janesville,*	Eng.
McGee, Charles Anson Augustus,	*Whitefish Bay,*	C. H. Sp.
McNair, Grace Elizabeth,	*Brodhead,*	C. H. (Hist.)
Main, John Smith,	*Madison,*	A. C.
Markham, Henry Stewart,	*Milwaukee,*	C. H. Sp.
Mason, Max,	*Madison,*	C. H. (Math.)
Matson, Andrea Rasmina,	*Poynette,*	Eng. Sp.
May, Earl Chapin,	*Rochelle, Ill.,*	G. S. Sp.
Meeker, Guy Abbott,	*Marshalltown, Ia.,*	C. H. Sp.
Merrill, Grace,	*Ashland,*	M. C.
Miller, Augusta Dorothea,	*Green Bay,*	M. C. Sp.
Moessner, Lillie Elda,	*Madison,*	G. S.
Monteith, Jessie,	*Madison,*	M. C. Sp.
Moore, Fred Milton,	*Fond du Lac,*	G. S. Sp.
Moore, William Washburn,	*Glendale,*	Eng. (Heb).
Morley, Ralsa Fred,	*Baraboo,*	C. H. Sp.
Nash, Archie Lyman,	*Manitowoc,*	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.
Odland, Martin,	*Madison,*	Eng. Sp.
Parkinson, Eve,	*Madison,*	A. C.
Parkinson, Maude,	*Madison,*	A. C.
Patzer, Otto,	*Wausau,*	C. H.
Pendleton, Genevieve,	*Sioux City, Ia.,*	M. C.
Penniston, Dora Luella,	*Argyle,*	C. H.
Perkins, Frances Gay,	*Fond du Lac,*	M. C.
Perry, Agnes Arlette,	*McHenry, Ill.,*	Eng. Sp
Peterson, Frederick Burns,	*Madison,*	Eng. Sp.
Pinkum, Anna Shaw,	*Eau Claire,*	C. H. Sp.
Pollard, Eliza Alwilda,	*Madison,*	M. C. (Math.)
Raymer, John Wesley,	*Madison,*	G. S.
Reedal, George Banks,	*Dekorra,*	G. S.
Riordan, Jermiah Patrick,	*Myra,*	C. H.
Robinson, Eliza,	*Sparta,*	G. S. (Math.)
Rockwell, Adaline Benson,	*Oneida, N. Y.,*	Eng.
Roden, August,	*Madison,*	C. H. Sp.
Rouse, James Dewey,	*Madison,*	G. S. Sp.
Ruebhausen, Julia,	*Madison,*	G. S.
Ryan, Herbert Harry E.,	*Milwaukee,*	C. H.
Sanborn, Dwight Alexander,	*Milwaukee,*	C. H. Sp.
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.
Secker, Charles Mitchel,	*Baraboo,*	M. C.
Shapiro, Rebecca,	*Medford,*	C. H.
Shearer, Louise,	*Janesville,*	C. H.
Sheldon, Stuart Harris,	*Madison,*	G. S.
Shong, Albert Clifton,	*West Superior,*	C. H.
Short, Nathan Green,	*Dodgeville,*	C. H.
Sias, Jessie Josephine,	*Sparta,*	M. C.
Smith, Ella Knowles,	*New Richmond,*	M. C. Sp.
Smith, Genevieve Church,	*Madison,*	Eng. Sp.
Smith, Lloyd Dean,	*Amherst,*	C. H.
Snively, Letitia Rowena,	*Menomonie,*	Eng.
Spiegelberg, Fred Fitzgerald,	*Boscobel,*	A. C. Sp.
Stephenson, Harriet Frances,	*Madison,*	M. C.
Squire, Charles Albert,	*Sheboygan,*	G. S. Sp.
Staver, Frances Mary,	*Monroe,*	Eng. Sp.
Suhr, Edmund,	*Madison,*	C. H.

Thomas, George,	*Rewey*,	Eng.
Thomas, Herbert Henry,	*Darlington*,	C. H.
Tompkins, Lucy S. Estella,	*Madison*,	M. C.
Thomson, Christina Irene,	*Oshkosh*,	G. S. Sp.
Van Kirk, Frank Walter,	*Janesville*,	G. S.
Van Vorhis, James Harrison,	*Shullsburg*,	G. S. Sp.
Vilas, Elizabeth Day,	*Madison*,	M. C. Sp.
Vogel, Guido Charles,	*Milwaukee*,	G. S.
Weter, James Parsons,	*De Pere*,	M. C.
Wigdale, Norman Amos,	*Fort Atkinson*,	Eng. Sp.
Wilson, Harry Brooks,	*Fort Atkinson*,	Eng.
Witter, Ruth Emily,	*Grand Rapids*,	Eng. Sp.
Wolfe, Albert Christian,	*Greenville*,	Eng.
Wood, Augusta,	*Madison*,	M. C. Sp.
Woy, Maud,	*Madison*,	M. C.
Wright, Christine Ramsay,	*Baraboo*,	M. C.
Young, John Howard,	*Madison*,	C. H.
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Sophomore Class.

Ackley, Charles Breck,	*Oconomowoc*,	Eng. Sp.
Adams, Myrtle Grace,	*Beloit*,	M. C. Sp.
Allen, Charles Elmer,	*Madison*,	G. S. Sp.
Allen, Philip Loring,	*Madison*,	C. H.
Anderson, Lewis Albert,	*Mt. Horeb*,	Eng. Sp.
Andrews, Helen Grace,	*Lodi*,	Eng.
Anthony, Anna Gertrude,	*Central City*,	G. S.
Aylward, Joseph John,	*Madison*,	Eng. Sp.
Baldwin, Jay Burdette,	*Evansville*,	Eng. Sp.
Bartmann, John Henry,	*Madison*,	Eng.
Bartmann, Joseph,	*Appleton*,	Eng.
Becker, Charles Henry,	*Kenosha*,	Eng.
Beerbaum, Adolph F.,	*Waterloo*,	G. S.
Behnke, Henry J.,	*Appleton*,	G. S.
Bibbs, Emma Newham,	*Madison*,	Eng.
Blodgett, Maude Catharine,	*Sharon*,	Eng. Sp.
Bohan, Martha,	*Milwaukee*,	Eng. Sp.
Bolender, Charles Barton,	*Monroe*,	A. C.
Borgers, William Benjamin,	*Neillsville*,	A. C. Sp.
Brewer, Chester Leland,	*Janesville*,	M. C. Sp.
Brownell, George Holmes,	*Janesville*,	C. H. Sp.
Bush, Nellie Martha,	*Sparta*,	M. C.
Butt, Margaret Elizabeth,	*Viroqua*,	M. C.

Calkins, Ernest Eugene,	*Delavan,*	Eng. Sp.
Campbell, Daisy,	*Hudson,*	Eng. Sp.
Carter, Harrie Nathan,	*Humbird,*	G. S. Sp.
Case, Lillian,	*Madison,*	A. C.
Chamberlain, Alonzo Albert,	*Darlington,*	Eng. Sp.
Chamberlain, Harlem Roy,	*Darlington,*	Eng.
Chubbuck, Alice L.,	*Hudson,*	Eng. Sp.
Churchill, Arthur Moore,	*Marinette,*	A. C.
Clancy, Henry Patrick,	*Racine,*	C. H.
Clark, Henry Kendall,	*Madison,*	Eng. Sp.
Cloes, Grace Gage,	*Lake Bluff, Ill.*	M. C.
Cole, Orsamus,	*Milwaukee,*	M. C.
Cook, Mathilde Viola,	*Madison,*	M. C.
Cornish, Edwin J.,	*Myrna, Minn.,*	G. S.
Curran, John David,	*Stevens Point,*	M. C. Sp.
Curtis, Nathan Stephenson,	*Madison,*	Eng. Sp.
Darling, William S.,	*Middleton,*	G. S.
Davies, Charles George,	*Spring Green,*	G. S. Sp.
De Lay, Cyril Scott,	*Madison,*	Eng. Sp.
Denu, Albert Ralph,	*Madison,*	Eng.
De Reamer, Gertrude Elizabeth.	*Fond du Lac,*	M. C.
Desmond, Cora Frances,	*Fox Lake,*	Eng.
Desmond, Thomas Aquinas,	*Milwaukee,*	Eng. Sp.
Dopp, Mary,	*Oconomowoc,*	G. S. Sp.
Dorset, Helen,	*La Crosse,*	M. C. Sp,
Driver, Bert Ormond,	*Darlington,*	Eng.
Edwards, Annie Katharine,	*La Crosse,*	M. C.
Ehlman, Ernest George,	*Milwaukee,*	G. S. Sp.
Ellis, Amy Gertrude,	*Mazomanie,*	Eng.
Ellison, Wanda Gladys,	*Darlington,*	Eng.
Elward, Dorothy,	*Peoria, Ill.,*	Eng. Sp.
Emerson, John Bolles,	*Madison,*	G. S. Sp.
Emery, Sydney Lawton,	*Madison,*	Eng.
Enge, John Jacob,	*Eau Claire,*	Eng. Sp.
Fargo, Elsie Rutherford,	*Lake Mills,*	M. C. Sp,
Ferguson, Marion Jane,	*La Crosse,*	C. H. Sp.
Fiske, Lulu Blanche,	*Burlington,*	A. C.
Foley, May Genevieve,	*Wauwatosa,*	A. C.
Fowler, Helen Ada,	*Madison,*	M. C.
Fox, Edward Tappan,	*Milwaukee,*	M. C.
Friend, Alice Relaine,	*Milwaukee,*	M. C. Sp,
Fries, Mayce Belle,	*Richland Center,*	Eng.
Gaenslen, Fred Julius,	*Milwaukee,*	G. S. Sp.

Gale, Gladys,	*Reedsburg,*	Eng.
Gardner, Mabel Bernice,	*Grand Rapids,*	Eng. Sp.
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.
Haight, George Ives,	*Rockdale,*	Eng.
Hanchett, Ruth May,	*Sparta,*	M. C.
Hanson, Albert,	*Eau Claire,*	G. S.
Heller, Hattie Marie,	*Sheboygan,*	Eng. Sp.
Hinkley, Lucretia French,	*Milwaukee,*	A. C.
Hopkins, George Allen,	*Madison,*	A. C.
Horlick, Bessie Margaret,	*Racine,*	Eng. Sp.
Huber, Grace Emma,	*Madison,*	M. C. Sp,
Huenkemier, Etta,	*Freeport, Ill.,*	C. H.
Inglis, John Percy,	*Bayfield,*	Eng.
Jacobson, Marcus A.,	*Waukesha,*	Eng.
Jeffrey, John Jonas,	*Centralia,*	Eng. Sp.
Jenney, Adaline Miriam,	*Huron, S. D.,*	A. C. Sp.
Johnson, Lillian Gertrude,	*Decorah, Ia.,*	M. C.
Jonas, Emma Christian,	*Beaver Dam,*	M. C. Sp.
Jordan, Alice Marie,	*Sioux City, Ia.,*	Eng. Sp.
Koltes, Frank X.,	*Madison,*	G. S.
Kraenzlein, Alvin Christian,	*Milwaukee,*	G. S. Sp.
Kurtz, Frank Howard,	*Milwaukee,*	Eng.
Lueders, Minnie Magdalene,	*Madison,*	M. C. Sp,
McCoy, Nettie Irene,	*Madison,*	Eng.
McCumber, Mary Etta,	*Fond du Lac,*	M. C. Sp,
MacMillan, Antoinette,	*Appleton,*	A. C. Sp.
Malec, Marie,	*Madison,*	Eng.
Mehl, Hugo Francis,	*Milwaukee,*	G. S.
Meyer, Arthur W.,	*Cedarburg,*	G. S.
Miller, Mary Elizabeth,	*Racine,*	Eng.
Miller, Maud Elsie,	*Edgerton,*	M. C. Sp,
Mills, Lewis Welling,	*Racine,*	M. C. Sp,
Mitchell, Thomas William,	*Cuba City,*	Eng.
Montgomery, Milton Gray,	*Omaha, Neb.,*	C. H.
Moore, Lydia Emma,	*Madison,*	Eng. Sp.
Murrish, Harry John,	*Mazomanie,*	Eng.
Nelson, Edith,	*Madison,*	A. C.
Nuzum, Jessie Ann,	*Viroqua,*	Eng. Sp.
Odell, Susan,	*Des Moines, Ia.,*	M. C.
Ogilvie, Jenny,	*Madison,*	Eng. Sp.

O'Neill, Ernest Andrew,	*Neillsville,*	M. C.
Pahlow, Edwin William,	*Milwaukee,*	Eng.
Parker, Oren Franklin,	*Rensselaer, Ind.,*	G. S. Sp.
Parkinson, Stanley Barber,	*Madison,*	Eng. Sp.
Peet, Katharine Olive,	*Madison,*	G. S. Sp.
Pengra, Mabel Agnes,	*Madison,*	A. C.
Peterson, Charles N.,	*Racine,*	C. H.
Peterson, George Ernest,	*Waukesha,*	A. C. Sp.
Pierpont, David Cowes,	*Milwaukee,*	A. C.
Radensleben, Frank Ernest,	*Eau Claire,*	C. H. Sp.
Reed, Roy,	*Ripon,*	Eng. Sp.
Rickfort, William O.,	*Lake Mills,*	G. S.
Riley, Mabel Victoria,	*Madison,*	G. S. Sp.
Robertson, William Spence,	*Oxford,*	Eng. Sp.
Ryan, Ferne,	*Reedsburg,*	Eng.
Scanlan, Dennis F.,	*Madison,*	C. H.
Sceets, Laura Alice,	*Milwaukee,*	Eng. Sp.
Schilling, George Edward,	*Madison,*	M. C.
Schumaker, Raymond H.,	*McGregor, Ia.,*	Eng.
Sexton, Andrew Reynolds,	*Madison,*	A. C. Sp.
Shaw, Eliza Harper,	*Geneseo, Ill.,*	A. C.
Shaw, Joseph Lawrence,	*Geneseo, Ill.,*	A. C.
Stahl, Henry Vincent,	*Bayfield,*	Eng.
Stanton, Belle,	*Warren, Ill.,*	Eng. Sp.
Starkweather, Charles Marcus,	*Sun Prairie,*	C. H. Sp.
Stauff, John H.,	*Milwaukee,*	A. C.
Stearns, Jane Athlyn,	*Milwaukee,*	G. S.
Stillman, Gertrude,	*Milwaukee,*	Eng.
Stock, Alma,	*Madison,*	Eng.
Stone, Jesse Raymond,	*Burnett Jct.,*	Eng.
Strass, Edward Marlowe,	*Milwaukee,*	Eng. Sp.
Stuntz, Stephen Conrad,	*Monroe,*	G. S.
Sylvester, Genevieve,	*Milwaukee,*	C. H.
Thomson, Fred,	*Tomah,*	Eng.
Tillisch, John Henry,	*Scandinavia,*	G. S. Sp.
Tormey, Thomas William,	*Madison,*	G. S.
Tratt, Paul,	*Whitewater,*	C. H. Sp.
Treweek, Joseph Nicholas,	*Mineral Point,*	Eng.
Updegraff, Samuel,	*Salem, Oregon,*	C. H.
Ver Planck, Helen Gertrude,	*King's Park, L. I.,*	M. C. Sp.
Vilas, Charles Atwood,	*Milwaukee,*	A. C.
Wadsworth, Timothy Benjamin,	*Milwaukee,*	A. C.
Walker, Mabel Emma,	*Racine,*	Eng. Sp.

