

The University of Minnesota

THE GRADUATE SCHOOL

1912-1913



BULLETIN OF THE UNIVERSITY OF MINNESOTA
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1912							1913													
JULY							JANUARY							JULY						
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa
..	1	2	3	4	5	6	..	..	..	1	2	3	4	..	..	1	2	3	4	5
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26
28	29	30	31	..	..	..	26	27	28	29	30	31	..	27	28	29	30	31	..	..
..
AUGUST							FEBRUARY							AUGUST						
..	..	..	..	1	2	3	..	..	..	..	..	..	1	..	..	..	..	..	1	2
4	5	6	7	8	9	10	2	3	4	5	6	7	8	3	4	5	6	7	8	9
11	12	13	14	15	16	17	9	10	11	12	13	14	15	10	11	12	13	14	15	16
18	19	20	21	22	23	24	16	17	18	19	20	21	22	17	18	19	20	21	22	23
25	26	27	28	29	30	31	23	24	25	26	27	28	..	24	25	26	27	28	29	30
..	..	..	..	..	..	..	..	..	..	..	..	..	..	31	..	..	..	..	..	..
SEPTEMBER							MARCH							SEPTEMBER						
1	2	3	4	5	6	7	..	..	..	..	..	..	1	..	1	2	3	4	5	6
8	9	10	11	12	13	14	2	3	4	5	6	7	8	7	8	9	10	11	12	13
15	16	17	18	19	20	21	9	10	11	12	13	14	15	14	15	16	17	18	19	20
22	23	24	25	26	27	28	16	17	18	19	20	21	22	21	22	23	24	25	26	27
29	30	..	..	..	..	..	23	24	25	26	27	28	29	28	29	30	..	..	..	..
..	..	..	..	..	..	..	30	31	..	..	..	..	..	..	..	..	..	..	..	..
OCTOBER							APRIL							OCTOBER						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
6	7	8	9	10	11	12	6	7	8	9	10	11	12	5	6	7	8	9	10	11
13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18
20	21	22	23	24	25	26	20	21	22	23	24	25	26	19	20	21	22	23	24	25
27	28	29	30	31	..	..	27	28	29	30	..	..	..	26	27	28	29	30	31	..
..
NOVEMBER							MAY							NOVEMBER						
..	..	..	..	..	1	2	..	..	..	..	1	2	3	..	..	..	..	..	..	1
3	4	5	6	7	8	9	4	5	6	7	8	9	10	2	3	4	5	6	7	8
10	11	12	13	14	15	16	11	12	13	14	15	16	17	9	10	11	12	13	14	15
17	18	19	20	21	22	23	18	19	20	21	22	23	24	16	17	18	19	20	21	22
24	25	26	27	28	29	30	25	26	27	28	29	30	31	23	24	25	26	27	28	29
..	..	..	..	..	..	..	..	..	..	..	..	..	..	30	..	..	..	..	..	..
DECEMBER							JUNE							DECEMBER						
1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	
8	9	10	11	12	13	14	8	9	10	11	12	13	14	7	8	9	10	11	12	13
15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20
22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27
29	30	31	..	..	..	..	29	30	..	..	..	..	..	28	29	30	31	..	..	..

UNIVERSITY CALENDAR

1912-1913

The University year covers a period of thirty-eight weeks, beginning on the second Tuesday in September. Commencement Day is always the second Thursday in June.

1912

September	3	Tuesday	Registration closes except for new students
September	3-10	Week	Fees payable except for new students
September	10-16	Week	Entrance examinations, registration of new students, and payment of fees
September	11-17	Week	Military encampment of cadets
September	18	Wednesday	First semester begins
Sept. 30 - Oct. 5		Week	Second semester condition examinations in College of S., L., A., Agriculture, and Chemistry
November	27	Wednesday	Thanksgiving recess begins 6:00 p. m.
December	2	Monday	Thanksgiving recess ends 8:00 a. m.
December	20	Friday	Christmas vacation begins 6:00 p. m.

1913

January	7	Tuesday	Christmas vacation ends 8:00 a. m.
January	21	Tuesday	Registration for second semester closes
January	27	Monday	Final examinations begin
January	28	Tuesday	Payment of fees for second semester closes
February	5	Wednesday	Second semester begins
February	12	Wednesday	Lincoln's Birthday: a holiday
February	13	Thursday	First semester class reports due
February	22	Saturday	Washington's Birthday: a holiday
March	19	Wednesday	Easter recess begins 6:00 p. m.
March	27	Thursday	Easter recess ends 8:00 a. m.
March 31-Apr. 5		Week	First semester condition examinations in College of S., L., A., Agriculture, and Chemistry
May	30	Friday	Decoration Day: a holiday
June	2	Monday	Final examinations begin
June	7	Saturday	Second semester closes
June	8	Sunday	Baccalaureate service
June	9	Monday	Senior class day exercises
June	11	Wednesday	Alumni Day
June	12	Thursday	Forty-first Annual Commencement
June	13	Friday	Summer vacation begins

The University year for 1913-14 will begin Tuesday, September 9.

Program of Entrance Examinations 1912-13

Entrance examinations for admission to the various colleges of the University will be conducted according to the following schedule, in Room 205, Library Building, unless otherwise specified.

Any student finding a conflict in his program should report to the Registrar for adjustment.

Tuesday, Sept. 10	9 a. m.	Astronomy, Botany, Geology, Chemistry, Physiography, Zoology
	2 p. m.	American Government, History, Physics, Economics, Commercial Geography
Wednesday, Sept. 11	9 a. m.	English
	2 p. m.	German, French, Latin, Scandinavian
Thursday, Sept. 12	9 a. m.	Elementary Algebra
	2 p. m.	Higher Algebra
Friday, Sept. 13	9 a. m.	Plane Geometry
	2 p. m.	Solid Geometry

A representative of each department will be at the office of the head of the department each forenoon of entrance examination week from 9 to 12 to give information and advice.

THE UNIVERSITY

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges, and departments:

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

THE COLLEGE OF AGRICULTURE

THE COLLEGE OF FORESTRY, including—

FOREST EXPERIMENT STATIONS AT ITASCA AND CLOQUET

THE SCHOOL OF AGRICULTURE, including—

THE DAIRY SCHOOL

THE SHORT COURSE FOR FARMERS

TEACHERS' SUMMER TRAINING SCHOOL

THE SCHOOL OF TRACTION ENGINEERING

THE SCHOOL OF AGRICULTURE, CROOKSTON

THE SCHOOL OF AGRICULTURE, MORRIS

THE EXPERIMENT STATIONS, including—

THE MAIN STATION AT ST. ANTHONY PARK

THE SUB-STATION AT CROOKSTON

THE SUB-STATION AT GRAND RAPIDS

THE SUB-STATION AT DULUTH

THE SUB-STATION AT WASECA

THE SUB-STATION AT ZUMBRA HEIGHTS

AGRICULTURAL EXTENSION

BUREAU OF RESEARCH IN AGRICULTURAL ECONOMICS

THE LAW SCHOOL

THE COLLEGE OF MEDICINE AND SURGERY, including—

THE SCHOOL FOR NURSES

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES, including—

MINNESOTA SCHOOL OF MINES EXPERIMENT STATION

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

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The President of the University	
The Hon. ADOLPH O. EBERHART, Mankato	- - - - - <i>Ex-Officio</i>
The Governor of the State	
The Hon. C. G. SCHULZ, St. Paul	- - - - - <i>Ex-Officio</i>
The State Superintendent of Public Instruction	
The Hon. W. J. MAYO, Rochester	- - - - - 1913
The Hon. MILTON M. WILLIAMS, Little Falls	- - - - - 1913
The Hon. HENRY B. HOVLAND, Duluth	- - - - - 1914
The Hon. A. E. RICE, Willmar	- - - - - 1915
The Hon. CHARLES L. SOMMERS, St. Paul	- - - - - 1915
The Hon. B. F. NELSON, Minneapolis	- - - - - 1916
The Hon. PIERCE BUTLER, St. Paul	- - - - - 1916
The Hon. CHARLES A. SMITH, Minneapolis	- - - - - 1916