Walloe, Olga,	*Madison,*	Eng. Sp.
Watson, Frank Hosford,	*Milwaukee,*	G. S.
Westover, Minnie Comstock,	*Madison,*	G. S.
Wheelihan, Nelle,	*Necedah,*	Eng.
White, Allen Orvis,	*Madison,*	M. C.
Williams, Daniel Jenkins,	*Genesee Depot,*	A. C.
Woy, John Morledge,	*Madison,*	C. H.
Wright, Luther Millard,	*New London,*	G. S.
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Freshman Class.

Adams, Edna Cooper,	*Madison,*	Eng. Sp.
Adams, Harry Wilfred,	*Black Earth,*	Eng. Sp.
Adams, William Frazier,	*Mukwonago,*	A. C.
Albrecht, Sebastian,	*Milwaukee,*	G. S.
Alfred, Clarence John,	*Lake Geneva,*	C. H. Sp.
Anderson, Andrew Runni,	*Melvina,*	A. C.
Andresen, Oliver Severre,	*Medford,*	Eng.
Austin, Rolland M.,	*Monroe,*	G. S.
Axtell, Everett Lyle,	*Harvard, Ill.,*	C. H. Sp.
Ayers, Arthur Carlton,	*Sparta,*	C. H. Sp.
Bachhuber, Charles Hugo,	*Mayville,*	Eng.
Bandelin, Oscar John,	*Centralia,*	Eng. Sp.
Barber, Winchel Fay,	*Waukesha,*	C. H.
Barry, Arthur Richard,	*Phillips,*	C. H. Sp.
Berryman, Clay Sumner,	*Madison,*	Eng.
Boardman, Howard Gilman,	*Milwaukee,*	G. S.
Brayton, Fannie Elizabeth,	*La Crosse,*	A. C.
Briere, Carolyn Louise,	*Grand Rapids,*	Eng. Sp.
Brigham, Bertha Blanche,	*Evansville,*	M. C. Sp.
Brooke, James Ernest,	*Burlington,*	C. H. Sp.
Brown, John Sears,	*Sparta,*	G. S.
Brown, Luther Edward,	*Rhinelander,*	A. C.
Brown, Ralph Crissman,	*Dixon, Ill.,*	G. S. Sp.
Bump, Florence,	*Wausau,*	Eng.
Burnham, Charles Lewis,	*Milwaukee,*	A. C.
Burnham, George Ernest,	*Milwaukee,*	Eng.
Carney, Francis Joseph,	*Eau Claire,*	Eng. Sp.
Cashel, Mae,	*Arcadia,*	Eng.
Cassels, George Snowden,	*Tomah,*	G. S.
Castle, Mildred Alice,	*Black River Falls,*	Eng. Sp.
Challoner, Grace Mary,	*Oshkosh,*	A. C.
Clark, Fay Truman,	*Sharon,*	G. S. Sp.

Clark, William Bernard,	*Belleville,*	Eng. Sp.
Clifford, Ellen Ora,	*Madison,*	Eng. Sp.
Coen, Benjamin Franklin,	*Rensselaer, Ind.,*	C. H.
Colton, Grace Beth,	*Evansville,*	M C. Sp.
Congdon, Mirah,	*La Crosse,*	A. C.
Cook, Edward Albert,	*Madison,*	Eng. Sp.
Currier, Louis Claire,	*Stoughton,*	Eng.
Darling, Frank Edward,	*Middleton,*	G. S.
Davis, Jessica Esther,	*Madison,*	G. S.
Devine, Clark Bailey,	*Oregon,*	G. S. Sp.
Dewey, Richard Dwight,	*Wauwatosa,*	G. S. Sp.
Dillingham, Grace Louise,	*Baraboo,*	M. C.
Dillon, Joseph Golder,	*Sterling, Ill.,*	G. S. Sp.
Dopp, Homer Rodger,	*Oconomowoc,*	G. S.
Dorset, Bernard Charles,	*La Crosse,*	A. C.
Douthit, Robert Collyer,	*Shelbyville, Ill.,*	A. C. Sp.
Dreyer, John William,	*Fitchburg,*	G. S.
Du Bois, Floyd Manning,	*Reedsburg,*	Eng. Sp.
Duke, Henry Clay,	*Madison,*	A. C. Sp.
Dye, Daisy,	*Madison,*	Eng. Sp.
Eastman, Clarence W.,	*Portage,*	G. S.
Egdahl, Anfin O.,	*Menomonie,*	G. S.
Elmer, Walter Edgar,	*Hustler,*	Eng.
Evans, Isaac Corador,	*Spring Green,*	Eng.
Fairchild, Margaret Tecklah,	*Clinton, Ia.,*	M. C.
Ferris, George Neb,	*Whitewater,*	C. H. Sp.
Fisher, Carl Elisha,	*Bayfield,*	Eng.
Fletcher, Mabel Emily,	*Portage,*	G. S.
Fox, Philip Ayers,	*Milwaukee,*	A. C.
Fraser, Rebecca Smith,	*Lake Beulah,*	G. S.
Gabel, Charles Ernst,	*Milwaukee,*	G. S.
Gath, Emelia Caroline,	*Madison,*	M. C.
Glasier, Gilson Gardner,	*Wauwatosa,*	Eng. Sp.
Goddard, Herbert,	*Decorah, Ia.,*	M. C.
Goodwin, John Edward,	*Madison,*	Eng.
Graham, Katherine Sophia,	*Merrill,*	Eng. Sp.
Gray, Walter Kemster,	*Milwaukee,*	A. C.
Green, Ethelyn Maude,	*Madison,*	M. C.
Greverus, Ernst,	*New Holstein,*	C. H. Sp.
Gruber, John George,	*Melnik,*	G. S.
Gunderson, Henry Adolph,	*Rio,*	Eng.
Hall, Claudia Jeanie,	*Madison,*	M. C. Sp.
Hall, Henry Leonard,	*St. Joseph, Mo.,*	C. H. Sp.

Hall, Roy Dykes,	*Burnett Junction,*	G. S.
Hardgrove, George Patrick,	*Fond du Lac,*	Eng.
Henry, Herbert Arthur,	*Lake Mills,*	Eng.
Hibbard, Carlisle C.,	*Racine,*	G. S.
Hinkley, Louise,	*Janesville,*	M. C.
Hobbins, Harry Mears,	*Madison,*	M. C.
Hoffmann, Frank,	*St. Wendel,*	Eng. Sp.
Hollister, Henry Conrath,	*Madison,*	G. S.
Honeywell, Jesse Frank,	*Monroe,*	A. C.
Hook, Edward Alfred,	*South Milwaukee,*	G. S.
Hoover, Ira J.,	*Waterloo,*	C. H. Sp.
Howe, Winfred Chester,	*Sheboygan,*	C. H.
Hoy, Eugene Richard,	*Woodstock, Ill.,*	C. H. Sp.
Hubbell, Lena Louise,	*S. Manistique, Mich.,*	M. C. Sp.
Hunt, Florence Adele,	*Aurora, Ill.,*	C. H.
Hurd, Katherine,	*Oregon,*	Eng. Sp.
Hutchinson, Mable Fern,	*Colby,*	C. H.
Jackman, Marcia Maria,	*Janesville,*	M. C.
Jackson, Alice Fanny,	*Madison,*	M. C.
James, Blanche Ella,	*Eau Claire,*	A. C.
Jamieson, William Henry,	*Shullsburg,*	C. H. Sp.
Janes, Lula May,	*Tunnel City,*	M. C. Sp.
Joannes, Ralph Lillis,	*Green Bay,*	C. H.
Johnson, Buchanan,	*Sheridan,*	C. H. Sp.
Johnson, Nora Francisca,	*Rockdale,*	M. C. Sp.
Johnson, Philip Terhune,	*Hancock, Mich.,*	Eng.
Jones, Alice,	*Barneveld,*	Eng.
Kalvelage, John Bernhard,	*Milwaukee,*	G. S.
Karstens, Minnie,	*Madison,*	Eng. Sp.
Kasson, Alice P.,	*Madison,*	M. C.
Kelley, John Pettit,	*Madison,*	G. S. Sp.
Ketcham, Florence Josephine,	*Madison,*	Eng.
Kierstead, Sarah Genevieve,	*Oregon,*	G. S. Sp.
Kies, Samuel William,	*Madison,*	M. C.
King, Bessie Susan,	*Neillsville,*	M. C.
Klahr, Leora Einsel,	*Horicon,*	G. S.
Kney, Ena,	*Madison,*	Eng.
Koch, Arthur Alexander,	*Beaver Dam,*	G. S.
Koffend, Joseph,	*Appleton,*	Eng.
*Kuehn, Fred Andrew,	*Arlington, S. D.,*	C. H.
Kull, Herman,	*Lake Geneva,*	Eng.

*Deceased.

Lamb, Ellen Ware,	*Madison,*	G. S.
Lamberson, Elbert Ward,	*Richland Center,*	G. S. Sp.
Langley, Edna Elmira,	*Merrill,*	Eng. Sp.
Law, J. Eugene,	*Perry, Ia.,*	G. S. Sp.
Lee, Kenelm Julius,	*Chippewa Falls,*	G. S.
Loeb, Joseph,	*Appleton,*	C. H.
Lucas, Sarah May,	*Brodhead,*	M. C.
Luhman, Frederick Walter,	*Manitowoc,*	G. S.
Lyle, John Thomas Stuart,	*Madison,*	M. C.
Lynch, John Francis,	*West Bend,*	G. S. Sp.
McCarthy, Lillian Fidelia,	*Madison,*	M. C.
McClernan, Marie Helen,	*Janesville,*	A. C.
McDonald, Alexander Vaughan,	*Fond du Lac,*	G. S. Sp.
McGilvra, Sadie Love,	*Baraboo,*	M. C.
McGraw, Mae Maude,	*Chippewa Falls,*	M. C.
McLaughlin, Edmund Melendy,	*Winona, Minn.,*	G. S.
McLean, Marion Clara,	*Monroe,*	M. C.
McNamara, Frank Landis,	*Janesville,*	C. H. Sp.
McNeel, James Herbert,	*Fond du Lac,*	M. C.
Maercklein, Ella Dorothea,	*Milwaukee,*	G. S.
Mauermann, Julius Ferdinand,	*Brodhead,*	G. S.
Maxon, Densmore William,	*Cedar Creek,*	Eng. Sp.
Mayhew, Etta Verne,	*Madison,*	Eng.
Meisnest, Frank William,	*Branch,*	G. S.
Mikelson, Albert,	*Mount Horeb,*	Eng.
Monahan, Daniel George,	*East Troy,*	G. S. Sp.
Monteith, Ida Jean,	*Madison,*	M. C.
Moseley, Wayne Thornton,	*Sparta,*	C. H.
Murphy, Daniel Hayes,	*Milwaukee,*	G. S.
Narbo, Lauritz Martin,	*Madison,*	C. H. Sp.
Nelson, Norman Oscar,	*Madison,*	G. S.
Nicholson, John Frederick,	*Brodhead,*	G. S.
Niven, John MacKean,	*Ironwood, Mich.,*	M. C.
Nohelty, Patrick,	*Lake Geneva,*	Eng. Sp.
North, Charles Raymond,	*Onalaska,*	Eng.
Ochsner, Emma Julia,	*Baraboo,*	G. S.
Offield, Gentry,	*Sedalia, Mo.*	Eng.
Ordway, Charles Hiram,	*Fond du Lac,*	Eng. Sp.
Osborne, John Goodrich,	*Milwaukee,*	M. C.
Oscar, Stephen Albert,	*Washburn,*	Eng. Sp.
Palmer, Bernard Morey,	*Janesville,*	C. H.
Park, Bessie May,	*Des Moines, Ia.,*	M. C. Sp.
Parkinson, Lee Allen,	*Madison,*	M. C.

Patterson, Fay Metcalf,	*Pine River,*	Eng. Sp.
Pearce, Charles Sumner,	*Walworth,*	C. H. Sp.
Pease, Raymond, Burnette,	*Oregon,*	Eng.
Peck, Roy Walter,	*Milwaukee,*	M. C.
Perry, Ralph Waldo Emerson,	*Belfast, N. Y.,*	G. S. Sp.
Peterson, Edward H.,	*Janesville,*	G. S.
Pfisterer, Clara,	*Brodhead,*	Eng.
Pierce, Helen Augusta,	*Madison,*	Eng.
Poss, Benjamin,	*Milwaukee,*	Eng.
Price, Clinton Guilford,	*Madison,*	Eng.
Ramsay, Sara Isabella,	*Madison,*	A. C.
Rawson, James Pern,	*Whittemore, Ia.,*	Eng.
Ray, Walter William,	*Waukesha,*	M. C. Sp.
Reed, Miriam Keith,	*Madison,*	M. C.
Reinhard, Hans August,	*Milwaukee,*	M. C.
Reynolds, Vanetta Genevieve,	*Necedah,*	Eng.
Richardson, Berl Dewitt,	*Valma, Ind.,*	G. S. Sp.
Ringle, Oscar Louis,	*Wausau,*	Eng.
Ritan, Elling S.,	*Cumberland,*	Eng. Sp.
Robinson, Irving Porter,	*Milwaukee,*	C. H.
Ross, Lura Llora,	*Hudson,*	Eng. Sp.
Rothmann, Emma,	*Chilton,*	Eng. Sp.
Rudquist, Carl Albert,	*Ashland,*	C. H.
Rued, Hjalmar,	*Madison,*	Eng. Sp.
Ruschhaupt, Louis Fred,	*Milwaukee,*	G. S.
Russell, Edna Leona,	*Manistee, Mich.,*	Eng.
Russell, Henry Alexander,	*Fort Scott, Kan.,*	C. H.
Salisbury, Grace Mildred,	*Oregon,*	Eng. Sp.
Scheer, George Henry,	*Sheboygan,*	G. S.
Schneider, Antoinette Marie,	*Madison,*	G. S. Sp.
Schultz, Alfred Reginold,	*Tomah,*	G. S.
Seabury, Roxie Katharine,	*Oak Park, Ill.,*	A. C. Sp.
Seckler, Harry,	*Leavenworth, Kan.,*	Eng. Sp.
Seiler, Charles Edwin,	*Alma,*	G. S.
Seiler, Livia Estelle,	*Alma,*	M. C. Sp.
Sheldon, Mable,	*Reedsburg,*	Eng.
Sherman, Gertrude,	*Milwaukee,*	A. C.
Shirk, William Schneider,	*Sedalia, Mo.,*	G. S.
Short, George Howard,	*Lake Geneva,*	Eng. Sp.
Siddle, Robert Addison,	*Clinton, Ia.,*	Eng. Sp.
Siefert, Carl Fred,	*Milwaukee,*	G. S. Sp.
Simpson, Edward Bert,	*Chippewa Falls,*	G. S. Sp.
Smith, Allard Johnston,	*Milwaukee,*	C. H.

Smith, Almeda Marion,	*Cherokee, Ia.,*	A. C. Sp.
Smith, Goldwin Howard,	*Madison,*	Eng.
Smith, Harry Gray,	*Madison,*	M. C.
Smith, Laura Eoleen,	*Wheaton, Ill.,*	Eng.
Smith, Winifred Alice,	*Wheaton, Ill.,*	Eng.
Sprague, Edna Mabel,	*Sioux City, Ia.,*	C. H.
Stangel, Charles George,	*Tisch Mills,*	G. S. Sp.
Stetson, Dudley Donnelly,	*Milwaukee,*	G. S. Sp.
Stewart, Harriet Belle,	*Brodhead,*	Eng.
Stowell, Sarah Lillian,	*La Crosse,*	Eng.
Strong, Mary Louise,	*Dodgeville,*	Eng.
Susan, Eunice Esther,	*Fond du Lac,*	M. C. Sp.
Sutherland, Charles Henry,	*Janesville,*	G. S.
Sutherland, William Chester,	*Madison,*	G. S. Sp.
Swain, Katharine Egerton,	*Milwaukee,*	A. C.
Taylor, Henry Herman,	*Barron,*	G. S.
Tearse, Clarence Dudley,	*Winona, Minn.,*	G. S.
Thompson, George,	*Moscow,*	Eng. Sp.
Thompson, James,	*Moscow.*	C. H. Sp.
Thompson, Mortimer Leo,	*La Crosse,*	A. C.
Tourneaure, Alice Maud,	*Freeport, Ill.,*	C. H.
Underwood, Enoch William,	*Minneapolis, Minn.,*	Eng.
Valentine, Anna De Riemer,	*Janesville,*	M. C.
Vallee, Francis Arthur,	*Racine,*	C. H.
Van Horn, Fred Milo,	*Omaha,*	A. C.
Waller, Edward Carson, Jr.,	*River Forest, Ill.*	G. S. Sp.
Warner, Fanny,	*Windsor,*	M. C.
Warner, Florence Maurine,	*Windsor,*	G. S.
Warner, Paul Sherman,	*Madison,*	Eng.
Warning, Edith Henrietta,	*Elkhorn,*	M. C.
Warriner, Helen Haskell,	*Portage,*	M. C.
Washburn, Robert Glendenning,	*Milwaukee,*	G. S.
Waters, Herbert,	*Fond du Lac,*	C. H. Sp.
Weber, Anna Katherine,	*Monroe,*	C. H. Sp.
Wells, Maude Susan,	*Portage,*	C. H. Sp.
Welsh, Eunice Wallace,	*Madison,*	M. C.
Whelan, Dutee Allen,	*Mondovi,*	Eng. Sp.
White, Alfred Edward,	*Sparta,*	G. S.
Willett, Thomas,	*Greenbush,*	G. S.
Winter, Paul Gerhardt,	*Madison,*	Eng.
Wright, Mary Alice,	*Lancaster,*	M. C.
Wright, Paul Randall,	*Monroe,*	A. C.
Yankey, Charles,	*Juneau,*	Eng.

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ADULT SPECIAL STUDENTS.

Acker, Ruby May,	*Brandon.*
Babcock, Ella Louise,	*Manistee, Mich.*
Bates, Walter Eugene,	*Madison.*
Benjamin, William Vincent,	*Fond du Lac.*
Berg, William Carl,	*Nelsonville.*
Boerner, Albert Frederick,	*Cedarburg.*
Bold, Mabel Dixon,	*Madison.*
Brahany, Thomas William,	*Madison.*
Bratrud, Ida G.,	*Madison.*
Crawford, Fannie Matilda,	*Madison.*
Crawford, George Washington,	*Oconto.*
Crocker, Levi Archibald,	*Madison.*
Crosby, Sarah F.,	*Madison.*
Custer, James William,	*Madison.*
Davis, Jennie Belle,	*Madison.*
Dawson, William,	*Marshall.*
Dibble, Olive Amanda,	*Madison.*
Eddy, Ernest Wilder,	*Madison.*
Erickson, Halford,	*West Superior.*
Esterly, Henry Minor,	*Spring Green.*
Feeney, Elizabeth,	*Madison.*
Fish, Albert Elias,	*Florence, O.*
Fisher, Jacob A.,	*Janesville.*
Foss, Catherine,	*Omaha, Neb.*
Fordyce, Maud Beryl,	*Evansville.*
Frazier, Raymond Reuben,	*Sparta.*
Gardner, Genevieve,	*Grand Rapids.*
Goddard, Louis Allen,	*Madison.*
Gray, Eunice Thompson,	*Madison.*
Gray, Zoe Leonore,	*Gratiot.*
Hart, Fannie Gertrude,	*Madison.*
Heimdal, Sara Guenvor,	*Madison.*
Henkes, David Albert,	*Madison.*
Hoskins, Horace Cooley,	*La Grange, Ill.*
Irish, Grace Elinore,	*Madison.*
Jackson, Charles T.,	*Madison.*
Jones, Warren Gilbert,	*Moundville.*
Kollock, Jessie Laura,	*Madison.*
Lamb, Mary Effie,	*Melrose.*
McCallister, Edith Abigail,	*Whitehall.*
McCumber, Anna Levina,	*Fond du Lac.*

Macdonald, Nina Constance,	*Ashland.*
MacNeill, Eloise,	*Madison.*
Morris, Thomas Sherman,	*Madison.*
More, Russell Andrew,	*Fountain City.*
Nichols, Nettie,	*Superior.*
Nicodemus, Grace Marie,	*Madison.*
Noel, Joseph James,	*Madison.*
Nolte, Simon,	*Milwaukee.*
Noyes, Eugene Clement,	*Janesville.*
Nuzum, Willard Otto,	*Oregon.*
O'Dea, Patrick John,	*Madison.*
Ostenberg, Daisy Louisa,	*Barneveld.*
Quentin, Hans C.,	*Milwaukee.*
Richardson, Robert Emmons,	*Burlington.*
Rogers, Margaret Fuller,	*Milwaukee.*
Ruediger, Gustav Ferdinand,	*Alma.*
Sauthoff, Harriet Rosetta,	*Madison.*
Sieker, William Christian,	*Manitowoc.*
Smith, Leona,	*Cherokee, Ia.*
Tallman, Stanley Dexter,	*Janesville.*
Taylor, Cassius Clay,	*Madison.*
Turneaure, Florence Lillian,	*Madison.*
Victory, Walter O.,	*Augusta.*
Wilder, Katherine Miller,	*Madison.*
Wojta, Joseph Frank,	*Nero.*
Woodbury, Hope Hall,	*Milwaukee.*
Young, Mary Elizabeth,	*Philadelphia, Pa.*
Zink, William Stanley,	*Verona.*

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COLLEGE OF MECHANICS AND ENGINEERING.

Senior Class.

Alexander, Walter,	*Madison,*	M. E.
Allen, John Samuel,	*Genoa Jct.,*	E. E.
Beebe, Murray Charles,	*Racine,*	E. E.
Berganthal, Victor William,	*Milwaukee,*	E. E.
Broenniman, Arnold Emil,	*Watertown,*	C. E.
Brown, Perry Fisher,	*Janesville,*	C. E.
Clausen, Leon Raymond,	*Fox Lake,*	E. E.
Cochrane, Robert Boyd,	*Madison,*	M. E. Sp.
Comstock, Nathan,	*Madison,*	M. E.
Coombs, Edward Christopher,	*Madison,*	C. E.

Cornish, Ross Carlton,	*Oshkosh,*	C. E.
Dixon, Fred,	*New London,*	C. E.
Dutcher, John E.,	*Madison,*	E. E.
Fuldner, Henry Christian,	*Milwaukee,*	C. E.
Hawley, George Prince,	*Madison,*	C. E. Sp.
James, Benjamin Winfield,	*Rhinelander,*	M. E.
Jones, George Harvey,	*Fond du Lac,*	E. E.
Kiehl, Wallace Phillip,	*Oconomowoc,*	E. E.
Kirchoffer, William Gray,	*Madison,*	C. E.
Kratsch, William Hermann,	*Milwaukee,*	M. E.
Kurtz, Charles Mears,	*Milwaukee,*	C. E.
Lademan, Otto Thilo,	*Milwaukee,*	E. E.
Lueth, Emil Samuel,	*Baraboo,*	M. E.
McDonald, Clinton,	*Waupun,*	C. E.
McGregor, Wallace Francis,	*Janesville,*	M. E.
Nelson, Fred William,	*Ishpeming, Mich.,*	M. E.
Owen, Llewellyn,	*Milwaukee,*	E. E.
Reilly, Harry Winne,	*Milwaukee,*	E. E.
Ross, Harry Hurson,	*Columbus,*	C. E.
Rumsey, Spencer Smith,	*Berlin,*	C. E.
Schildhauer, Edward,	*New Holstein,*	E. E.
Schmidt, Charles John,	*Milwaukee,*	E. E.
Schuchardt, Rudolph Fred,	*Milwaukee,*	E. E.
Short, Frank James,	*Elkhorn,*	M. E.
Webber, Merton Lamont,	*New London,*	C. E.
Wheeler, Stanley Canover,	*Milwaukee,*	C. E. Sp.

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Junior Class.

Aston, James,	*Milwaukee,*	E. E.
Bentley, Fred William,	*Floyd,*	M. E.
Boynton, Clarence William,	*Valders,*	M. E.
Campbell, Bert,	*Evansville,*	C. E.
Connor, Samuel Powers,	*Clinton, Ia.,*	C. E. Sp.
Crandall, Henry Ray,	*Milwaukee,*	M. E.
Elser, Robert Charles,	*Milwaukee,*	C. E. Sp.
Fugina, Arthur R.,	*Fountain City,*	C. E.
Gerlach, Thomas Anton,	*Theresa,*	C. E.
Hayes, Harry Spoor,	*Milwaukee,*	E. E.
Heine, Rudolph Ernst,	*Milwaukee,*	E. E.
Jenne, Robert Daniel,	*Berlin,*	E. E.
Klug, Lebrecht J.,	*Milwaukee,*	C. E.
Kremers, John,	*Milwaukee,*	E. E.

Landgraf, Fred Karl,	*Ft. Atkinson,*	M. E.
Leich, Oscar M.,	*Jackson,*	E. E.
Lueth, Paul Frederick,	*Baraboo,*	M. E.
McConville, Curran Collins,	*La Crosse,*	M. E. Sp.
Malec, Anton,	*Madison,*	M. E.
Merriam, Hugh Nelson,	*Waupun,*	C. E.
Newell, William Martin,	*New Richmond,*	C. E. Sp.
Newman, Frederick Jacob,	*Milwaukee,*	E. E.
Parsons, Eliot Barber,	*Milwaukee,*	C. E. Sp.
Pope, George William,	*Milwaukee,*	C. E.
Radtke, Albert Augustus,	*Madison,*	E. E.
Raymond, Louis Gilmore,	*Peru, Ind.,*	M. E. Sp.
Reaburn, De Witt Lee,	*Madison,*	C. E. Sp.
Riley, Frank Morris,	*Madison,*	C. E. Sp.
Schafer, Otto,	*Muscoda,*	C. E.
Scheiber, Arthur Valentine,	*Milwaukee,*	E. E.
Schneider, Henry Charles,	*Appleton,*	M. E.
Seymour, Marshall Ehl,	*Beloit,*	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. Sp.
Thaller, Lawrence John,	*Fountain City,*	E. E.
Thorkelson, Halsten Joseph Ber	ford, *Racine,*	M. E.
Voth, William Benjamin,	*Milwaukee,*	E. E. Sp.
Warner, Horace Ray,	*Whitewater,*	M. E.
Winger, Oscar,	*Grand Rapids,*	M. E. Sp.
Younge, Dillard Marion,	*Madison,*	E. E. Sp.
Zabel, Max William,	*Milwaukee,*	E. E.
Zinn, Walter Adolph,	*Milwaukee,*	M. E.

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Sophomore Class.

Ackerman, Harry Roy,	*Necedah,*	E. E.
Austin, Lee Frank,	*Danville,*	E. E. Sp.
Austin, Wilbur Azro,	*Bloomington,*	E. E.
Barr, John Martin,	*Milwaukee,*	M. E.
Bate, Stuart Mill,	*Madison,*	C. E. Sp.
Buckley, Walter John,	*Lake Mills,*	E. E.
Byrne, James Matthew,	*Ironton,*	C. E. Sp.

Curtis, Norman Philip,	*Madison,*	C. E. Sp.
Dorschel, Oscar Lucas,	*Chilton,*	E. E. Sp.
Egan, Richard A.,	*Madison,*	E. E. Sp.
Emerson, Fred Merrill,	*Milwaukee,*	E. E. Sp.
Ferris, James Archibald,	*Fennimore,*	M. E. Sp.
Fowle, Arthur Neves,	*Milwaukee,*	E. E. Sp.
Freschl, Edward,	*Milwaukee,*	M. E.
Gorman, Harry B. L.,	*Oregon,*	E. E.
Hambuechen, Carl,	*Milwaukee,*	E. E.
Hanks, Marshall Wilfred,	*Madison,*	E. E. Sp.
Hanson, Henry Olaus,	*Eau Claire,*	E. E.
Hogan, John Joseph,	*Chippewa Falls,*	E. E.
Hunner, Earl Emmet,	*Madison,*	C. E. Sp.
Keller, Carl August,	*Chilton,*	E. E.
Knauer, Bernard Francis,	*Chicago, Ill.,*	C. E. Sp.
Knowles, James Henry,	*Berlin,*	C. E.
Knutson, Arthur Martin,	*Madison,*	E. E.
Lippert, Arthur Bernard,	*Milwaukee,*	E. E.
Logemann, Richard Thomas,	*Milwaukee,*	C. E.
McArthur, Joseph Maxwell,	*Gainesville, Fla.*	E. E.
McNichol, Irwin Stuart,	*Shawano,*	E. E. Sp.
McPherson, Charles W.,	*Tomah,*	E. E.
Marvin, Arba B.,	*Oregon,*	E. E.
Mason, Charles Thomas,	*Fond du Lac,*	E. E.
Nee, Thomas George,	*Ft. Atkinson,*	E. E.
Nelson, Oscar Martin,	*Boscobel,*	M. 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. Sp.
Persons, Warren Milton,	*Madison,*	C. E. Sp.
Pooler, Earl,	*Onakaska,*	C. E. Sp.
Rawson, Charles Perley,	*Madison,*	C. E. Sp.
Reynolds, William Everett,	*Mineral Point,*	E. E.
Richards, William Allen,	*Madison,*	M. E.
Romadka, Charles Aloysius,	*Milwaukee,*	M. E.
Rothfolk, Edward,	*New Holstein,*	E. E.
Schroeder, Frederick Albert,	*Milwaukee,*	E. E.
Sloan, William Griffith,	*Englewood, Ill.,*	M. E.
Stewart, Ralph William,	*Madison,*	C. E.
Warner, Charles Thomas,	*Canaan, N. Y.,*	M. E.

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Freshman Class.