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 WILLIAM R. VANCE, Ph.D., LL.B., Dean of the Law School
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 ALFRED OWRE, B.A., M.D., C.M., D.M.D., Dean of the College of Den-
 tistry
 FREDERICK J. WULLING, Ph.D., LL.M., Dean of the College of Pharmacy
 WILLIAM R. APPELBY, M.A., Dean of the School of Mines
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 GEORGE F. JAMES, Ph.D., Dean of the College of Education
 HENRY T. EDDY, C.E., Ph.D., LL.D., Dean of the Graduate School
 ADA L. COMSTOCK, M.A., Dean of Women

THE GRADUATE SCHOOL

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and Mechanics, and Dean Emeritus 916 6th St. S. E.
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Professor of Anthropology 825 5th St. S. E.
CEPHAS D. ALLIN, LL.B., M.A., Assistant Professor of Political Science
112 Church St. S. E.
FRANK MALOY ANDERSON, M.A., Professor of History
1629 University Ave. S. E.
CHARLES MARTIN ANDRIST, M.L., Professor of French
706 Delaware St. S. E.
WILLIAM R. APPLEBY, M.A., Professor of Metallurgy 911 5th St. S. E.
GEORGE NEANDER BAUER, Ph.D., Professor of Mathematics
1115 E. River Road
JOSEPH W. BEACH, Ph.D., Assistant Professor of English
1801 University Ave. S. E.
RICHARD OLDING BEARD, M.D., Professor of Physiology
The Virginia, Lowry Hill
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827 University Ave. S. E.
CHARLES WILLIAM BENTON, Litt.D., Professor of the French Language
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ANDREW BOSS, Professor of Agriculture 1439 Raymond Ave., St. Paul
GISLE BOTHNE, M.A., Professor of Scandinavian Languages and Litera-
tures 1105 6th St. S. E.
WILLIAM E. BROOKE, B.C.E., M.A., Professor of Mathematics and Me-
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2137 Commonwealth Ave., St. Paul
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2109 Blaisdell Ave.
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112 Church St. S. E.
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412 Walnut St. S. E.
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1202 7th St. S. E.

*On leave of absence February 1, 1912, to February 1, 1913.

- THEOPHILUS L. HAECKER, Professor of Dairy and Animal Husbandry
1205 Raymond Ave., St. Paul
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914 7th St. S. E.

*Died September 5, 1912.

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*On leave of absence 1912-13.

- CHARLES PETER SIGERFOOS, Ph.D., Professor of Zoology
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- SAMUEL G. SMITH, Ph.D., LL.D., Professor of Sociology
The Aberdeen, St. Paul
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University Farm
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- NORMAN WILDE, Ph.D., Professor of Philosophy and Psychology
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3305 2d Ave. S.
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1120 6th St. S. E.
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- CLYDE H. BAILEY, Instructor in Chemistry 251 15th Ave. N.
- OLIVER BOWLES, M.A., Instructor in Geology 321 19th Ave. S. E.
- WILLIAM H. FRAZIER, B.S., Instructor in Soils 937 17th Ave. S. E.
- CHARLES E. JOHNSON, Ph.D., Instructor in Comparative Anatomy of
Vertebrates 714 16th Ave. S. E.
- A. WALFRED JOHNSTON, M.A., Instructor in Geology
417 Union St. S. E.
- CORNELIA KENNEDY, B.A., Instructor in Agricultural Chemistry
2504 4th Ave. S.

- WINFORD P. LARSON, M.D., Demonstrator in Pathology and Bacteriology
614 9th Ave. S. E.
- FRANKLIN R. McMILLAN, C.E., Instructor in Experimental Engineering
524 8th Ave. S. E.
- GUSTAV A. MAGNUSSON, M.D., Demonstrator in Pathology and Bacteriology
- WALLACE H. MARTIN, M.E., Instructor in Mechanical Engineering
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2213 Grand Ave.
- WIELAND L. OSWALD, Instructor in Agricultural Botany
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1316 7th St. S. E.
- RAYMOND V. PHELAN, Ph.D., Instructor, Extension Work in Economics
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- ANNA H. PHELAN, Ph.D., Instructor in Rhetoric
612 10th Ave. S. E.
- RUTH SHEPARD PHELPS, M.A., Instructor in Italian
East Sanford Hall
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and Political Science
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119 Union St. S. E.
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2541 Harriet Ave.
- EDGAR K. SOPER, B.A., Instructor in Geology
417 Union St. S. E.
- ELVIN C. STAKMAN, M.A., Instructor in Plant Pathology
1485 Cleveland Ave., St. Paul
- RODNEY M. WEST, B.A., Instructor in Agricultural Chemistry
2128 Knapp St., St. Paul

COMMITTEES

Standing Committees, of which the Dean is a member ex-officio.

Executive—WILDE, Chairman, term expires 1914; CLEMENTS and CRAIG, term expires 1913; CONSTANT and WHITE, term expires 1915.

Scholarships and Fellowships—LEE, Chairman, GRAY, SHENEHON.

Research and Publication—The Dean, Chairman; FLATHER, KLAEBER, NACHTRIEB, PIKE, ROBINSON, WESBROOK.

Editorial Board—JOHNSTON, Editor-in-Chief; APPLEBY, EMMONS, FRANKFORTER, MINER, SCHAFER, THOMAS.

THE GRADUATE SCHOOL

ORGANIZATION

The Graduate School includes in a single organization the graduate work of all colleges and schools of the University which offer opportunities for work in advance of that regularly pursued for the bachelor's degree.

The regulation and administration of the school is committed to the Dean and Faculty under the general direction of the President of the University.

THE FACULTY

The Graduate Faculty consists of deans of the various colleges and all those members of faculties of college rank who are offering graduate work.

The Dean is member ex-officio of all committees, and in the absence of the President of the University, is Chairman of the Faculty.

THE EXECUTIVE COMMITTEE

The Dean is assisted in the supervision and administration of the School by the Executive Committee, of which the Graduate Committee of the College of Agriculture is a special committee for that College.

It is the function of the Executive Committee to administer, in conjunction with the Dean, the rules and regulations governing the granting of the higher degrees, and to make exceptions to these rules whenever in its judgment the nature of the case may demand it. Furthermore the Committee passes upon the sufficiency of work offered by candidates for registration and for degrees, and certifies to the Faculty when candidates are entitled to receive degrees. It decides also under faculty rules upon the contents of the Graduate Bulletin, and edits the same.

DEPARTMENT COMMITTEES

Those members of each department* who offer instruction in the Graduate School constitute a Department Committee for the control and direction of the graduate study of that department. Each committee is required to hold regular meetings for the purpose of arranging the courses of graduate students, assisting and directing them in the choice of problems for investigation, assigning them to particular members of the department under whose special direction the students are to pur-

*In the Colleges of Agriculture and Forestry, the word "division" is equivalent in meaning to that of "department" in other colleges.

sue their investigation, and administering other matters pertaining to the graduate work of the department.

This committee has charge of the seminars of the department, which are defined in the Graduate School to consist of groups including not more than ten students, pursuing independent work upon problems. These are open to graduates only, or to specially qualified seniors.