Atkins, Hubbard Chandler,	*Milwaukee,*	M. E.
Barnes, Charles Ballou,	*Denrock, Ill.,*	M. E.
Baus, Richard Edward,	*Madison,*	M. E.
Blakely, Fred Nielsen,	*Janesville,*	C. E.
Blood, Clarence Curtice,	*Appleton,*	C. E.
Buttles, Benjamin Elijah,	*Lancaster,*	M. E.
Brooker, Eugene George,	*Waterford,*	E. E.
Campbell, Mildred Wadsworth,	*Madison,*	C. E. Sp.
Cannon, Willis West,	*Ahnapee,*	E. E.
Coey, Alfred Lawther,	*Chicago, Ill.,*	C. E.
Collins, Charles Graham,	*West Bend,*	C. E.
Conlee, Harry Burdick,	*Oshkosh,*	M. E.
Cook, Thomas Russell,	*Oshkosh,*	M. E.
Countryman, Merton Alvin,	*Rochelle, Ill.,*	C. E. Sp.
Crosby, Francis Hinckley,	*Kankakee, Ill.,*	M. E.
Dayton, Charles Melville,	*Chicago, Ill.,*	M. E. Sp.
De Montigny, Henrie George,	*Salt Lake City, Utah,*	M. E. Sp.
Dixon, John Edward,	*Milwaukee,*	M. E.
Echlin, Samuel Bosset,	*Janesville,*	M. E.
Ellsworth, Gleason Sherwood,	*Marshfield,*	M. E. Sp.
Elston, Henry Lane,	*Muscoda,*	E. E. Sp.
Emerson, Fred Merrill,	*Milwaukee,*	E. E. Sp.
Fowler, Myron Marshall,	*Wauwatosa,*	E. E.
Gillen, Hugh Harry,	*New Richmond,*	E. E. Sp.
Goodsell, Charles Glenn,	*Sparta,*	E. E. Sp.
Granke, Leo Ernest,	*La Crosse,*	C. E.
Harvey, John Le Roy,	*Mondovi,*	M. E.
Heald, Eugene Hamilton,	*Oak Park, Ill.,*	C. E.
Hedke, Charles Richard,	*Racine,*	C. E.
Hipple, James Stone,	*Elgin, Ill.,*	M. E. Sp.
Hirshheimer, Louis Carver,	*La Crosse,*	M. E.
Howell, George Little,	*Dixon, Ill.,*	E. E. Sp.
Hoyt, Samuel Demerit,	*Wauwatosa,*	C. E. Sp
Humphrey, Clifford Wane,	*Waterloo,*	E. E. Sp.
Icke, John Frederick,	*Marshfield,*	C. E.
Jacobs, Frank William,	*Milwaukee,*	E. E.
Jones, Frank William,	*Milwaukee,*	E. E.
Ketcham, Samuel Hammond,	*Milwaukee,*	M. E.
Lacey, Frank Herbert,	*Sioux Falls, S. D.*	E. E.
Lake, Henry Aubrey,	*Madison,*	C. E. Sp.
Lea, John McKenzie,	*Waupaca,*	E. E.
Lindem, Olaf James,	*Marinette,*	C. E.

McDonough, Gilbert Joseph,	*Eau Claire,*	M. E. Sp.
McKay, Clyde Marshall,	*Chippewa Falls,*	M. E.
Meffert, Edward Persie,	*Wonewoc,*	C. E. Sp.
Merrick, Eldridge Gerry,	*Green Bay,*	E. E.
Minch, Walter Bernard,	*Madison,*	M. E.
Moore, Lewis Eugene,	*Chicago, Ill.,*	M. E.
Nelson, Clarence Lotario,	*Racine,*	C. E.
Nicholaus, Albert Adam,	*Beaver Dam,*	E. E.
Oberland, Edmund,	*Manitowoc,*	E. E. Sp.
Older, Clifford,	*Portage,*	C. E.
Phillips, Charles Allen,	*Sioux Falls, S. D.,*	E. E.
Putney, George Sidney,	*Waukesha,*	M. E.
Rhine, Charles Augustus,	*Milwaukee,*	E. E. Sp.
Robinson, Robert Edwin,	*Hermosa, S. D.,*	E. E. Sp.
Rowe, Clarence Wallace,	*Janesville,*	M. E.
Sands, Edward Emmet,	*Sparta,*	C. E.
Schmitt, Frederick Emil,	*Green Bay,*	M. E.
Seaman, Harold,	*Milwaukee,*	E. E.
Smith, Sydney Thomas,	*Sturgeon Bay,*	C. E.
Soland, Jacob,	*Blair,*	C. E. Sp.
Stephens, Arthur David,	*Madison,*	E. E. Sp.
Stone, Melvin Bailey,	*Delavan,*	C. E. Sp.
Sweet, Henry Livingston,	*Fond du Lac,*	C. E.
Taylor, John Clarence,	*Barron,*	E. E.
Wasmansdorff, Otto F.,	*Chicago, Ill.,*	C. E.
Weed, Louis Burgess,	*Bristol,*	C. E. Sp.
Wheeler, Herbert Edward,	*La Crosse,*	M. E.
Whomes, Harry Richards,	*Baraboo,*	M. E.
Williams, Lynn Alford,	*Milwaukee,*	M. E.
Williams, William Thomas,	*Oshkosh,*	C. E. Sp.
Williamson, Edward Lucius,	*Janesville,*	C. E.
Willis, Joseph Monroe,	*Linden,*	M. E.
Wolcott, Edson Ray,	*Sharon,*	E. E.

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COLLEGE OF AGRICULTURE.

Long Course.

Michels, John,	*Calumet Harbor,*	Freshman.
Schlundt, Charles Ferdinand,	*Two Rivers,*	Freshman.
Smith, William G.,	*New Duluth, Minn.,*	Senior.
Trott, Harry Louis,	*Milwaukee,*	Sophomore.

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Short Course (Second Year).

Allen, James Grier,	*Genoa Jct.*
Allis, Frank Watson,	*Madison.*
Anderson, Andrew N.,	*Browntown.*
Anderson, Thomas N.,	*Browntown.*
Artman, Andrew Gottlieb,	*Elizabeth, Ill.*
Austin, Bertrand Walter,	*Johnstown Centre.*
Austin, George,	*Johnstown Centre.*
Brandt, Charles,	*West Salem.*
Dopp, Gustave William,	*Arcadia.*
Fellows, William Harrison,	*Foscoro.*
Gansky, Albert,	*Beaver Dam.*
Hagestad, Andrew Cornelius,	*Ettrick.*
Hale, Claude William,	*Mauston.*
Hanson, Henry Jonathan,	*Otsego.*
Howie, David William,	*Elm Grove.*
Hoyt, Joseph Warren,	*Rosendale.*
Kunz, Emil,	*Chicago, Ill.*
Laird, William,	*Wittlin.*
McConnell, Thomas Franklin,	*Ripon.*
McDonald, John Robert,	*North Bend.*
McGeachy, William Ralston,	*Winnebago, Ill.*
Marshall, Samuel Hager,	*Madison.*
Meyer, Martin Henry,	*Cedarburg.*
Moyle, Walter John,	*Yorkville.*
Ovenden, Frank,	*Madison.*
Owens, Grant Edward,	*Portage.*
Raymer, Jesse Marion,	*Cadiz.*
Rice, Henry Burgett,	*Lewiston, Ill.*
Stahman, Benjamin Herman,	*Pine Knob.*
Thompson, George Thomas,	*Token.*
Tomkins, Robert Frank,	*Madison.*
Waterstreet, William,	*Kawaunee.*
Wilkowsky, Herman,	*Mishicott.*
Witte, Max Arthur,	*Ebenezer.*
Wyatt, Ernest Ezra,	*Tomah.*

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First Year.

Aldrich, Harry Elliot,	*Burlington.*
Anderson, James Christ,	*Raymond.*
Arms, Walter Lyon,	*Randolph.*
Bernards, Herbert John,	*Waunakee.*

Black, Reynolds Harvey,	*Lone Rock.*
Bradford, Arthur Collins,	*Viola, Ill.*
Burchard, Henry Charles,	*Ft. Atkinson.*
Caldwell, Thomas Andrew,	*Arlington.*
Clark, Horace Greeley,	*Princeton.*
Colburn, Bert,	*Chippewa Falls.*
Coleman, Robert Parker,	*Richmond, Mass.*
Cotzhausen, Curt, von,	*North Greenfield.*
Culbertson, Frank Watters,	*Baldwin.*
Dukleth, Peter Andrew,	*Big Bend.*
Edwards, Frank,	*Waterford.*
Evers, Diedrich Ernst,	*Lorton, Neb.*
Fencil, John Frank,	*Casco.*
Follmer, Clarence,	*Oak, Neb.*
Fosse, Peter John,	*De Forest.*
Gaffin, Benjamin Heistand,	*Leaf River, Ill.*
Gaffin, Charles Harold,	*Leaf River, Ill.*
Gardner, Henry Dode,	*Saxeville.*
Good, Sidney Edward,	*Vilas.*
Grover, Wilbur Arthur,	*Annsburg.*
Haevers, Martin,	*Tonet.*
Hamilton, James Henry,	*Poynette.*
Johnson, Peter Marcus,	*South Wayne.*
Joos, Alfred,	*Fountain City.*
Koch, Gustav Carl,	*Beecher, Ill.*
Kreuger, Alexander,	*Watertown.*
Levy, Sam Everett,	*Milwaukee.*
Luebke, Charles Emil,	*Monterey.*
Luedke, Frank William,	*Seymour.*
Martin, James Munroe,	*Union Grove.*
Milner, John Luke,	*Thorntown, Ind.*
Moyer, William Hamilton,	*Azalia, Mich.*
Nelch, Benjamin Franklin,	*Springfield, Ill.*
Ovitt, Earl,	*Amy.*
Parker, Bailey Rufus,	*Hebron.*
Parks, Perry Calhoun,	*Orangeburg, S. C.*
Patterson, John Leo,	*Bloomington.*
Perschbacher, Adolph,	*Kewaskum.*
Prasse, Conrad,	*Lena, Ill.*
Preston, Fred Chapman,	*Platteville.*
Rabeler, Jr., Peter Fred Henry,	*Leigh, Neb.*
Ray, William Frank,	*Alaska.*
Reddeman, August William,	*Danville.*

Renk, William Frank,	*Sun Prairie.*
Ritzinger, George,	*Eau Claire.*
Ross, Gilbert Leo,	*Lake Geneva.*
Ruud, Hans Gunderson,	*Cambridge.*
Sandgren, Edward,	*Lake Geneva.*
Schuknecht, Herman Ernst,	*Madison.*
Skala, Joseph Wenzel,	*Kewaunee.*
Snyder, Robert Byron,	*Clinton.*
Stanton, James Henry,	*Mitchell.*
Steffen, Charles,	*Western Union.*
Taylor, Frederick Dan,	*Bates, Ill.*
Thompson, Anders Cornelius,	*Clark Mills.*
Thorsgaard, Emile Oscar,	*Westby.*
Thronson, Thron,	*Big Bend.*
Tormey, James Ambrose,	*Fennimore.*
Tufts, Moses Fred,	*Ahnapee.*
Voegeli, William,	*Jordan.*
Ward, John Archie,	*Black Earth.*
Waterstreet, Frank,	*Kewaunee.*
Welch, Clifford Benjamin,	*Fox Lake.*
Wiverstad, Willie Bernard,	*Holmen.*
Woodworth, Roy Dennis,	*Geneva, Ohio.*
Yerkey, Otto Robert,	*Husher.*

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Dairy Class.

Accola, Andrew George,	*Prairie du Sac.*
Adkins, Forest Jerome,	*Troy.*
Anderson, Albert John,	*Amherst.*
Atwood, Lynn Leigh,	*Gray, S. D.*
Bane, Charles Arthur,	*Dana, Ill.*
Barrett, Frederick Eugene,	*Framingham, Mass.*
Bivins, Richard M.,	*Terrell, Texas.*
Blakeley, Lyman Ray,	*Hebron.*
Blong, Mathias,	*St. Lucas, Iowa.*
Bowman, Walter John,	*Harvard, Ill.*
Bolchen, Thomas Edward,	*Homer.*
Bottems, James Francis,	*Mineral Point.*
Botten, Theodore H.,	*Hanska, Minn.*
Brady, James Francis,	*Deerfield, Minn.*
Brandt, Louis,	*Kieler.*
Brei, George John,	*Spring.*

Briggs, James,	*Jonesdale.*
Brown, Frank L.,	*Ft. Atkinson.*
Bruhn, Aksel,	*Plain.*
Brundage, Herman Epson,	*Nortonville, Kansas.*
Burton, James Smeathurst,	*Seneca.*
Buschke, Charles Fred,	*Columbus.*
Cathcart, William Robert,	*Winchester, Kansas.*
Cross, Milo Rozell,	*New Lisbon.*
Dewhirst, Frank,	*Stonewall P. O., Manitoba.*
Dickerson, Almon George,	*Woodstock, Ill.*
Dixon, Thomas,	*Boaz.*
Dodge, Marcus Eugene,	*Windsor.*
Dowe, Arthur Harold,	*Weyauwega.*
Drew, Harry Gideon,	*Leland.*
Dutcher, Eugene Joseph,	*Appleton.*
Ekstrom, John,	*West Superior.*
Engelhaupt, Frank Casper,	*Amelia, Neb.*
Gaedke, Fred August,	*Rankin P. O.*
Gibson, David Imrie,	*Misha Mokwa.*
Goeb, John Henry,	*St. Cloud.*
Goodman, Arthur,	*Mazomanie.*
Goodrich, Jay Frank,	*Dixon.*
Hamm, Willie P.,	*Kohlsville.*
Hanson, Peter N.,	*Bakerville.*
Hart, Thomas Hall,	*Hortonville.*
Hartmann, Eddie Joseph,	*Oconomowoc.*
Haukom, John A.,	*Pigeon Falls.*
Hills, Myron Gustus,	*Medina.*
Hodson, John Martin,	*Montpelier, Ohio.*
Homann, Walter Louis,	*Plain.*
Huntington, Vernon J.,	*Honey Creek.*
Hyde, Pliny,	*Carthage, Mo.*
Irvine, David Almarion,	*Loyal.*
Janssen, John Henry,	*Kohlsville.*
Jeide, Oscar,	*Lancaster.*
Johnson, Carl J.,	*Prairie Farm.*
Kapelke, John August,	*Highland.*
Kissack, James S,	*Bangor.*
Koepsel, John,	*Mayville.*
Kurtz, Karl Jacob,	*Edgerton.*
Lehnherr, Edward G.,	*Dayton.*
Lytle, Frank Joseph,	*West Salem.*
McEdward, George Angus,	*Livermore Falls, Maine*

Mielkie, Willie Fred,	*Rio.*
Morig, Charles W.,	*Middleton.*
Morrow, Clarence Gifford,	*Champaign, Ill.*
Munthe, Alf.,	*Grand Rapids, Mich.*
Oyster, Albert Edward,	*Washington, D. C.*
Parshall, Harry Clide,	*Lake Geneva.*
Peterson, Casper Paulus,	*Curtiss.*
Pierce, Peter Trewartha,	*Hazel Green.*
Price, Charles,	*Oakfield.*
Pyke, Abraham Solomon,	*Detroit, Kansas.*
Raffensperger, William L.,	*Tiskilwa, Ill.*
Renkenberger, Harry Elmer,	*Leetonia, Ohio.*
Rice, George Wilfred,	*Boscobel.*
Rohn, Samuel Grant,	*Ayersville, Ohio.*
Rottenbach, Jacob Jr.,	*Ackerville.*
Schreiber, Theodore William,	*Ada.*
Seelbinder, George William,	*Neillsville.*
Semeran, Rudolph Herman,	*Butternut.*
Sill, Frank John,	*Colby.*
Steinhart, Otto Jacob,	*Apex.*
Steinhauer, August Charles,	*Hope.*
Stewart, Willis Alexander,	*Little Prairie.*
Streveler, Clauss,	*Marshfield.*
Stuessi, Gabriel,	*South Milwaukee.*
Tarbell, Alonzo Emerson,	*Woodworth.*
Thomas, Miss May,	*Decatur, Mich.*
Thorssen, Oscar Joseph,	*Wood Lake.*
Timmreck, Otto,	*New London.*
Trager, Gus,	*Mazomanie.*
Turner, Harry Alvin,	*Rome.*
Tyler, Clay,	*Union Mills.*
Uehling, Ernest Arthur,	*Shopiere.*
Urban, John,	*Middleburg.*
Van Leeuwen, Henry,	*Effingham, Kansas.*
Vick, Charley Henry,	*Granton.*
Wahler, Lars O.,	*Northfield.*
Walker, Carl Joseph,	*Marysville, Kansas.*
Wallington, Frank,	*Muscoda.*
Wells, Mrs. Willis Charles,	*Evansville.*
White, Harrison Attaway,	*Hematite, Mo.*
Wilber, Philander Howard,	*Whitewater.*

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COLLEGE OF LAW.