ADMISSION

Any graduate holding a bachelor's degree or its equivalent from a reputable college or university will be admitted to the Graduate School without examination, and may register for such graduate work as he may be found by any department committee to be prepared to enter upon, but he will not thereby be admitted to candidacy for either of the higher degrees until his case has been duly considered and approved by the Executive Committee.

In order to enter upon any work whatever in the Graduate School the applicant shall present to the Registrar his credentials, preferably his diploma of graduation, and obtain from him a blank registration book in duplicate in which to inscribe the courses and work he desires to pursue. In case of doubt respecting the sufficiency of credentials, the Dean should be consulted.

He should then satisfy the various departments in which he desires to take graduate work as to his fitness to enter upon the proposed work, and should secure the signatures of the professors in charge of the work in his registration book, who thus certify that he is prepared to begin the work asked for. On the basis of these signatures, the Registrar will collect fees and admit to the work so approved.

REGISTRATION AND REPORTS

Every student should renew his registration at the beginning of each semester and have the work he is taking inscribed in his book with the proper signatures affixed. Applicants for degrees will observe the preceding regulations respecting admission and registration, and also the further steps indicated in what follows with reference to those degrees.

The original registration book will be preserved by the applicant and upon successful completion of graduate work will be signed from time to time by the instructors with whom the work is done. The duplicate will be placed in the hands of the Dean.

In order that due record may appear upon the books of the Registrar of all work done, each member of faculties in charge of the graduate work, major or minor, of any student, will transmit a formal report to the Registrar at the close of each semester, to certify to attendance during the semester, to satisfactory progress, and to the results of work done in any courses for which grades are given.

FEES

All students taking full work in this School are required to pay an incidental fee of fifteen dollars per semester, or a proportionate fee for less work; but members of the staff of instruction in the University may register for graduate work without payment of the incidental fee. Shevlin fellows are also excused from paying the incidental fees. Laboratory fees are charged in addition to those just mentioned at the same rate as those in the college where the work is taken.

THE SHEVLIN FELLOWSHIPS

Four graduate fellowships have been established by Mr. Thomas H. Shevlin of Minneapolis, as follows: One in Medicine, one in Chemistry, one in Agriculture, and one in Liberal Arts, each yielding \$500 per annum. They are awarded annually.

Before any appointment as fellow can take effect the candidate must have completed the course for the bachelor's degree.

Candidates for these fellowships will file their application before May 1st with the Dean of the Graduate School and state their previous education, their attainments, and the graduate work they desire to enter upon. They will also give suitable references.

Shevlin fellows will devote their entire time to the graduate work for which they are registered, and will not engage in private tutoring or any outside remunerative employment during the academic year, nor will they be required during this time to render any service to the University. They may in cases of exceptional merit be reappointed for a second year.

THE ALBERT HOWARD SCHOLARSHIP

Under the last will and testament of Mr. James T. Howard, of the town of St. Johnsbury, Vermont, a fund was left to the University to establish a scholarship to be known as the Albert Howard Scholarship. This has been devoted to the encouragement of graduate work in Liberal Arts. The fund yields \$240 annually. Candidates will file applications in the same manner as for Shevlin fellowships.

MASTER'S DEGREES

The degree of Master of Arts (M.A.) is, in general, conferred for advanced non-technical study; the degree of Master of Science (M.S.) for advanced technical study, in such subjects as Agriculture, Industrial Chemistry, Engineering, etc.

Residence.—A minimum of one year in residence is required for a master's degree. An exception may be made in favor of graduates of this University and those graduates of universities of equal rank, who

are teaching in Minnesota, who may be permitted to do half their work in absentia when suitable arrangements can be effected for carrying it on.

Candidates will not be considered to be in residence unless they are under the immediate supervision of an instructor. The location of the work, however, is not determinative, and when its character makes it desirable, one-half of it may be done in the field.

Assistants and instructors who give more than ten hours of assistance or three hours of class-room instruction per week will not be permitted to take the master's degree in one year.

In cases where work is permitted in absentia, or the candidate is devoting time to work other than that pertaining to his degree, a longer time than one year will be required to attain the master's degree, subject to the decision of the Executive Committee.

Candidacy for the Master's Degree.—Any Bachelor, a graduate of this University or of any other university or college with equivalent requirements for its bachelor's degree, will be admitted as candidate for the corresponding master's degree on the basis of a course of graduate work approved by the Executive Committee, provided it appears that the applicant has adequate preparation to enter upon the work proposed.

In case of inadequate preparation, or a bachelor's degree obtained for work below the standard just mentioned, the candidate will be required to take without credit such preliminary work as in the judgment of the Executive Committee the case may require, before the applicant is admitted to candidacy.

Work Required for Master's Degree.—Every candidate for a master's degree will be registered for a major in some department and one minor in a department approved by the Executive Committee.

The Major Work.—The major work of every candidate will center in his individual problem or thesis, which must be selected in a department in which the candidate has had at least three years of work if it be a department open to freshmen, or two years of work if it be a department not open to freshmen. Part or all of this preliminary may consist of designated prerequisites.

The work on the thesis will be done in the department seminar or under the personal direction of the instructor to whom the candidate has been assigned, who will meet him for conference if possible, at least once a week. It will occupy at least one-half of the candidate's time.

Selection of Problem for Thesis.—At least one and one-half semesters before a candidate comes up for his degree he will choose with the advice and consent of the committee of the department in which his major lies, his specific problem for research or investigation, and report the same to the Dean.

Other Work Including the Minor.—Each candidate will, in addition to his thesis, take graduate courses selected from those offered in this Bulletin amounting to not less than six or more than nine scheduled hours each semester. Of these one course at least must be in a department approved as a minor by the Executive Committee. The minor

subject must be selected in a department in which the candidate has had at least one year of work, or he must have had, in a closely allied department, a year's work which is actually designated as a prerequisite to the minor subject.

No credit toward a master's degree will be granted for work done as an undergraduate, except by permission of the Executive Committee granted at the time of registration.

Preliminary Notice.—Each candidate for master's degree at any Commencement is required as a preliminary to notify the Dean in writing by the first of the preceding May of his intention to present himself for the degree, and state the work which he will offer for the degree; including the major, the minor, the courses he has passed and is to pass, the subject of his thesis, and the names of those with whom the work is done. This statement should also be endorsed as approved by the Chairman of the Committee in charge of his major.

Examinations for Master's Degree.—All candidates for this degree are required to take the regular examinations in all the courses for which they are registered. No credit toward the degree shall be granted for any work in which a grade lower than "good" has been received.

In addition to the written reports and partial examinations during the progress of the major, a final written examination upon the major is required. If all these examinations are found to be satisfactory by the professor in charge of the candidate's major, he will submit the thesis for approval to a committee designated as the candidate's committee. The concurrence of this entire committee is required for the approval of any thesis.

The Candidate's Committee.—The professor under whose immediate direction the candidate is pursuing his investigation shall be chairman of this committee, and the other members of the committee shall be those under whom he is doing his other work, and to these shall be added a member of an allied department, appointed by the Executive Committee.

Master's Thesis.—Each candidate will present at least three weeks before Commencement of the academic year in which his degree is to be granted, a thesis written in acceptable English and embodying the satisfactory study of his problem. In it he must show ability to work independently, and give evidence of power of independent thought both in perceiving problems and in making satisfactory progress toward their solution, as well as exhibit familiarity with the bibliography and sources of material in some special field.

Form of Thesis.—The thesis is required to be in triplicate in order to facilitate its consideration, and will be typewritten on one side only of each sheet, the size of which will be eight and one-half by eleven inches with a margin of one and one-quarter inches on all four sides of the text. One of these three may be a carbon copy, on cheap paper, but the original and one other which are intended for binding and preservation in the Library must be on paper of good linen stock.