Senior Class.

Amazeen, John Brown,	*Milwaukee.*
Anderson, William John,	*Milwaukee.*
Angwick, Martin M.,	*Eau Clair*
Arthur, Frederick William,	*Madison.*
Bacon, Henry Newton,	*Oshkosh.*
Baldwin, Cameron Leander,	*Milwaukee.*
Belland, Amund,	*Viroqua.*
Bell, Thomas Sloan,	*Kendall.*
Booth, Max Gardner,	*Monroe.*
Borchsenius, George Waldemar,	*Baldwin.*
Bischel, Lawrence Joseph,	*Chippewa Falls*
Blackstone, Adelbert Linley,	*Schullsburg.*
Briggs, Albert Newton,	*Madison.*
Buchholz, George Otto,	*Janesville.*
Cady, Samuel Howard,	*Madison.*
Carter, Thomas Percy,	*Milwaukee.*
Cavanaugh, William Edward,	*Princeton.*
Clifford, John Melvin,	*Madison.*
Collins, Joseph William,	*Sheboygan.*
Coon, Charles Asa,	*Madison.*
Davis, Alvin Edward,	*Marinette.*
DeBower, Edward Wallace,	*Dane.*
Dorr, Frank Berry,	*Schullsburg.*
Doyle, Thomas Lewis,	*New Prospect.*
Dow, Charles M.,	*Madison.*
Dodge, James E.,	*Madison.*
Elholm, George,	*Racine.*
Edgren, Jesse,	*Madison.*
Eyerly, Frank David,	*Neillsville.*
Fehr, Jacob, Jr.,	*Milwaukee.*
Ford, Marcus Clisbe,	*Madison.*
Frambach, Arthur Augustus,	*Kaukauna.*
Gettle, Lewis Elmer,	*Evansville.*
Gittins, Elmer Ellsworth,	*Racine.*
Hall, Charles H.,	*Madison.*
Harper, Charles Lewis,	*Lancaster.*
Hase, William Frederick,	*Milwaukee.*
Haskell, Herbert Michael,	*Oregon.*
Hayes, William Arthur,	*Ahnapee.*
Hendrickson, Henry,	*Dorchester.*
Hougen, Albert,	*Saint Nazianz.*

Kingsley, George Almon,	*Madison.*
Kinney, Knox,	*Madison.*
Konrad, Nicholas,	*Madison.*
Kuechle, Ernest John Rudolph,	*Milwaukee.*
Ladd, Nels Albert,	*Madison.*
Loew, Edward,	*Madison.*
Luedke, Walter John,	*Milwaukee.*
MacDonald, Eugene Roderick,	*Madison.*
Manson, Herbert Hayes,	*Wausau.*
Nelson, John Mand,	*Madison.*
Phipps, Cranston George,	*Milwaukee.*
Potter, Harry Lee,	*Madison.*
Powell, Will Anson,	*La Crosse.*
Price, John, Jr.,	*Madison.*
Reilly, James Patric,	*Fond du Lac.*
Schlothauer, Oscar,	*Madison.*
Severson, Herman John,	*Cambridge.*
Shearer, Leonard Melvin,	*Fennimore.*
Sheldon, George Mathew,	*Brandon.*
Simpich, Albert John,	*Madison.*
Suhr, Frederick William,	*Madison.*
Suhr, John,	*Madison.*
Torbe, Leo,	*Milwaukee.*
Torgerson, Andrew Theodore,	*Madison.*
Tucker, Frank Tyler,	*Omro.*
Urquhart, Kenneth James,	*Medford.*
Vandercook, Gilbert E.,	*Madison.*
Vernon, Ralph Charles,	*Madison.*
Werner, Edgar Victor,	*Black River Falls.*
Winter, Herman C.,	*Madison.*
Wolf, Charles Louis,	*Sharon.*
Wollaeger, Gustave, Jr.,	*Milwaukee.*

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COLLEGE OF LAW.

Middle Class.

Alsted, Louis Losey,	*Milwaukee.*
Blewett, Francis Dennis,	*Eldorado.*
Burgess, Ezra Roy,	*Racine.*
Cameron, John Alexander,	*Oshkosh.*
Clark, Homer Caswell,	*Demariscotta Mills, Me.*
Earling, George Peebles,	*Chicago, Ill.*
Frame, Harvey Jay,	*Waukesha.*

Frazier, William Sumner,	*Madison.*
Griswald, William Edson,	*Columbus.*
Harnan, John Michael,	*Madison.*
Hollister, Raymond Asa,	*Oshkosh.*
Hubbell, Leslie Thomas,	*S. Manistique, Mich.*
Kauwertz, Walter Washington,	*Milwaukee.*
Kirkland, Ira Bird,	*Jefferson.*
Kneipp, Henry Dominique,	*Weyauwega.*
Krugmeier, Albert Herman.	*Horicon.*
Kulig, John Frank,	*Independence.*
Leigler, John Henry,	*Racine.*
Magne, Charles William,	*Polo, Ill.*
Meyrose, Henry Victor,	*Milwaukee.*
Rehm, Henry Charles,	*Milwaukee.*
Ryan, John Elbert,	*North Andover.*
Schmidt, Albert Henry,	*Manitowoc.*
Stockett, Norman,	*Pottsville, Penn.*
St. Peters, Reginald Ivar,	*Kewaunee.*
Van Doren, Ray Newton,	*Birnamwood.*
Warren, Edgar Beach,	*Green Bay.*
Weidner, Adolph John,	*Milwaukee.*
Wheelan, William Edward,	*Grand Rapids.*
Williams, John Irving, Jr.,	*Youngstown, Ohio.*

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Junior Class.

Anderson, Earle,	*Madison.*
Andrews, Ross,	*Milwaukee.*
Anson, George Mehan,	*Menill.*
Barney, Charles Richard,	*Mauston.*
Baumgarten, Otto Charles,	*San Francisco, Cal.*
Baxter, Charles Melvin,	*Waupaca.*
Borden, James Benjamin,	*Milton.*
Butt, Cyrus Marion, Jr.,	*Viroqua.*
Bean, Frank,	*Hamilton, Minn.*
Bartles, John Francis,	*Green Bay.*
Case, Henry Cadby,	*Milwaukee.*
Cate, Walter,	*Stockton.*
Clausen, Frederick Harold,	*Fox Lake.*
Collipp, Platon,	*Portage.*
Conway, William James,	*Rudolph.*
Craig, Elmer Rusk,	*Viroqua.*
Devney, Edward James,	*Reeseville.*

Dolph, Cyrus Washington, *Brookfield.*
Doyon, Bertrand Herrick, *Madison.*
Edgbert, Orville DeBreton, *Neillsville.*
Edwards, Clarence Bushnell, *Lancaster.*
Ellis, Frederick Charles, *Oconto.*
Evans, Evan Alfred, *Spring Green.*
Fisher, John Lincoln, *Janesville.*
Frame, William Somerville, *Waukesha.*
Frazier, Raymond R., *Madison.*
Frye, Herman Sidney, *Mitchelville.*
Gannon, Walter Scott, *Cedarburg.*
Gault, John Henry, *Poynette.*
Gilbert, Frank Lynch, *Madison.*
Gilbertson, Julius, *Eau Claire.*
Gillen, Martin James, *Racine.*
Gilman, Stephen Warren, *Madison.*
Gregg, John Parker, *Madison.*
Groelle, Frederick Ford, *Unity.*
Greenwood, Charles Sheen, *Lake Mills.*
Gernon, George Edward, *Madison.*
Guile, Walter Cline, *Wauwatosa.*
Hartwell, Fred Hoffman, *La Crosse.*
Hedler, Albert, *Milwaukee.*
Heyn, Bernard Goldsmith, *Milwaukee.*
Hoar, Frank Everitt, *Shell Lake.*
Hoyt, Heber Bishop, *Waterloo.*
Humphrey, Thomas Augustus, *Daucy.*
Hutchinson, Richard Gill, *Rose Lawn.*
Jackson, Russell, *Madison.*
Kelley, John William, *Menominee.*
Kittell, John Albert, *DePere.*
Klatte, William Augustus, *Milwaukee.*
Kreiss, William Henry, *Appleton.*
Lowry, Robert Burr, *La Crosse.*
McGee, Charles Anson Augustus, *Milwaukee.*
McLean, James Perry, *Menominee.*
McMillan, Donald J. *Neillsville.*
McNaught, William Christie, *Madison.*
McPhail, Archibald Cameron, *Stevens Point.*
Magoon, Jay Howard, *Milwaukee.*
Main, John S., *Madison.*
Martin, George Cushing, *Omaha, Neb.*
Mason, Vroman, *Madison.*

Maybury, James Henry,	*St. Cloud, Minn.*
Miller, George Harvey,	*Winneconne.*
Miller, John Oscar,	*Marinette.*
Miller, Nelson,	*Ramsen, Ia.*
Minty, Louis William,	*Chicago, Ill.*
Mueller, Edgar Eugene,	*Milwaukee.*
Murat, LeRoy John,	*Stevens Point.*
O'Connor, George Egbert,	*Eagle River.*
Oliver, James Frederick,	*Montrose.*
*Orbendorfer, Herbert Spencer,	*Milwaukee.*
Paulson, Ernest William,	*Elkhart Lake.*
Page, Jay Wright,	*Honey Creek.*
Phelps, Charles Austin,	*Madison.*
Pingrey, Chester Edwin,	*Rhinelander.*
Pinkerton, David Clark,	*Menasha.*
Potter, Homer Earle Sargent,	*Necedah.*
Pritzlaff, Adolph Herman,	*Milwaukee.*
Putnam, Giles Henry,	*Greenbush.*
Reinhart, Ward Allen,	*Oconto.*
Richards, John Robertson,	*Lake Geneva.*
Risjord, Gullick Nelson,	*Mount Horeb.*
Roddis, Hamilton,	*Marshfield.*
Rowan, Frank Joseph,	*Milwaukee.*
Seymour, Harry Ozias,	*Lake Geneva.*
Schendel, Oscar John,	*Columbus.*
Schmidt, Adelbert Carl,	*Manitowoc.*
Scott, Winfield,	*Okee.*
Shaw, James Deyo,	*Wauwatosa.*
Shimeall, Spencer Ray,	*Shopiere.*
Sidler, Cornelius Anthony,	*Milwaukee.*
Smith, Richard Edwin,	*Gleenwood.*
Smith, Sidney William,	*Rockford, Ill.*
Smelker, Roy C.	*Dodgeville.*
Staples, Isaac,	*Stillwater, Minn.*
Sturges, Benjamin Oscar,	*Lake Geneva.*
Sturgis, James Bennett,	*Houghton, Mich.*
Thorn, Paul Chaney,	*New London.*
Tolrud, Thomas Anderson,	*Peterson, Minn.*
Tillotson, Earle Clarence,	*Baraboo.*
Torkelson, Theodore Bernhardt,	*Black River Falls.*
Thiel, William Fernando,	*Schlesingerville.*
Townsend, Amos,	*Randolph, Iowa.*

*Deceased.

Upham, Robert Allen,	*Shawano.*
*Viebahn, Gustave O.,	*Waterlain.*
Voigt, Edward,	*Milwaukee.*
Waller, Edward Carson, Jr.,	*River Forest, Ill.*
Walsh, James Alexander,	*Eagle River.*
Warner, Harry Chester,	*Dixon, Ill.*
Wheeler, James Samuel,	*Marinette.*
Wild, Robert,	*Milwaukee.*
Woodmansee, John Frasier,	*Milwaukee.*
Yockey, Chauncey William,	*Escanaba, Mich.*
Winterbotham, John Miller,	*Eau Claire.*

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SCHOOL OF PHARMACY.

Four Years' Course.

Bennett, Lepha May,	*Madison,*	Sophomore.
Bobb, Clement Luesther,	*Madison,*	Junior.
Ferris, William Stewart,	*Madison,*	Junior.
Gage, Florence Meta,	*Milwaukee,*	Junior.
Hunkel, Carl George,	*Madison,*	Senior.
James, Martha Morris,	*Oshkosh,*	Special.
Jewett, Harvey Claude,	*Arcadia,*	Senior.
Richtmann, William Oscar,	*Oregon, Ill.,*	Freshman.
Schreiner, Oswald,	*Madison,*	Senior.
Stephens, Henry Elmo,	*Fennimore,*	Junior.
Whare, George Bartholomew,	*Madison,*	Freshman.

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Three Years' Course.

Alden, Frederick William,	*Madison,*	Junior.
Anderson, Joseph Alvin,	*Argyle,*	Senior.
Bjornson, Henry Nordie,	*Ada, Minn.,*	Sophomore.
Bosshard, Oscar William,	*Bangor,*	Junior.
Brandel, Irvin Walter,	*Madison,*	Sophomore.
Clark, Guy Charley,	*Augusta,*	Sophomore.
Denniston, Rollin Henry,	*Burlington,*	Senior.
Donkle, Alfred De Forest,	*Madison,*	Junior.
Eighmey, Alva,	*McFarland,*	Sophomore.
Fox, Charles Marvin,	*La Grange, Ill.,*	Sophomore.
Funck, George William,	*Milwaukee,*	Sophomore.

*Deceased.

Geerlings, Isaac,	*Milwaukee,*	Sophomore.
Gorr, Charles William,	*Milwaukee,*	Sophomore.
Grenier, Achille Bettridge,	*Racine,*	Sophomore.
Hendricks, Wallace Edward,	*Campbellsport,*	Junior.
Henning, Albert Louis,	*Iron Ridge,*	Sophomore.
Hindley, Robert William,	*Racine,*	Junior.
James, Charlotte Frances,	*Oshkosh,*	Junior.
Jewett, Harvey Claude,	*Oregon, Ill.,*	Sophomore.
Kiesslich, Robert,	*Milwaukee,*	Junior.
Kimball, Myra Weston,	*Green Bay,*	Sophomore.
Krogh, Clarence Alfred,	*Mt. Horeb,*	Junior.
Randall, May Inez,	*Ladoga,*	Sophomore.
Ruediger, Gustave Ferdinand,	*Alma,*	Sophomore.
Sage, Edna,	*Beloit,*	Junior.
Schowalter, Edwin Andrew,	*Milwaukee,*	Sophomore.
Schwarz, Herman Frederick,	*Green Bay,*	Junior.
Tyler, Algernon Sidney,	*Mazomanie,*	Junior.
Upjohn, James,	*Fond du Lac,*	Sophomore.

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Two Years' Course.

Arent, John Henry,	*Appleton,*	Senior.
Bartels, Wilbert Kelsey,	*Madison,*	Junior.
Boedecker, Henry Frederick,	*Ahnapee,*	Junior.
Bosshard, Oscar William,	*Bangor,*	Junior.
Crawford, Bertha,	*Madison,*	Junior.
Curtis, Clarence Edward,	*Shell Lake,*	Junior.
Kleuert, Oscar Anthony,	*Portage,*	Junior.
Koske, Edwin Charles William,	*Fond du Lac,*	Junior.
Loew, Edwin Joseph,	*Milwaukee,*	Junior.
Metz, Alexander,	*Madison,*	Senior.
Miller, George Joe,	*Beaver Dam,*	Junior.
Mullen, William Augustine,	*Mineral Point,*	Junior.
Reichert, Arthur Louis,	*Mayville,*	Senior.
Schroeder, John Hugo,	*Madison,*	Junior.
Shepard, Alfred Clayton,	*Mauston,*	Junior.
Shields, George Alvin,	*Mazomanie,*	Junior.
Van Norman, Eugene,	*Milwaukee,*	Senior.
Wadmond, Louis Christensen,	*Racine,*	Junior.
Werner, James Henry,	*Brillion,*	Junior.
Wigdale, Enos Samuel,	*Ft. Atkinson,*	Junior.

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SCHOOL OF MUSIC.

Collegiate.

Second Year.

Bach, Frank Charles,	*Madison.*
Beck, Clara Margaret,	*Madison.*
Brand, Bessie Goodrich,	*Madison.*
Burnham, Lillian Everette,	*Madison.*
Cushing, Alice Gertrude,	*Wauwatosa.*
Dacy, Alice Beatrice,	*Woodstock, Ill.*
Fordyce, Maude Beryl,	*Evansville.*
Fowler, William Muzzy,	*Madison.*
Gibbons, Frank Clark,	*Sun Prairie.*
Goodwin, Sophy Marie,	*Madison.*
Gray, Zoe Lenore,	*Gratiot.*
Haner, Cordelia,	*Sun Prairie.*
Hayden, Blanche Mary,	*Sun Prairie.*
Heller, Hattie Marie,	*Sheboygan.*
Hickok, Ella,	*Madison.*
Hinkley, Louise,	*Janesville.*
Karel, Flora May,	*Kewaunee.*
Lipe, Olive,	*Sharon.*
Lyon, Jennie Charity,	*Sun Prairie.*
Mayer, Bertha Margaret,	*Madison.*
Mills, Netta,	*Lodi.*
Mosel, Clara Belle,	*Sun Prairie.*
Nash, Nellie Irene,	*Centralia.*
Olsen, Clara,	*Madison.*
Persons, Margaret Marston,	*Madison.*
Pickarts, Mary Eliza,	*Madison.*
Pound, Martha Edith,	*Madison.*
Rogers, Martha May,	*Madison.*
Rogers, Mary Margaret,	*Milwaukee.*
Seymour, Arthur Romeyn,	*Madison.*
Shapiro, Rebecca,	*Medford.*
Smith, Marietta Baldwin,	*Racine.*
Walden, Alice,	*Argyle.*
Westenhaver, Ada Josephine,	*Kewaunee.*
Williams, Anna Mae,	*Waupaca.*

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First Year.

Anderson, Verne Eugene,	*Mauston.*
Boardman, Howard Gilman,	*Milwaukee.*
Brigham, Bertha Blanche,	*Evansville.*

Brown, Bertha Louise,	*Madison.*
Chapman, Bertha Estelle,	*Plainfield.*
Clausen, Frederick Harold,	*Fox Lake.*
Comstock, Leila Leona,	*Oregon.*
Davies, Olive Merrill,,	*Madison.*
Dibble, Olive Amanda,	*Evansville.*
Dinneen, Della Mary,	*Madison.*
Edwin, Clara,	*Verona.*
Elston, Henry Lane,	*Muscoda.*
Everett, Edward,	*Madison.*
Gale, Gladys,	*Reedsburg.*
Gillett, William Leslie,	*Madison.*
Glenn, Mary Alice,	*Chicago, Ill.*
Graham, Katherine Sophia,	*Merrill.*
Gunthorp, Pauline Priscilla,	*Austin, Ill.*
Hart, Fannie Gertrude,	*Madison.*
Hayden, Willard Ware,	*Sun Prairie.*
Hayhurst, Elizabeth,	*Waterloo.*
Hobbins, Harry Mears,	*Madison.*
Jackman, Marcia Maria,	*Janesville.*
Janes, Lulu May,	*Tunnel City.*
Jones, Gwen,	*Barneveld.*
Law, J. Eugene,	*Perry, Ia.*
Lee, Jessamine,	*Vermillion, S. D.*
Logeman, Richard Thomas,	*Milwaukee.*
Marshall, Clara Hughes,	*Madison.*
Merrill, Grace,	*Ashland.*
Miner, Marie Stevens,	*Racine.*
Morris, Julia Sophia,	*Madison.*
Nash, Guy,	*Centralia.*
Parr, Charles Henry,	*Madison.*
Pratt, Frank Thomas,	*Madison.*
Purcell, John Dominick,	*Madison.*
Robinson, Juanita,	*Madison.*
Scheer, George Henry,	*Sheboygan.*
Seiler, Charles Edwin,	*Alma.*
Seiler, Livia Estelle,	*Alma.*
Shockley, Mabel,	*Sun Prairie.*
Siddle, Robert Addison,	*Clinton, Ia.*
Smith, Mary Campbell,	*Madison.*
Townsend, Jessie Belle,	*Randolph, Ia.*
Turneaure, Florence Lillian,	*Madison.*
Wilson, Edith Bessie,	*Perry, Ill.*

Academic.

Alford, Alice Irene,	*Madison.*
Baas, Steven Charles,	*Madison.*
Barber, Winchell Fay,	*Waukesha.*
Blodgett, Maude Catherine,	*Sharon.*
Boerner, Albert Frederick,	*Cedarburg.*
Briere, Carolyn Louise,	*Grand Rapids.*
Bull, Eyvind,	*Madison.*
Clifford, Ellen Ora,	*Madison.*
Clifford, Grace Claudia,	*Madison.*
Dahle, Eleonore Benedicta,	*Mount Horeb.*
Daniells, William Nathaniel,	*Madison.*
Dillon, Joseph G.,	*Sterling, Ill.*
Driver, Bert Ormund,	*Darlington.*
Fay, Helen Armine,	*Madison.*
Gardner, Mabel Bernice,	*Madison.*
Gibbs, Earle Edwin,	*Madison.*
Gill, William Wesley,	*Madison.*
Griffiths, Kathryn,	*Madison.*
Harding, Harry Alexis,	*Brodhead.*
Harrington, Mary Catherine,	*Griggsville, Ill.*
Hart, John,	*Waunakee.*
Henwood, Emily May,	*Madison.*
Horlick, Bessie Marguerite,	*Racine.*
Howell, John Gower,	*Madison.*
Hughes, Walter Wellington,	*New Lisbon.*
Johnson, Philip Terhune,	*Hancock, Mich.*
Ketchum, Frances Isabelle,	*Madison.*
Ketchum, Maude Margaret,	*Milwaukee.*
Kries, Samuel William,	*Oshkosh.*
Koltes, Mary,	*Madison.*
Lamberson, Ward,	*Madison.*
Lueders, Minnie Magdalene,	*Madison.*
McConnell, Emily,	*Madison.*
McKay, Evarts Simpson,	*Madison.*
McLean, James Peter,	*Menomonie.*
Mayer, Charles Benaiah,	*Madison.*
Neckerman, Reuben,	*Madison.*
Nelson, Florence Eugenia,	*Madison.*
Nichols, Minnie Irene,	*Madison.*
Nietert, Herman Adolf,	*Madison.*
Noel, James Joseph,	*Madison.*

Nugent, Lulu Margaret,	*Madison.*
Omen, Earl,	*Madison.*
O'Neill, Ernest Albert,	*Neillsville.*
Osen, Charles Buchard,	*Oconomowoc.*
Palz, Peter,	*Madison.*
Peet, Katherine Olive,	*Madison.*
Prien, Rolland Henry,	*Madison.*
Rasmusson, Thora Ferdinanda,	*Madison.*
Rawson, Charles Perley,	*Madison.*
Ruediger, Gustave Ferdinand,	*Alma.*
Smiley, Maggie Belle,	*Madison.*
Spooner, Philip Loring,	*Madison.*
Thompson, Martha,	*Mount Horeb.*
Veerhusen, Vera Louise,	*Madison.*
Wagner, Meta,	*Madison.*
Wheeler, Frances Wilhelmina,	*Madison.*
Willard, Alma Luthera,	*Honey Creek.*
Willott, George Henry,	*Madison.*
Winden, Nora Amanda,	*Madison.*
Wirth, Carl,	*Blooming Grove.*
Wood, Gea Fylte,	*Madison.*
Woods, Florence Estella,	*Madison.*
Woodward, Florence,	*Madison.*

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WISCONSIN SUMMER SCHOOL.

Students in 1896.

Anderson, Anna E.,	*Merrill,*	Prin., High School.
Anderson, Andrea M.,	*Stoughton,*	Ass't, High School.
Arbuthnot, John,	*Woodman,*	Student, U. W.
Armstrong, Mary,	*Portage,*	Ass't, High School.
Ashton, Jennie,	*Arcadia,*	6th Grade, Menomonie, Wis.
Athearn, Grace Weston,	*Oshkosh,*	Ass't, High School, Omro.
Beckwith, Fermine P.,	*Fond du Lac,*	Tea., 5th Grade, Fond du Lac
Bennett, Lepha Mae,	*Madison,*	Student, U. W.
Bergen, John F.,	*Prairie du Sac,*	Prin., High School.
Bosworth, Ellen M.,	*Merrill,*	7th Grade, Ironwood, Mich.
Brady, Charles Eugene,	*Osman,*	Teacher, 2d Dist., Newton.
Buck, Guerdon Conde,	*Platteville,*	Student, U. W.
Bunting, Alice Isabella,	*La Crosse,*	Teacher, High School.
Bunting, Chas. Henry,	*La Crosse,*	
Caldwell, Olive Blanche,	*Hudson,*	Teacher, 7th Grade.
Campbell, Bert,	*Evansville,*	Teacher, Normal School.

Chase, Susan Frances,	*Buffalo, N. Y.,*	Student, U. W.
Churchill, Herman,	*Menomonie,*	Teacher.
Clark, Robert Luther,	*Beaver Dam,*	Teacher.
Comstock, Elizabeth,	*Madison,*	Student, U. W.
Comstock, Elting H.,	*Milwaukee,*	Student, U. W.
Cory, Alberta Josephine	*Barberton, Ohio,*	Tea., W. G., Oberlin.
Crocker, Levi A.,	*Madison,*	Student, U. W.
Crosby, Frances S.,	*Madison,*	
Culver, Lillie,	*Milwaukee,*	Teacher, 6th Grade.
Darling, William,	*Knapp,*	
Davis, Sophia Elizabeth	*Winneconne,*	
Dehm, Lena,	*Milwaukee,*	Teacher, High School.
Devlin, Sarah Rebecca,	*Woodworth,*	Whitewater Normal.
Dixon, John,	*Glenwood,*	Assistant, High School.
Dobbins, George Henry,	*Auroraville,*	
Dubois, Nellie,	*Appleton,*	Teacher, High School.
Dutcher, Adelaide,	*Madison,*	Student, U. W.
Edwards, Elizabeth,	*Hazel Green,*	Teacher, Intermediate Grade.
Emery, Sidney L.,	*Edgerton,*	Student, U. W.
Enteman, Minnie Marie	*Hartland,*	Ass't E. S. H. S., Green Bay.
Felker, Abram Henry,	*Madison,*	
Felker, Gertrude,	*Madison,*	Teacher Gym., Rockford, Col.
Fischer, Herman,	*Pardeeville,*	Prin., Graded School.
Fisher, John William,	*Orangeville, Ill.,*	
Fletcher, Albert H.,	*Mauston,*	Prin. and Sup't.
Ford, William Brown,	*Sparta,*	Student, U. W.
Ford, Guy Stanton,	*Grand Rapids,*	Prin., High School.
Gallagher, Katharine A.	*Canton, Ill.,*	Teacher, High School.
Gilmore, Loalma C.,	*Yorkville,*	
Gray, Oliver,	*Mineral Point,*	Assistant, High School.
Greenbank, George H.,	*Madison,*	
Grove, Cyrus,	*Orangeville, Ill.,*	Tea., Grammar School.
Harder, Henry,	*New Holstein,*	Stu, N. W. Med. C., Chicago.
Harper, Blanche,	*Madison,*	
Harrison, Frederick A.,	*Bangor,*	Prin., High School.
Hatherell, Rosalia A.,	*Janesville,*	River Falls Normal.
Heffernan, John J.,	*Glenmore,*	
Henkes, David Albert,	*Bismark, Ia.,*	Student, U. W.
Hewitt, Mary Anne,	*Manitowoc,*	
Higbee, Roscoe Bacon,	*La Crosse,*	
Hill, Charles Leslie,	*Knapp,*	Prin., Graded School.
Hollis, Andrew P.,	*Wellington, Ohio,*	Student, U. W.
Homburg, Fred,	*Cincinnati, Ohio,*	Teacher, High School.

Howe, Grace, *Oregon*, Student, U. W.
Howey, Laura Eloise, *Helena, Montana*, Teacher, High School.
Hurlbut, Medora, *Elkhorn*,
Hurlbut, Sadie E., *Elkhorn*,
James, Eliza Smith, *Delavan*,
Johnson, Axel Edward, *Waukesha*, Instructor, Carroll College.
Johnson, Ellen, *McFarland*, Student, U. W.
Johnson, Joseph O., *Saude, Iowa*,
Johnson, Karen, *Sioux Falls, S. D.*, Luth. Normal School.
Johnson, Mattie, *Aurora, Ill.*, Tea., 8th Grade, W. Aurora.
Jones, Alfred Tennyson *Berlin*, Ass't, High School.
Loughlin, Dan, *Clark's Mills*, T., Gram. Dept., Manitowoc.
Lowell, Franklin A., *Madison*, Prin. of Schools, Berlin.
McFarland, George A., *Valley City, N. D.*, State Normal School.
McGinnis, James W., *Chicago*, Principal.
Maclennan, John J., *Mills Center*, Prin., Graded School.
MacNish, Ralph B., *Berlin*, Assistant, High School.
Manchester, John D., *Waupaca*, Student, Rush Medical College.
Maynard, Clara Elgar, *Platteville*, Student, U. W.
Michels, John, *Calumet Harbor*, Student, U. W.
Milne, William, *Elroy*, Student.
Morrissey, Edward, *Fontana*, Prin., Graded School, Alden.
Mueller, Olga, *La Crosse*, Teacher, H. S.
Mumbrue, Guy, *Cedar Lake*,
Mutschman, Charles J., *Boscobel*,
Nicholas, William, *Monticello*,
Olesen, Thora, *Chicago*,
Patterson, Enoch R., *Benton*,
Pratt, John Alexander, *Stoughton*, Prin., H. S., Prairie du Chien.
Pyre, Walton Hawkins, *Madison*, Ass't Prin., Evansville.
Replinger, Charles N., *Madison*.
Reynolds, Gertrude, *Tomah*, Teacher, 6th Grade.
Rowan, Emma Frances, *Sparta*, Student, U. W.
Rowe, Susie A., *Kenosha*, Ass't, High School.
Ruebhausen, Julia, *Watertown*, Student, U. W.
Ryan, Joseph, *St. Louis, Mo.*,
Sexton, Andrew R., *Madison*, Student, U. W.
Sheldon, Anna L., *Madison*,
Simpich, Albert John, *Madison*, Student, U. W.
Sims, Joseph Thomas, *Colby*, Teacher, Mosinee.
Smith, Harriet Ellen, *Milwaukee*, Prin., 16th Dist. Primary.
Stangel, Charles George *Tisch Mills*, Student, U. W.
Stephenson, Harriet F., *Madison*, Student, U. W.