To entitle the candidate to his diploma, the two intended for binding must be placed unbound in the hands of the Registrar one week before Commencement.

The title page of the thesis should be in the following form: (title of thesis). A thesis submitted to the Faculty of the Graduate School of the University of Minnesota by (name in full) in partial fulfillment of the requirements for the degree of (name of the degree and date).

Printed theses whose title pages conform to the regulation just stated will also be accepted.

The Final Oral Examination.—If the candidate's committee concur in approving his thesis, the Chairman will call a committee meeting at least two weeks before Commencement, where complete reports upon all the examinations and other work of the candidate, including the thesis, shall be presented. If the reports be found to be satisfactory, the committee shall have the candidate brought before them and proceed to such oral examination upon all the work of the candidate, including his thesis, as the circumstances may require.

It will be the duty of this committee to consider and pass upon the sufficiency and character of the work of the candidate in its entirety, and in case they regard him as entitled to a degree, to send, at least ten days before Commencement, a statement of the fact to the Dean, together with the carbon copy of the thesis and the registration book of the candidate for the consideration of the Executive Committee.

The Colleges of Agriculture and Forestry.—In these colleges the procedure respecting the final oral examination is governed by the regulation just stated, except that the candidate's committee will report to the Dean of his college in order to obtain the concurrence of the special Graduate Committee of the college, before final report is made to the Dean of the Graduate School.

Furthermore each candidate in these colleges is required to have his thesis in the hands of the special Graduate Committee of the college by April 1st. If any extension of time is granted, the thesis will not be accepted later than May 1st.

The other regulations previously stated, respecting number of copies and form, are to be observed in these colleges also.

Note on the Grouping of Graduate Courses in the Departments of Comparative Philology, English, German, and Scandinavian

Candidates for the Master's Degree in these departments are advised to choose at least three courses from one of the following groups:

Group I. Germanic Philology.

Comparative Philology 6 (Comparative Phonology alternating with Advanced Science of Language), 7 (Comparative Grammar), 8 (Gothic), 9 (Urgermanische Grammatik), 10 (Old Saxon), 11 (Old High German).

English 33 (Anglo-Saxon), 34 (Beowulf).

German 13a (Middle High German), 16a (History of the German Language).

Scandinavian 13 (History of the Scandinavian Languages), 14 (Old Norse).

Group II. Earlier Germanic Literature.

Comparative Philology 10 (Old Saxon).

English 3 (Middle English), 4 (*Piers the Plowman*), 22 (Elizabethan Literature), 32 (Drama in England before Shakespeare), 34 (*Beowulf*).

German 12a (The Reformation), 13a (Middle High German), 15 (Seminar in German Drama).

Scandinavian 10 (Early Norwegian Literature), 12 (Swedish Literature), 14 (Advanced Old Norse).

Group III. Later Germanic Literature.

English 9a and 9b (18th Century Literature and the Romantic Movement), 10 (English Humorists), 11 (17th Century Prose), 13 (Drama, Structure and Evolution), 31 (Meredith), 35 (Drama as a Literary Form), 37 (Metaphysical Poets), 38 (Political Prose of the Protectorate).

German 12b (*Faust*), 13b (Age of Frederick the Great), 16b (Drama of Schiller), 17a (History of German Literature), 17b (Lyric Poetry of the 17th and 18th Centuries), 10 (German Literature of the 19th Century).

Scandinavian 6 (Modern Norwegian Literature), 7 (Swedish Literature), 8 (Henrik Ibsen), 11 (Modern Danish Literature), 12 (Swedish Language and Literature), 15 (Strindberg).

DOCTOR'S DEGREES

Two degrees of this grade, namely: Doctor of Philosophy (Ph.D.), and Doctor of Science (Sc.D.), are conferred for attainments still more advanced than are required for the corresponding bachelor's and master's degrees. The doctor's degree is granted, not on the basis of the successful completion of a definite amount of prescribed work, but solely in recognition of the candidate's high attainments and ability in his special field, to be shown, first, by the preparation of his thesis, and, second, by successfully passing the required examinations covering both the general and the special fields of the candidate's subjects as detailed later.

Candidates for the doctor's degree must devote at least three years of graduate study to the subjects approved for candidacy, of which the last year must be spent in residence at the University of Minnesota.

This requirement of time devoted exclusively to work toward the degree will not be met by candidates who merely devote the intervals of professional or other regular employment to graduate work. Such candidates will sometimes need to spend a period two or three times as long as that just mentioned. It is usually not advisable for persons so engaged to try to become candidates for a doctor's degree, but rather to undertake only such special graduate work as they may find to their advantage, without reference to any degree.

The same definition of residence applies in this case as in that already given in connection with the master's degree.

Assistants and Instructors.—The restriction mentioned in connection with the master's degree, whereby assistants and instructors largely engaged in class-room and other instructional work are debarred from obtaining full credit for time so spent, toward a degree, applies equally to work for the doctor's degree.

Members of the staff of instruction above the rank of instructor will not be permitted to take a doctor's degree at this University. There is no objection however to their registering for graduate work at this University and credit so obtained may be presented elsewhere.

Preliminaries to Candidacy.—A graduate student applying to be enrolled as candidate for a doctor's degree should fulfil the requirements already specified for those applying for the master's degree and, in addition, possess a reading knowledge of French and German certified by the professors respectively in charge of those languages. Knowledge of Latin will also be required in certain cases, when for example, the major is in medieval history, or philosophy, as the department may prescribe.

The applicant must, moreover, have made before enrollment such noteworthy advancement in his major as to secure the written approval of his candidacy by the department in which he proposes to take his major.

Such written approval should state that in view of the work already done by the applicant the department has become convinced of his capacity and of his probable ability to carry through an investigation in his special field to a successful conclusion and embody it in a satisfactory thesis, and furthermore is prepared to accept him as candidate.

This approval of the department will after due consideration be passed on by the Executive Committee. It will frequently not be possible to secure such enrollment before the completion of one year of study in the Graduate School, but it must be secured at least a year before attaining the degree.

Under these circumstances it will ordinarily be advisable for the candidate to spend the first year in attaining the master's degree as part of the work leading to the doctor's degree, since that procedure is likely to furnish a decisive test of capacity for advanced study, as well as such valuable experience in preparation of thesis material as to settle definitely the question of candidacy for the doctor's degree.

Preliminary Work, Major and Minor Work.—The requirements already detailed in reference to the distribution and kind of work for the master's degree hold for the doctor's degree also, but in this case the special problem for the thesis must be selected with the advice and consent of the department committee in which the candidate's major lies, at least one year before the degree is to be conferred. Announcement of the fact must be transmitted to the Executive Committee through the Dean, together with the written approval of the department, before the beginning of the last academic year. On recommendation of the department committee of the major, the Executive Committee may excuse the candidate from complying with the above requirement as to a part or the whole of the additional courses, in order that more time may be devoted to the thesis; such permission should be endorsed upon the registration book by the Dean, or the secretary of the Executive Committee. The work upon the minor should not extend into the candidate's final year.

Preliminary Notice.—Each candidate for a doctor's degree at any Commencement will notify the Dean in writing by the first of the preceding February of his intention to present himself for the degree, and he will make a full statement of the work which he will offer for the degree, his major, his minor, and the subject of his thesis, together with the names of those with whom the work is being done. The statement

should be endorsed as approved by the chairman of his major department.

Examinations for the Doctor's Degree.—Candidates for the doctor's degree are required to take the regular examinations in all the courses for which they are registered, as in case of the master's degree.

Candidates are required to take two degree examinations, a preliminary and a final. The preliminary degree examination is a written examination upon the minor subject or subjects given by the department committees concerned. Upon recommendation of a department committee, this examination may be given in connection with the courses taken by the candidate, provided that such examination be a more exhaustive one than that given to other students taking such courses. When the preliminary examination is not given in connection with a course, it shall be taken not less than six months prior to the final examination. All such examinations must be approved as satisfactory by the department committee concerned and so certified to on the candidate's registration book before he can be admitted to final examination on his major, and when so certified to will be final for that subject.

The Thesis must give evidence of originality and power of independent investigation, and embody results of research, which form a real contribution to knowledge, as well as exhibit mastery of the literature of the subject and familiarity with the sources of knowledge. The matter must be presented with a fair degree of literary skill, and the thesis must contain such extended references to the bibliography of the subject as to make it in every way a scholarly production.

It must be approved as satisfactory by the candidate's committee before he can be admitted to his final oral examinations. In the Colleges of Agriculture and Forestry the doctor's thesis must conform in its time of presentation to the same rules as those of the master's thesis in those colleges, as already given.

Presentation of Doctor's Theses.—At least four weeks before Commencement the candidate will present to the chairman of his committee his thesis typewritten in triplicate copy to facilitate reading by the Committee. No special size or form is required, since it is to be printed subsequently.

The Candidate's Committee.—In case of the doctor's degree the candidate's committee will include the same members as in the case of master's degree, and will be enlarged so as to include, besides these, the department committees in which the candidates' major and minor subjects lie, and such other members of the Faculty as the Dean may appoint. It is the duty of the Chairman to call the meetings of this committee and duly inform the Dean in writing, of the time and place of such meetings as are held for final oral examinations.

Doctor's Final Examinations.—The final examinations on the major will be both written and oral.

The written examinations will occur at least four weeks before Commencement, and will be conducted by the department com-

mittee of the candidates' major. It will cover in an exhaustive manner the whole field of the major.

If the thesis, as well as the written examination on the major, are adjudged to be satisfactory, and all other requirements have also been met, the candidate's committee enlarged as previously provided for, will be convened by its chairman at least two weeks before Commencement and proceed to the final oral examination. At the conclusion of the oral examination, after the candidate has withdrawn, the committee will canvass the work of the candidate as a whole, and in case it regards him as entitled to his degree, it will report the fact to the Dean at least twelve days before Commencement, and transmit to him for the use of the Executive Committee, two copies of the thesis and the final written examination papers of the major and minor subjects, together with his registration book.

Printing Theses, etc.—The candidate will have a copy of his thesis deposited with the Registrar one week before Commencement together with a sufficient bond or such sum of money as according to the estimate of the Registrar, will be required to print one hundred copies of it for the use of the University, and as many additional copies as the candidate may order for himself.

Presentation to the Faculty.—Each candidate recommended by the Executive Committee of the Graduate School for a doctor's degree will be presented at a meeting of the Faculty called for the purpose, by the professor in charge of his major subject, who will then read a written statement of the academic life of the candidate, of the character and scope of his examinations, and the scope and value of his thesis.

The candidate will be asked to give a brief outline of his research, and any member of the Faculty will then be at liberty to propound any questions he will respecting the candidate to his instructors or to the candidate himself respecting his work. Upon the evidence before it the Faculty will then decide by vote whether the candidate shall be recommended to the Regents for his degree.

DEPARTMENTAL STATEMENTS

AGRICULTURAL CHEMISTRY AND SOILS

RALPH HOAGLAND, B.Agr., Professor of Agricultural Chemistry and
Soils and Chief of Division

15 2d fl. Chemistry Bldg., University Farm

WILLIAM H. FRAZIER, B.S., Instructor in Soils

12 2d fl. Chemistry Bldg., University Farm

RODNEY M. WEST, B.A., Instructor in Agricultural Chemistry

16 2d fl. Chemistry Bldg., University Farm

CORNELIA KENNEDY, B.A., Instructor in Agricultural Chemistry

15 2d fl. Chemistry Bldg., University Farm

CLYDE H. BAILEY, Instructor in Agricultural Chemistry

5 1st fl. Chemistry Bldg., University Farm

8. Human Nutrition and Dietetics Miss KENNEDY

Three credits (six hours per week); second semester. Elective.
Open to seniors who have completed Courses 6 and 7.

An advanced course arranged to give the student a practical understanding of the problems of nutrition and laboratory methods employed in such work. The results of the more important human nutrition investigations will be studied, and, in addition, each student will be required to carry on an original investigation with some problem of nutrition and to report the results in a thesis.

10. Chemistry of Wheat and Its Milled Products Mr. BAILEY

Three credits (six hours per week); first semester. Elective. Open
to seniors who have completed Course 7.

This course is designed to meet the needs of those who wish to become familiar with the chemistry of the milling industry. It includes the determination of water, protein, ash, starch, sugar, gliadin, and glutenin, fiber in wheat flour and mill feeds. Special attention is paid to the composition of wheat as affecting the quality of flour for bread making. Provision has been made for conducting milling tests with wheat, and baking and other physical tests with flour.

13. Chemistry of Agricultural Products and By-Products Mr. WEST

Three credits (three hours per week); second semester. Elective.
Open to seniors who have completed Courses 5 and 7.

Lectures will cover the composition of the principal products and by-products of agriculture and their utilization as raw material in the various industries.

18. Analysis of Fertilizers Mr. FRAZIER

Three credits (six hours per week); first semester. Elective. Open
to seniors who have completed Courses 15 and 5.

Laboratory practice in the analysis of fertilizers according to methods outlined by the Association of Official Agricultural Chemists. The object of this course is to prepare students as analysts in fertilizer control work.

11. Advanced Agricultural Analysis Mr. HOAGLAND

Three credits (six hours per week); second semester. Elective.
Open to those who have completed Course 7.

This course offers an opportunity for those who wish to pursue work along some special line in agricultural or food chemistry. Work such as digestion experiments, analysis of dairy products, composition of crops at different stages of growth, etc., may be taken if desired. Students desiring to take this course should arrange for it before the close of the junior year so that material may be obtained for the work.

19. Research Work in Soils Mr. HOAGLAND

Three credits (six hours per week); second semester. Graduate course. Open to those who have completed Courses 14 and 17.

Special opportunity will be given students in this course to choose some line of investigation, and do original work. A thesis will be required giving all previous data, together with results of original work.

AGRICULTURAL ENGINEERING

JOHN T. STEWART, C.E., Professor of Agricultural Engineering and Chief
of Division 7 Main Bldg., University Farm

15. Special Problems Mr. STEWART

Three credits, minimum; nine credits, maximum. Open to graduates
of Engineering and Agricultural Colleges.

Investigation, collection of data, and compilation of facts relating to the various problems of Engineering as applied to Agriculture. Offered as special problems to individual students who have the necessary preparation for pursuing the line of work desired.

AGRONOMY AND FARM MANAGEMENT

ANDREW BOSS, Professor of Farm Management and Chief of Division
21 1st fl. Main Bldg., University Farm

COATES P. BULL, B.Agr., Associate Professor of Agronomy
23 1st fl. Main Bldg., University Farm

4. Thremmatology Mr. BULL

Three credits (three hours per week); first semester. Required of
seniors in Agricultural Course. Open to those who have completed
Botany 1, Zoology 1.

Heredity, variation, laws of breeding, the art of breeding, improvement by nature and under scientific experimentation, securing foundation stocks, value of using very large numbers, immense value of the occasional individual which can transmit qualities of peculiar value, use of an ideal, use and misuse of the score card, both numerical and graphic, intrinsic qualities, fancy points and distinguishing marks, statistical methods in breeding pedigree records of efficiency, fundamental principles underlying the arrangement of the record books, bibliography and terminology, study of literature of breeding.