Stetson, Dudley D.,	*Milwaukee,*	Student, U. W.
Steuber, Fred J.,	*Prairie du Sac,*	Ass't, High School.
Streckenbach, Louise,	*Green Bay,*	Teacher, Milwaukee.
Strong, Bertha Ann,	*Appleton,*	Teacher, Grammar Grade.
Swanson, Clara G.,	*Hudson,*	Teacher, 5th Grade.
Tallman, Stanley D.,	*Janesville,*	Student, U. W.
Taugher, Francis J.,	*Manitowoc,*	Teacher, 5th Dist., Liberty.
Thomas, Laura C.,	*West Superior,*	Tea., 8th Grade and H. S.
Thorson, Thowal John,	*Scandinavia,*	Student, U. W.
Tiffany, William E.,	*Plainfield,*	
Tomelty, Mary,	*Milwaukee,*	Teacher, 8th Grade.
Utendorfer, William,	*Elroy,*	Prin., High School.
Varney, George Andrew	*Babcock,*	Prin., Graded School, Dorchester.
Washburn, Andrew A.,	*Horicon,*	
Webster, Thomas,	*Elk Grove,*	Prin., H. S., Stockbridge.
Welles, Frances B.,	*Milwaukee,*	Teacher, H. S., Fond du Lac.
Welton, Adah,	*Richland Center,*	
Westphal, Herman F.,	*Manitowoc,*	Ass't, High School.
Whitmore, Eugene R.,	*Fennimore,*	Stu., Rush Med. Col., Chicago.
Wojta, Joseph Frank,	*Nero,*	Student, U. W.
Wolf, Helen M.,	*Rock Rapids, Ia.,*	Ass't, High School.
Wood, Minnie E.,	*Tomah,*	Teacher, Primary.
Woodbury, William W.,	*Sandwich, Ill.*	
Youker, Henry S.,	*Waterloo,*	Prin., H. S., Poynette.
Younge, Dillard,	*Mariette, Ga.*	Student, U. W.

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SUMMER SCHOOL OF LIBRARY SCIENCE.

Students in 1896.

Abbott, Katherine L.,	*Elgin, Ill.,*	Ass't Gail Borden Pub. Library.
Brown, Bertha,	*Eau Claire,*	Ass't, Public Library.
Clarke, Elva E.,	*Emporia, Kansas,*	Lib'n, Normal School.
Collins, Mabel,	*Great Falls, Mont.,*	Ass't, Valeria Pub. Lib.
Collins, Mary E.,	*Lincoln, Neb.,*	Ass't, State Library.
Earley, Maude A.,	*Chippewa Falls,*	Librarian, Public Library,
Gardner, Mary C.,	*Helena, Mont.,*	Assistant, Public Library.
Granger, Anna C.,	*Cleveland, O.,*	Ref. Lib'n, Public Library.
Hawley, Emma A.,	*Madison,*	Ass't, State Hist. Soc'y.
Hough, Georgia,	*Madison,*	Librarian Public Library.
Hughes, Alice,	*Madison,*	Librarian Public Library.
King, Anna C.,	*Merrill,*	Ass't, J. B. Scott Public Library.
Kunz, Minna,	*Battle Creek, Mich.,*	Librarian, Sanitarium.

Lucas, Stella,	*Freeport, Ill.,*	Ass't, Public Library.
MacDonald, Katharine I.,	*Menomonie,*	Lib'n, Mabel Tainter Library.
McDonnell, Anna H.,	*Green Bay,*	Librarian, Public Library.
Nichols, Sue Caroline,	*Fort Atkinson,*	Librarian, Public Library.
Packard, Ruby,	*Bloomington, Ill.,*	Ass't, Withers Pub. Lib.
Peterson, Georgia,	*Council Bluffs, Ia.*	
Pierce, Margaret G.,	*Cleveland, O.,*	Ass't, Public Library.
Poirier, Lydia M.,	*Duluth, Minn.,*	Ass't, Public Library.
Pope, Mary Compton,	*Helena, Mont.,*	Ass't, Public Library.
Reagh, Mary W.,	*Bellefontaine, O.*	
Stipp, Harley Herman,	*Grinnell, Ia.,*	Lib'n, Iowa College.
Webster, Ida May,	*Lincoln, Ill.,*	Librarian, Public Library.

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SUMMARY OF STUDENTS.

GRADUATES—110

Fellows	21
Graduates in Residence	70
Graduates studying *in absentia*	19

COLLEGE OF LETTERS AND SCIENCE—872

Fellows and Graduates	87

Senior Class—146

Ancient Classical Course	17
Modern Classical Course	26
English Course	45
Civic Historical Course	28
General Science Course	30

Junior Class—165

Ancient Classical Course	14
Modern Classical Course	37
English Course	48
Civic Historical Course	29
General Science Course	37

Sophomore Class—160

Ancient Classical Course	21
Modern Classical Course	31
English Course	15
Civic Historical Course	65
General Science Course	28

COLLEGE OF LETTERS AND SCIENCE—Continued.

Freshman Class—245

Ancient Classical Course	23
Modern Classical Course	43
English Course	36
Civic Historical Course	76
General Science Course	67
Adult Special Students	69

COLLEGE OF MECHANICS AND ENGINEERING—218

Fellows and Graduates	13

Senior Class—36

Civil Engineering Course	14
Mechanical Engineering Course	9
Electrical Engineering Course	13

Junior Class—46

Civil Engineering Course	15
Mechanical Engineering Course	13
Electrical Engineering Course	18

Sophomore Class—48

Civil Engineering Course	12
Mechanical Engineering Course	8
Electrical Engineering Course	28

Freshman Class—75

Civil Engineering Course	25
Mechanical Engineering Course	27
Electrical Engineering Course	23

COLLEGE OF AGRICULTURE—215

Graduates		6
Long Course		4
Short Course	Second Year	35
	First Year	70
Dairy Course		100

COLLEGE OF LAW—216	
Senior Class	73
Middle Class	30
Junior Class	113
SCHOOL OF PHARMACY—64	
Fellows and Graduates	4
Four Years' Course	11
Three Years' Course	29
Two Years' Course	20
SCHOOL OF MUSIC—145	
Collegiate — Second Year	35
Collegiate — First Year	46
Academic	64
TOTAL NUMBER OF STUDENTS	1,730
Twice enumerated 80, leaving as actual number	1,650

WISCONSIN SUMMER SCHOOL—127	
WISCONSIN SUMMER LIBRARY SCHOOL— 25	
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COLLEGE OF LETTERS AND SCIENCE.

Time Table of Elective Studies that Begin the First Semester.

	M	T	W	T	F	S
Prof. Austin:						
Physics 10		9		9		
Prof. Barnes:						
Biology 1	3		3			
Biology 1		3		3		
Prof. Birge:						
Physiology 4	8		8		8	
Prof. Cheney:						
Ele. Botany 20	8	8	8	8	8	
Botany 21 a	11				11	
Botany 21 b			11			
Prof. Coffin:						
European History 5	11	11	11	11	11	
Prof. Comstock:						
Astronomy 1	x		x		x	
Astronomy 2		x		x		
Astronomy 3		x		x		
Prof. Daniells:						
Chemistry 1	2	2	2	2	2	
Prof. Davies:						
Theory of Sound 8	2		2		2	
Prof. Ely:						
Dist. of Wealth 6		3	3	3		
Public Finance 11		4	4	4		
Prof. Frankenburger:						
Forensics 5	12		12		12	
Prof. Freeman:						
18th Century 9	10		10			
The Drama 12	9	9	9			
The Epic 13	10		10			
Miss Gay:						
French 1	9		9		9	9
French 3	11	11	11	11	11	
Prof. Giese:						
French 3		10	10	10	10	10
French 3	11	11	11	11	11	
French 12	12		12			
Prof. Haskins:						
Hist. of Middle Ages 3	11		11		11	
English Const. Hist. 8		12		12		
Hist. of Institutions 10		11		11		
Prof. Hobbs:						
Mineralogy 1	11	11	11	11	11	
Mineralogy 2		12			12	
Petrology 3	8	8	8	8	8	
Crystallogrophy 4	9		9		9	
Prof. Hubbard:						
Anglo Saxon 1	9		9		9	
Beowulf 3	8		8		8	
Chaucer 7	10		10		10	
Prof. Jastrow:						
Psychology 2		9		9		
Psychology 3	9		9		9	
		3		3		
Psychology 6 a	3					
Logic 16		10		10		
Dr. Jones:						
Economic Problems 4		9		9		9
Charities and Crime 7	2		2		2	
Economic Geography 2	9		9			
Dr. Kahlenberg:						
Physical Chemistry 8		8		8		
Prof. Kerr:						
Greek 8		11		11		

	M	T	W	T	F	S
Prof. Knowlton:						
Rhetoric 7		11		11		
Adv. Composition 8	11		11		11	
Prof. Laird:						
Greek 4	11				11	
Comp. Philology 3		8		8		
Sanscrit 4	10		10			
Prof. Miller:						
Histology 5		8		8		
Vert. Histology 6	9	9	9	9	9	
Vert. Anatomy 2	11	11	11	11	11	
Prof. Olson:						
Beginning Norse 1	12	12		12	12	
Norse 2	11	11	11	11	11	
Norse 3	10		10		10	
Icelandic 4		10		10		
Prof. Owen:						
Advanced French 6	11		11		11	
Spanish 1						
Prof. Parker:						
Musical Theory 1	5		5			
Elem'tary Harmony 2		4		4		
Advanced Harmony 3	11		11		11	
History of Music 6		3		3		
Prof. Parkinson:						
Const. Law 2	9		9		9	
Const. Law 3		9		9		
Eng. Const. Law 4		10		10		
International Law 8	10		10		10	
Mr. Pyre & Mr. Baker:						
Survey of Eng. Lit. 6	9		9		9	
	11		11		11	
	12		12		12	
Elizabethan Period 8	10		10		10	
English Essayist 16		12		12		
American Writers 20	12		12		12	
Prof. Raymond:						
Anthropology 1	11		11		11	
Sociology 3	10		10		10	
Telic Sociology 5	9		9		9	
Mr. Reinsch:						
Ele. Law 1		11		11		
Roman Law 6	12		12			
History of Law 8		12		12		
Hist. Pol. Thought 9	11		11			
Miss Remington:						
Historical German 9	12		12			12
Prof. Rosenstengel:						
German 10	9		9		9	
German 11	11		11		11	
German 12	11			11	12	
Prof. Scott:						
Ele. of Pol. Econ. 1		8		8		8
Money and Banking 3	8		8		8	
Theories of Value 8		12		12		
Prof. Sharp:						
Greek Philosophy 7	10		10		10	
Social Ethics 10		10		10		
Adv. Ethics 17		9		9		9
Prof. Slaughter:						
Latin 9	8		8		8	
Latin 10						8
Latin Seminary 13			9		9	
Latin 14	9					

COLLEGE OF LETTERS AND SCIENCE.

Time Table of Elective Studies that Begin the First Semester.

	M	T	W	T	F	S
Prof. Slichter:						
Analytic Mechanics 12	11		11		11	
Potential Theory 13		11		11		
Hydrodynamics 19	12		12			
Prof. Smith:						
Greek 5	11		11		11	
Greek Seminary 11						9
Greek Life 10				5		
Prof. Snow:						
General Physics 1		12		12		
General Physics 1	12		12			
Prof. Sober:						
Latin 4	2				2	
Latin 5			2			
Latin 6		2		2		
Latin 10		12		12		
Dr. Sparling:						
Ele. Administration 12		8		8		
Comp. Admin. Law 14		9		9		9
Municipal Law 13	8		8		8	

	M	T	W	T	F	S
Prof. Stearns:						
History of Phil. 8	10		10		10	
Aesthetics 18		8		8		8
Pedagogy 1	9		9		9	
School Supervision 2		9		9		
Philosophy 11		8		8		
Prof. Turner:						
American History 4		11		11		
History of the West 7	12		12		12	
Am. Hist. Seminary 11	2	2	2			
Prof. Van Hise:						
General Geology 1	12		12		12	
General Geology 1	12	12	12	12	12	
Prof. Van Velzer:						
Differential Eq's 8, 9	10		10		10	
Anal. Geometry 11	9	9	9	9	9	
The. of Substitu'ns 21		10		10		

COLLEGE OF LETTERS AND SCIENCE.

Time Table of Elective Studies that Begin the Second Semester.

	M	T	W	T	F	S
Prof. Birge:						
Physiology 4		8		8		
Prof. Barnes:						
Veg. Physiology 17		12		12		
Prof. Clements:						
Applied Geology 2	12	12	12	12	12	
Prof. Coffin:						
Hist. of 19th Century 6	11	11	11	11	11	
Prof. Comstock:						
Astronomy 2	x		x		x	
Astronomy 3		x		x		
Astronomy 4	x		x		x	
Prof. Ely:						
Taxation 12		4	4	4		
Prof. Freeman:						
The Novel 15	11		11			
Literary Criticism 17	12		12			
Prof. Frankenburger:						
Poetry and Fiction 6		12		12		
Prof. Hobbs:						
Blowpipe Anal. 3	8	8	8	8	8	
Prof. Hubbard:						
Anglo Saxon 2	8		8		8	
Hist. Eng. Language 4	10		10		10	
Eng. Grammar 4a		9		9		
Prof. Jastrow:						
Ex. Psychology 3	9		9		9	
Inductive Logic 17		10		10		
Psychology 6		9		9		
Dr. Jones:						
Statistics 1	9		9		9	
Prof. Laird:						
Comp. Philology 1					9	
Prof. Miller:						
Embryology 6	9	9	9	9	9	

	M	T	W	T	F	S
Prof. Parker:						
Counterpoint 4	11		11		11	
Prof. Parkinson:						
International Law 9	10		10			
Mr. Pyre:						
Victorian Era 11	10		10		10	
American Writers 16	12		12		12	
Prof. Raymond:						
Ethnology 2	11		11		11	
History of Sociology 4	10		10		10	
Dynamic Sociology 6	9		9		9	
Mr. Reinsch:						
Political Science 2		12		12		
European Law 7	12		12			
Prof. Scott:						
Elem'ts of Economics 1		8		8		8
Classical Economists 2	8		8		8	
Prof. Sharp:						
Hist. of Philosophy 9	9		9		9	
Philosophy 7		10		10		
Ethics 15	8		8		8	
Ethics 16		8		8		
Mr. Sparling:						
Am. Municipal Gov't 15	8		8		8	
Comp. Administr'n 16		9		9		9
Administrative Pol. 17		8		8		
Prof. Stearns:						
Introduction to Phil. 10	8		8		8	
Aesthetics 18 b	10		10		10	
Phil. of Education 3	9		9		9	
Pedagogy 5		9		9		
Pedagogy 6		10		10		
Prof. Turner:						
American History 4 b		11		11		

COLLEGE OF LETTERS AND SCIENCE.

Time-table of Required Studies of Freshman Year for 1897-8.

The figures following the subjects refer to the number of the courses. See pp. 83-145.