5. Plant Breeding Mr. BULL

Three credits (three hours per week); second semester. Required
of seniors in Agricultural Course. Open to those who have completed
Botany 1, Agronomy 3 and 4.

Botany of the reproductive organs of field crops, field crop nursery management, producing new qualities of hybridizing and by change of environment, hybridizing versus cross-breeding, in-breeding and self-fertilization, originating varieties and improving standard varieties by selection and by hybridizing, followed by selection, methods of disseminating new varieties, seed and plant introduction, experimentation in the theories relating to heredity, variation and practical breeding, seed growing as a farm business, seed merchandising, and the breeding of each of the various field crops grown in Minnesota.

7. Farm Management

Mr. BOSS

Three credits (three hours per week); second semester. Required of seniors in Agricultural Course. Open to those who have completed Agronomy and Farm Management 2, Economics 1.

This course is offered with a view to emphasizing the business side of farming. It includes classes of farms; comparisons of types of farming; the adjustment of crops to location, market, and live stock; the systematic arrangement of crops in rotation; the effect of cropping systems on soil productivity and crop yields; the regular employment of capital, and the employment and distribution of labor. Special attention is given to the reorganization of farm plans. Each student is required to draft a plan of a farm in which he is interested, where some specialized type of farming is followed; to submit a business statement of the fixed and operating capital employed, together with the cost of operation, the revenue, and the net profit.

13. Plant Breeding

Mr. BULL

Six credits (minimum). Open to those who have completed two years in Botany, Agriculture 1, or equivalents. Thremmatology and Cytology are required, but may be taken as extra work during the course.

This course deals with the history, development, and improvement of field crops; with the technique of plant manipulation and nursery methods; with the selection and hybridizing of plants, and with the laws of evolution, heredity, probabilities, etc. Seminar work will be a feature of the course. The course will also include such research as may be advisable in view of the previous training of the candidate. The field crop nursery, the laboratory, and the plant breeding material of the Experiment Station are available to students for studies in experimental breeding.

14. Special Agronomic Problems

Mr. BULL

Six credits (minimum). Open to those who have completed two years in Botany, Agriculture 1 and 2, or equivalents.

The choice of subjects will be left primarily with the candidate; but it must be approved by the Chief of the Division and by the committee in charge of graduate work. Facilities similar to Course 13 are available.

15. Advanced Farm Management

Mr. BOSS

Six credits (minimum). Open to those who have completed Agriculture 1, Elementary Economics, Agriculture 6, or equivalent, Farm Management 7.

This course calls for the reorganization and business development of some large farm project. Inventory of equipment; plans for buildings; estimates and costs of improvements or of changes required on the farm must be included. Forms of accounting and labor distribution and cost for the farm specified must be included; and a complete working outline and business statement for the farm in question furnished on the close of the work. The cost of production records at the station, covering a period of ten years, are available, and access to the data from numerous demonstration farms and co-operative farm management farms now under supervision of the University will be given the student for investigation.

16. Farm Management Surveys Mr. Boss
 Credit, six hours (minimum). Open to those who have completed Elementary Economics, Agricultural Economics, Courses 11 and 7 (Agronomy and Farm Management) or equivalents. May be chosen as a major or minor subject.

Special work in making farm management surveys of the farms of a certain territory or of special types of farming. Studies of the cost of producing certain farm products may also be undertaken in connection with the statistical route work of the division.

ANATOMY

THOMAS G. LEE, B.S., M.D., Professor of Anatomy and Director of the Department of Anatomy

JOHN B. JOHNSTON, Ph.D., Professor of Comparative Neurology

RICHARD E. SCAMMON, Ph.D., Assistant Professor of Anatomy

Departmental Offices in Institute of Anatomy

The new institute of Anatomy offers excellent facilities of all kinds to graduate students who wish to take advanced work or to pursue investigations in any branch of human or comparative anatomy. Students may elect either majors or minors for the master's or doctor's degree in this department.

1. Histology and Splanchnology of Man and Vertebrates

Messrs. LEE, HILTON, and ALLEN

Three lectures and nine hours laboratory per week; third year, first semester. Open to those who have completed Zoology 1 or equivalent.

The structure and properties of protoplasm; the cell, its structure; the phenomena of cell division. A comparative study of the histology of the epithelial, connective, and muscular tissues, the blood, and the vascular and lymphatic systems of man and vertebrates, followed by a comparative study of the anatomy, gross and microscopic, of the various organs of the alimentary, respiratory, and urogenital, cutaneous, vascular, and lymphatic systems.

2. Comparative Embryology of Man and Vertebrates Messrs. LEE,

JOHNSTON, HILTON, ALLEN, and ASSOCIATES

Two lectures and six hours laboratory per week; third year, second semester. Open to those who have completed Zoology 1 or equivalent.

A comparative study of reproduction, the germ cells, fertilization, cleavage, implantation of ovum, formation of germ layer, fetal membranes, placenta, formation of body. The histogenesis of tissues, development of organs. The course includes practical work upon a large collection of series of embryos cut in various planes and representing all phases of development. The elements of teratology are considered as far as time permits.

5. The Human Nervous System Messrs. JOHNSTON and HILTON

Two lectures and seven hours laboratory; first semester. Open to those who have completed Anatomy 1 and 2; or Zoology 2 or 5.

The special sense organs and the central nervous system are studied by dissection and in microscopic preparations. The student makes a full dissection of the sense organs, and of the fiber paths in all segments of the human brain. Each member of the class is supplied with a series of sections of the brain stem (every twentieth transverse section) and with numerous preparations of the spinal cord, cerebellum, cortex, and other regions

stained by the Nissl, Golgi, Weigert, and other methods. In these the fiber tracts and nerve centers are worked out in comparison with the dissections. A large collection of mammalian and fetal and adult human preparations is used for demonstration.

This course may precede or follow Course 16. Both should be taken by candidates electing neurology as a major for the M.A. or as a minor for the Ph.D. degree.

16. Comparative Neurology of Vertebrates Mr. JOHNSTON

Two lectures and eight laboratory hours; either semester. Open to those who have completed Zoology 2 or 5; or Anatomy 1 and 2.

Intended for graduates; open by permission to juniors and seniors who meet the requirements. See note to Course 5. This course should be taken by students preparing for teaching in neurology.

19. Neurological Technique Mr. JOHNSTON

Three credits (six hours laboratory per week); either semester. Elective. Open to those who completed Course 1.

Practical work in the preparation of the nervous system for gross and microscopic study.

21. Anatomical Technique* Mr. LEE

Four credits (six hours laboratory, one hour technic); either semester. Open to those who have completed Course 1.

An elective course of lectures and practical laboratory work. The work consists of a careful study of the principles and practice of microtechnique, fixation, sectioning, staining, making drawings for illustrations, methods of reconstruction, injection, corrosion methods, museum methods, etc., of special value to those who intend qualifying for laboratory positions.

17. Spinal Cord, Brain Stem, and Cerebellum Mr. JOHNSTON

Either semester. Elective. Open to those who have completed Course 5 or 16.

Normal and experimental studies of the structure of the central mechanism involved in reflex actions.

18. The Evolution and Structure of the Cerebral Cortex Mr. JOHNSTON

Either semester. Elective. Open to those who have completed Course 5 or 16.

A study of the cerebral cortex with especial reference to the localization of function and the processes by which localization has been determined.

20. Research in Neurology Mr. JOHNSTON

Credit in proportion to work done; either semester.

Qualified students may undertake the investigation of problems in either human or comparative neurology.

22a. Cytology and Histogenesis Mr. LEE

Either semester. Open to those who have completed Courses 1 and 2.

A comparative study of the animal cell, the differentiation of the tissues and organs.

22b. Advanced Vertebrate Morphology Mr. LEE

Either semester. Open to those who have completed Courses 1 and 2.

A comparative study of the gross and microscopic anatomy of the organs of the body in man and vertebrates.

*Students electing a major in the Department of Anatomy must either be proficient in technique or devote sufficient time for that purpose in addition to their other work.

- 22c. Advanced Vertebrate Embryology Mr. LEE
 Either semester.
 Lectures, reading, and laboratory. A comparative study of the processes of embryonic development in man and vertebrates.
- 22d. Experimental Embryology Mr. LEE
 Either semester. Open to those who have completed Courses 1 and 2.
 A study of the changes produced in embryonic development by means of experimental methods.
- 22e. Special Dissections Mr. SCAMMON
 Either semester. Open to those who have completed Courses 1, 2, 4.
 Elective course in dissections, each student making a careful study of one or more special parts or regions of the body.
25. Anatomical Journal Club and Seminar
 Weekly meetings during the year for reviews of the current literature and discussion of special topics in Anatomy, Histology, Embryology, and Neurology, and of the research work being carried on in the Department.

ANIMAL BIOLOGY

HENRY F. NACHTRIEB, B.S., Professor, Head of Department of Animal Biology, Curator of the Zoological Museum	205 Pillsbury Hall
CHARLES P. SIGERFOOS, Ph.D., Professor	201 Pillsbury Hall
OSCAR W. OESTLUND, Ph.D., Assistant Professor	220 Pillsbury Hall
HAL DOWNEY, Ph.D., Assistant Professor	203 Pillsbury Hall
CHARLES E. JOHNSON, Ph.D., Instructor	2 Pillsbury Hall

Course 1 is required as a prerequisite for all graduate work.

6. Embryology of Invertebrates Mr. SIGERFOOS
 Six credits (six hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Courses 1 and 3. Both semesters must be completed before credit can be obtained for the first semester.
 Reference and laboratory work on the development of invertebrates.
7. Embryology of Vertebrates Mr. NACHTRIEB
 Six credits (six hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Courses 1, 2, and 3. Both semesters must be completed before credit can be obtained for the first semester.
 Reference and laboratory work on the development of vertebrates.
21. Problems and Research Mr. NACHTRIEB and ASSOCIATES
 Six or twelve credits (six or twelve hours per week); both semesters.
 Open to graduate students and undergraduates who have completed

Course 1 or its equivalent and such other courses of at least a year in length as may be required by the character of the work.

Advanced and essentially independent work in some specific line carried on under the supervision of the professor in charge of the subject.

22. Blood of Vertebrates.

Mr. DOWNEY

Twelve credits (twelve hours per week); both semesters. Open to seniors and graduate students who have completed Courses 1, 2, 3, and 7, and who have a reading knowledge of German and French. Both semesters must be completed before credit can be obtained for the first semester.

A comparative study of blood and blood forming organs of vertebrates. In this course the student will devote the major portion of his time to research.

23. Morphology of Vertebrates

Mr. JOHNSON

Six or twelve credits (six or twelve hours per week); both semesters. Open to those who have completed Courses 1 and either 3 or 5.

An advanced course in comparative or special anatomy of vertebrates, including anatomical technique. Students qualified will be directed into lines of original investigation.

24. Morphology of Invertebrates

Mr. SIGERFOOS

Three credits (six hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed at least two years of work in this department.

An intensive study of selected groups of invertebrates, exclusive of insects. Reference and laboratory work.

25. Entomology

Mr. OESTLUND

Three credits (six hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Course 9.

Certain lines of advanced work and research on the morphology and taxonomy of insects and other arthropods.

26. Vertebrate Histology

Mr. DOWNEY

Three credits (six hours per week); both semesters. Open to seniors and graduate students who have completed Course 3.

Conference, reference, and laboratory work.

27. Genetics and Eugenics

Mr. NACHTRIEB

Three credits (six hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed two years of work in this department.

Conference and reference work preparatory to research.

ASTRONOMY

FRANCIS P. LEAVENWORTH, M.A., Professor, Head of Department of
Astronomy Observatory or 123 Folwell Hall

The Astronomical Observatory contains a ten and one-half inch refracting telescope furnished with a third lens for converting it into a photographic telescope; a filar micrometer; a spectroscope by Brashear;

a meridian circle and zenith telescope; a Repsold photographic measuring machine, a chronograph, and astronomical clocks.

5. Advanced Practical Astronomy Mr. LEAVENWORTH
Six credits (three hours per week); both semesters. Open to graduate students who have completed Courses 1 and 4.
6. Celestial Mechanics Mr. LEAVENWORTH
Six credits (three hours per week); both semesters. Open to graduate students who have completed Course 1.
7. Astrophotography Mr. LEAVENWORTH
Open to graduate students who have completed Courses 1 and 4.
Photography of the heavenly bodies, measurement of plates, determination of positions, parallax, etc.

BOTANY

FREDERIC E. CLEMENTS, Ph.D., Professor, Head of Department of Botany	207 Pillsbury Hall
JOSEPHINE E. TILDEN, M.S., Professor	214 Pillsbury Hall
CARL OTTO ROSENDAHL, Ph.D., Professor	18 Pillsbury Hall
FREDERIC K. BUTTERS, B.S., B.A., Assistant Professor	206 Pillsbury Hall
NED L. HUFF, M.A., Assistant Professor	214 Pillsbury Hall

The Botanical Seminar consists of advanced students in Botany, together with the staff of the department. It meets every two weeks for the presentation of the results of investigation, and for the discussion of current problems.

The graduate courses in Botany are designed to prepare students directly for scientific positions in the United States Department of Agriculture and in the agricultural colleges and experiment stations of the various states. Such positions are those of ecologist, physiologist, systematic botanist, mycologist, agrostologist, algologist, etc., in the Bureau of Plant Industry, and of ecologist in the Forest Service. In co-operation with the Department of Plant Pathology and Botany in the College of Agriculture, training is given for the positions of plant pathologist and of seed expert in the Bureau of Plant Industry and in the state experiment stations. Positions in some of these lines are open to women as well as men. In addition to the general courses which are prerequisites, Courses 3, 5, 7, and 11 are most important in this preparation, followed by still more advanced courses determined by the training sought.

3. Plant Physiology and Ecology Mr. CLEMENTS
Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2; by permission of the department the course may be taken in conjunction with Course 2.

Study of the factors which make the plant's home, viz., water, light, soil, heat, etc.; response of the plant to its home, absorption, transport, water-loss, food-making, storage, growth, fertilization, and reproduction; adaptation of plants to their various homes, and

the origin of new forms by selection, adaptation, mutation, and hybridization; structure and development of vegetation, i. e., grouping, migration, competition, acclimatization, invasion, succession, zonation, etc. of plants.

4. Algae Miss TILDEN

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

A detailed comparative study of the structure and classification of the Algae; the blue-green and yellow-green Algae, together with a systematic examination of forms in the Minneapolis water supply, occupy the first semester, and the brown and the red marine Algae the second semester. Lectures, laboratory and reference work.

5. Fungi Mr. CLEMENTS

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

The classification and life history of the various groups of Fungi based on identification, culture, and field work, with particular reference to forms which cause plant and animal diseases. Lectures and discussions, laboratory, greenhouse and field work.

6. Mosses and Ferns Messrs. ROSENDAHL, BUTTERS, and
HUFF

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

Designed for students who wish to pay special attention to the morphology and taxonomy of liverworts, mosses, and ferns. Lectures, laboratory and field work.