Hour.	Course.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8 A.M.	C. H.	¶Latin. Mathematics, 1, 2.	¶Latin.	Mathematics, 1, 2.	¶Latin.	¶Latin. Mathematics, 1, 2.	Mathematics, 1, 2.
9 A.M.	A. C. M. C. C. H. Eng. G. S.	Mathematics, 1, 2. Mathematics, 1, 2. English History, 2. Mathematics, 1, 2.	Anc. History, 1. Anc. History, 1. Rhetoric, 2. Eng. History, 2. Mathemat's, 1, 2.	Mathematics, 1, 2. Mathematics, 1, 2. English History, 2.	Anc. History, 1. Anc. History, 1. Rhetoric, 2. Eng. History, 2. Mathemat's, 1, 2.	Mathematics, 1, 2. Mathematics, 1, 2. English History, 2. Mathematics, 1, 2.	Mathematics, 1, 2. Mathematics, 1, 2.
10 A.M.	A. C. M. C. C. H. Eng. G. S.	Greek, 5, 6. Latin, 2. Anc. History, 1. German, 1. German. 5.	Greek, 5, 6. Latin, 2. Anc. History, 1. Rhetoric, 2. Rhetoric, 2.	Rhetoric, 2. Anc. History, 1. German, 1. German, 5.	Greek, 5, 6. Latin, 2. Anc. History, 1. German, 1. German, 5.	Greek, 5, 6. Latin, 2. Ancient History, 1. Rhetoric, 2. Rhetoric, 2.	Rhetoric, 2. German, 1. German, 5.
11 A.M.	A. C. M. C. C. H. Eng.	Latin, 2. Mathematics, 1, 2. ¶German, 1. Mathematics, 1, 2.	Latin, 2. Mathemat's, 1, 2.	Rhetoric, 2. ¶German, 1. Mathematics, 1, 2.	Latin, 2. Mathemat's, 1, 2. Mathemat's, 1, 2.	Latin, 2. Rhetoric, 2. ¶German, 1.	Mathematics, 1, 2. ¶German, 1. Mathematics, 1, 2.
12 M.	M. C.	German, 7. German, 1. English History, 2.	German, 7. German, 1. Eng. History, 2.	German, 7. German, 1. Eng. History, 2.	German, 7. German, 1.	Eng. History, 2.	Eng. History, 2.
3 P.M.	G. S.	Biology, 1.	Biology, 1.	Biology, 1.	Biology, 1.	Biology, 1.	

Time Table of Required Studies of Sophomore Year for 1897-8.

Hour.	Course.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
8 A.M.	Eng.		German, 2.	German, 2.	German, 2.	German, 2.	
9 A.M.	A. C. M. C. C. H. G. S.	Ger., 6, or French, 2 French, 1. Rhetoric, 3. French, 3.	Latin, 3. Latin, 3. German, 2. French, 3.	Ger. 6, or French, 2 French, 1. German, 2. Rhetoric, 3.	Latin, 3. Latin, 3. Rhetoric, 3. French, 3.	Ger., 6, or French. 2 French, 1. German, 2. French, 3.	Ger., 6, or French, 2 French. German, 2. Rhetoric, 3.
10 A.M.	A. C. M. C. C. H. Eng.	Greek, 5, 6. Rhetoric, 3.	Greek, 5, 6. German, 4. French, 1.	Rhetoric, 3. Rhetoric, 3. French, 1.	Greek, 5, 6. German, 4. Rhetoric, 3.	Greek, 5, 6. French, 1.	Rhetoric, 3. Rhetoric, 3. French, 1.
11 A.M.	Eng. G. S.	Eng. Literature, 5. ¶Mathematics, 4, 5.	¶Mathematics, 4, 5 French, 1.	Eng. Literature, 5. ¶Mathematics, 4, 5. French, 1.	¶Mathematics, 4, 5 French, 1.	Eng. Literature, 5. ¶Mathematics, 4, 5. French, 1,	
12 M.	A. C. M. C. C. H. Eng. G. S.	 Physics, 2.	Physics, 1. Physics, 1. §Physics, 1. ‡Physics, 1. French, 1.	 Physics, 2. French, 1.	Physics, 1. Physics, 1. §Physics, 1. ‡Physics, 1. French, 1.	 French, 1.	
2 P.M.	C. H. Eng. G. S.	§ Chemistry, 1. ‡Chemistry, 1. ¶Chemistry, 1.	§ Chemistry, 1. ‡Chemistry, 1. ¶Chemistry, 1.	§ Chemistry, 1. ‡Chemistry, 1. ¶Chemistry, 1.	§ Chemistry, 1. ‡Chemistry, 1. ¶Chemistry, 1.	§Chemistry, 1. ‡Chemistry, 1. ¶Chemistry, 1.	
3 P.M.	C. H. Eng.	§Biology, 1. ‡Biology, 1.	§Biology, 1. ‡Biology, 1.	§Biology, 1. ‡Biology, 1.	§Biology, 1. ‡Biology.	§Biology, 1. ‡Biology, 1.	

¶ But one of these two subjects need be taken. ‡§ But one of these three subjects need be taken.

COLLEGE OF MECHANICS AND ENGINEERING—FIRST SEMESTER.

ABBREVIATIONS.—T. E., Tophographical Engineering; M. D., Machine Design; R. E., Railway Engineering; E. E., Electrical Engineering; Str. E., Structural Engineering; Mech., Mechanics; S. E., Steam Engineering; H. E., Hydraulic Engineering; H. & C., Highways and Canals; d., daily.

Yr.	Course.	8	9	10	11	12	P. M. and Sat.
Freshman.	E. E.	Shop 1, 2, M., W., F.	Shop 1, 2, M., W., F.	Math. 1, d.	Fr. 1, or Ger. 9, d. Rhet. 1, M., W., F.	Ger. 9, or Spec. Ger. d. Rhet. 1, M., W, F.	Math. 8, M., W., F., 2-4, T, Th., 2 or 3.
	M. E.	Math. 8, F.	Math. 8, F.	Math. 1, d.	Math. 8, T., Th. Fr. 1, or Ger. 9, d. Rhet. 1, M., W., F.	Ger. 9, or Spec. Ger. d. Rhet. 1, M., W., F.	Math. 8, S., 9-1. Shop 1, 2, W., Th., F., 2-4.
	C. E.	Math. 8, d.	Math. 8, d.	Math. 1, d.	Fr. 1, or Ger. 9, d. Rhet. 1, M., W., F.	Ger. 9, or Spec. Ger. d. Rhet. 1, M., W., F.	T. E. 1, M., T., W., Th., 2-4.
Sophomore.	E. E.	Math. 3, 4, d.	Shop 5, 6, T.	Shop 5, 6, T. M. D. 2, M., W., F.	Physics 2, T., Th. M. D. 2, M., W., F.	Physics 2, T., Th. Physics 1, M., W., F.	Chem. 1, 2-4 d. Shop 5, 6, 8-12 Sat.
	M. E.	Math. 3, 4, d.	Shop 5, 6, M., F.	Shop 5, 6, M., F. M. D. 2, T., W., Th.	Shop 5, 6, M., F. M. D. 2, T., W., Th.	Physics 1, M., W., F.	Chem. 1, 2-4, d. Physics 2, 8-12 Sat.
	C. E.	Math. 3, 4, d.	Physics 2, Th. T. E., M., W., F.	Phys. 2, Th. T. E. 2b, M., T., or W., F., 1st 9 wks.	Phys. 2, Th. T. E, 2b, M., T., or W., F., 1st 9 wks. Math. 5, T., Th., last 9 weeks.	Phys. 1, M., W., F. Phys. 2, Th. Min. 1, T., F.	Chem. 1, 2-4, d. Math. 5, 11 Sat., last 10 wks.
Junior.	E. E.	M. D. 4, T., W., Th., F. Shop 7, M.	M. D. 4, T., W., Th., F. Shop 7, M.	E. E. 1, M., W., F. M. D. 4, T., Th.	Mech. 3a, 4a, d.		E. E. 1, M., T., Th., 2-6. Phys. 5, W., F., 2-5. Shop 7, Sat., 9-1.
	M. E.	M. D. 4, T, W., Th., F.	M. D. 4, T., W., Th., F.	M. D. 4, T., Th.	Mech. 3a, 4a, d.	S. E. 1, d., 12 wks. S. E. 2, M., W., F., last 6 wks.	S. E. 7, Sat. 8-12, last 6 wks. Mech. 5, T., 2 5. Shop 7, W., F., 2-5:30.
	C. E.	R. E., T. Mech. 2, M., W., F.	Str. E. 2a, T., Th. Mech. 2, M., W., F.	Mech. 3b, d.	S. E. 6, M., W. F., 1st 12 wks. S. E. 8, M., W., F., last 6 weeks. Str. E. 1, T., Th,	Str. E. 1, T., Th. S. E. 8, M., W., F., last 6 wks.	R. E. 1, F. 2-6, Sat. 8-12. Mech. 5, Th., 2-5.
Senior.	E. E.	S. E. 3, M.	S. E. 3, M. M. D. 6, T., Th.	S. E. 3, T., Th.	E. E. 6b, T. E E. 2b, M., W., F., 1st 9 wks. E. E. 3, M., W., F., last 9 wks.	E. E. 4, d.	E E. 2b, M, W, 2-6, 1st 9 wks E. E. 3, M, W, 2-6, last 9 wks E. E. 4. F., 2-6, Sat. 8-12. M. D. 6, T., Th., 2-6. S. E. 7. M. W., 2-6.
	M. E.	S. E. 3, T., Th.	S. E. 3, T., Th. M. D. 6, W., F.	S. E. 3, T., Th. E. E. 1, M., W., F.	M. D. 6, d.	M. D. 6, d.	S. E. 7, F., 2-6. E. E. 1, T., Th., 2-6. Shop 10, M., W., 2-5.
	C. E.	Mun. E. 1, M., W., F	R. E. 4, M., F. Str. E. 6, W.	Str. E. 5b, 6, T., Th., F. Str. E. 7b, M., W.	Str. E. 7b, M. W.	Geol. 1, d.	Str. E. 3, 4, T., 2-5, Th., 2-4. Elective, M., W., 2-4.

COLLEGE OF MECHANICS AND ENGINEERING—SECOND SEMESTER.

ABBREVIATIONS.—T. E., Topographical Engineering; M. D., Machine Design; R. E., Railway Engineering; E. E., Electrical Engineering; Str. E., Structural Engineering; Mech., Mechanics; S. E., Steam Engineering; H. E., Hydraulic Engineering; H. & C., Highways and Canals; d., daily.

Yr.	Course.	8	9	10	11	12	P. M. and Sat.
Freshman.	E. E.	M. D. 1, d.	M. D., 1, D.	Math. 2, 3, d.	Fr. 1 or Ger. 9, d. Rhet. 2, M., W., F.	Ger. 9 or Spec. Ger. d. Rhet. 2, M., W., F.	Shop, 2, 3, 4, 8-1 Sat.
	M. E.	Math. 8, d, 1st 9 wks M. D. 1, d, last 9 wks	Math. 8, d, 1st 9 wks M. D. 1, last 9 wks	Math. 2, 3, d.	Fr. 1 or Ger. 9, d. Rhet. 2, M., W., F.	Ger. 9 or Spec Ger. d. Rhet. 2, M., W., F.	Shop 2, 3, 4, M., F. 2-4. Sat. 11-1.
	C. E.	Perspect. d, 1st 4 wks.	Perspect. d, 1st 4 wks Surv. T, Th 4-10th wk	Math. 2, 3, d.	Fr. 1 or Ger. 9, d. Rhet. 2, M., W., F.	Ger. 9 or Spec. Ger. d. Rhet. 2, M., W., F.	36 hrs. field work. Shop 1, 3, 7 b. 2-4 d.
Sophomore.	E. E.	Math. 4, 6, d.	Mech. 1, d.		M. D. 3, M., W., M. D. 3, Th. or F. or	M. D. 3, F. Phys. 1, M., W., F. .....F.	Chem. 2, M., Th. 2-4. F., 2-6. Phys. 2, W., 2-4.
	M. E.	Mech. 1, d.	Math. 4, 6, d.		M. D. 3, M., W., M. D. 3, Th. or F. or Chem. 2, T., Th.	Phys. 1, M., W., F. .....F. Chem. 2, T., Th.	Phys. 2, W., F., 2-4. Chem. 2, T., 2-4.
	C. E.	Mech. 1, d.	Math. 4, d, 1st 12 wks.	T. E., T., Th.	T. E., T., Th., last 8 wks. Chem. 2, T., Th, 1st 8 wks. M. D. 3, M., W. M. D. 3, Th. or F. or	T. E, T., Th., last 8 wks. Chem. 2, T., Th., 1st 8 wks. Phys. 1, M., W., F. .....F.	T. E., 3 Sat. 8-1. T. E., 3, T., Th., 2-6 last 8 wks. Chem. 2, M., T., Th., 2-4 1st 6 wks. Phys. 2, W., F., 2-4. 1st 9 wks.
Junior.	E. E.	S. E. 4, M., W., F. Mech. 5, T., Th.	E. E, 2 a, M., W., F., last 11 wks, Mech. 5, T., Th.	S. E. 4, T., Th. 1st 10 wks. M. D. 5, W., F.	M. D. 5, d.	M. D. 5, d.	S. E. 7, F. 2-6; S. 8-12, last 8 wks. E. E. 1, Sat. 8-1, M., T., 2-6, 1st 7 wks. E. E. 2a, T., Th., last 11 wks Mech, 5, M. 2-5. Shop 8, 9, T., Th., 2-6.
	M. E.	S. E. 3, T., Th.	S. E. 3, T., Th. S. E. 2, M., W., F.	M. D. 5, W., F.	M. D. 5, d.	M. D. 5, d.	S. E. 3, Sat. 8-10. S. E. 7, Th., 2-6. Shop 8, 9, W., F., 2-6, Sat. 10-12.
	C. E.	Str. E. 7a, M., T., W., Th.	Str. E. 7a, M., T., W., Th. T. E. 4, F.	Mech. 4 b, T., Th., F. T. E. 4, M., W.	Str. E. 5a, M., W., F. R. E. 3, T., Th.		Astr. 5, 6, M., T., W., F., 2-4. Str. E. 2b, Th., 2-5. Mech. 4b, Sat. 8-1.
Senior.	E. E.	E. E. 4, F., 1st 9 wks. E. E. 6c, M., T., Th.	E. E. 4, d, 1st 9 wks.	E. E. 4, F., 1st 9 wks E. E. 5, M., T., Th. Discussion of Thesis. W.	E. E. 4, F., 1st 9 wks H. E. 1, M., T., W., 1st 9 wks. H. E. 2, M, F. last 9 wks	E. E. 6a, d., 1st 9 wks	H. E. 2. M., 2-6, last 9 wks. E. E. 4, Sat. 8-12, 1st 9 wks.
	M. E.	M. D. 6, d, 1st 8 wks.	M. D. 6, d, 1st 8 wks,	S. E. 3, M., W., F., 1st 10 wks. M. D. 6, T., Th., 1st 8 wks.	Shop 11, F.	H. E 1, M., T., W., Th., 1st 9 wks. H. E. 1, W., F., last 9 wks. Shop 11, F.	H E. 2, T., 2-6, last 9 wks. S. E. 7, W., 2-6, 1st 10 wks. Shop 11, Th., F., 2-6.
	C. E.	Str. E. 4, T., Th.	Str. E. 4, T., Th. R. E. 6, W., F.	Str. E. 4, T., Th. Mun. E. 2, M., W., F.	Str. E. 8, T., Th., Mun. E. 2, 4, M., W., F.	Geol. 5, d, 1st 6 wks. Geod. 6, W., F., Elective last 10 wks	Municipal Eng. 3, T., Th., 2-4, Elective last 10 wks.

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