7. Flowering Plants Mr. ROSENDAHL

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

Designed to afford the student an opportunity to become proficient in the determination of plant species and plant types, as well as to show the generic development and relationships of the flowering plants. Lectures, reference reading, laboratory, greenhouse and herbarium work, together with field work in the fall and spring.

8. Ecology Mr. CLEMENTS

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1, 2, and 3.

A critical study of plant habitats by means of instruments and the adaptations produced by water and by light, together with a careful examination of the causes and reactions of plant formations. Class discussions and quizzes, field and greenhouse work.

9. Plant Physiology Mr. CLEMENTS

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1, 2, and 3.

A study of the relations of factor, function, and structure in the various organs of the plant, with special reference to absorption, transpiration, photosynthesis, respiration, irritability, and reproduction. Class discussions and quizzes, greenhouse and field work.

10. Cytology Mr. ROSENDAHL

Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

A survey of cell structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytologic investigation. Methods of cytological research indicated in the laboratory. Laboratory work and collateral reading.

11. Industrial Botany Miss TILDEN
Six credits (six hours per week); both semesters. Open to technical students who have completed Course 1, and to academic students who have completed Courses 1 and 2.

A study of the origin, distribution, and cultivation of plants yielding products of economic value, the nature and use of these products and the processes by which they are obtained from the plants. Lectures, demonstrations, topics, and laboratory work.

12. Plant Foodstuffs and Textiles Miss TILDEN
Six credits (six hours per week); one or both semesters. Open to technical students who have completed Course 1, and to academic students who have completed Courses 1 and 2.

A study of the botany of foods, textiles, and fabrics, with reference to their source, structure, preparation, adulteration, etc., together with an inquiry into the relation of plants to household processes and problems. Lectures, demonstrations, topics, and laboratory work.

15. Botanical Microchemistry Mr. CLEMENTS
Six credits (six hours per week); both semesters. Open to those who have completed Course 1.

A microscopical study by means of stains and reagents of the nature and structure of plant substances, in the natural condition as well as in the finished product. Lectures, laboratory and reference work.

16. Plant Studies and Methods Mr. CLEMENTS
Six credits (six hours per week); both semesters. Open to those who have completed Courses 1 and 2.

A course for teachers and for students intending to teach, the subjects of nature study and high school botany are presented as they are to be taught and not from the university point of view; the material is taken up in detail in its proper sequence, and training in method is afforded as far as possible by practice in the Elementary School of the College of Education.

17. General Bacteriology Messrs. CLEMENTS and BUTTERS
Six credits (six hours per week); both semesters. Open to technical students who have completed Course 1, and to academic students who have completed Courses 1 and 2.

The first semester of the course is given in the College of Medicine, and deals with the technique of general culture methods, inoculation, staining, etc. The second semester's work is primarily with non-pathogenic bacteria, yeasts and molds in their relation to everyday life, and to fundamental processes among plants and animals. Class discussions and quizzes and laboratory work.

21. Morphology and Taxonomy Mr. ROSENDAHL
Both semesters. Open to graduate students; other arrangements may be ascertained upon application to the department.

Important literature and necessary material will be provided for whatever research is entered upon, and the results of the investigations will be required to be prepared for publication. The course is an elastic one and will be adapted to the special training and requirements of those pursuing it.

22. Problems in Algology Miss TILDEN
Both semesters. Open to graduate students; other arrangements may be ascertained upon application to the department.

Research work may be done on special groups or along any of the following lines: The freshwater Algae of Minnesota; the Algae of the Minneapolis and St. Paul water supplies; the Algae of hot springs; lime-depositing Algae; arctic marine Algae (material from Vancouver Island); tropical marine Algae (material from the Hawaiian Islands). Special facilities for study are offered by the Minnesota Seaside Station on Vancouver Island, which is open during the summer vacation.

23. Problems in Physiology and Ecology Mr. CLEMENTS

Both semesters. Open to graduate students; other arrangements may be ascertained upon application to the department.

Opportunity for research work in ecology and physiology is offered along the following lines: Critical investigation of the physical factors of the habitat by means of instruments; studies in plant functions and adaptations; the experimental production of new forms; investigations in the development and structure of vegetation, and especially in migration, competition, etc.

24. Problems in Cytology and Embryology Mr. CLEMENTS

Both semesters. Open to graduate students; other arrangements may be ascertained upon application to the department.

Research work may be taken along any of the following lines: The minute structure of the cell; microchemistry of the cell; development of sporangia and spores; fecundation; development of the embryo; origin and development of the primary tissues; development of organs, correlation, etc.

CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., Professor, Head of Department
of Chemistry 114 Chemistry Building

CHARLES F. SIDENER, B.S., Professor 203 Chemistry Building

EDWARD E. NICHOLSON, M.A., Assistant Professor
104 Chemistry Building

EVERHART P. HARDING, M.S., Ph.D., Assistant Professor
209 Chemistry Building

IRA H. DERBY, Ph.D., Assistant Professor 220 Chemistry Building

FRANCIS C. FRARY, Ph.D., Assistant Professor 108 Chemistry Building

The following courses, requiring an equivalent of two years of Chemistry as prerequisites, are offered in the Graduate School:

4. Quantitative Analysis Mr. SIDENER and INSTRUCTORS

Eight credits (four credit hours per week); both semesters. Open to those who have completed Course 2 or 3.

The course includes a general discussion of quantitative methods, with laboratory work in gravimetric analysis, first semester, followed by a discussion of standard solutions and the necessary stoichiometric calculations with laboratory work in volumetric analysis, second semester.

5. Organic Chemistry Messrs. FRANKFORTER, DERBY, HUNTER,
HANDY, and ASSISTANTS

Eight credits (two lectures, four hours laboratory per week); both semesters. Open to those who have completed Course 2 or 3.

This course includes the aliphatic and the aromatic series with the preparation of the more important compounds.

6. THEORETICAL CHEMISTRY

Mr. DERBY

Two credits (one lecture and one recitation per week); second semester. Open to those who have completed Course 5.

The course involves a study of the most important theories which co-ordinate and unify chemical and physico-chemical phenomena.

8. Inorganic Preparations

Mr. HARDING

Three credits (six hours laboratory); first semester. Open to those who have completed Course 2.

The preparation of inorganic salts, supplemented by Thorpe's *Inorganic Preparations*.

9. Sugar Chemistry

Mr. NICHOLSON

Three credits (one lecture, four hours laboratory per week); first semester. Open to those who have completed Course 5.

The course includes the technology and chemical control of sugar manufacture.

10. Special Problems

Mr. SIDENER

Three credits (six hours laboratory per week); first semester. Open to those who have completed Course 4.

The course includes the working out of various mineralogical, technological, and metallurgical problems.

11. Iron and Steel Analysis

Mr. SIDENER and INSTRUCTORS

Three credits (six hours laboratory per week); second semester. Open to those who have completed Course 4.

The course includes the rapid determination of iron by the various methods as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese, and carbon.

12. Mineral Analysis

Mr. SIDENER

Two credits (four hours laboratory per week); second semester. Open to those who have completed Course 4.

The course includes the analysis of building stones and some of the most important minerals.

14. Water Analysis

Mr. FRANKFORTER

Two credits (four hours laboratory per week); first semester. Open to those who have completed Course 4.

The course includes an exhaustive discussion of the chemical and sanitary properties of water.

15. Food Analysis

Mr. HARDING

Six credits (six hours laboratory per week); both semesters. Open to those who have completed Course 5.

The course includes the chemical analysis of the various food products and the detection of the common adulterants.

16. Industrial Chemistry

Mr. FRARY

Three credits (two lectures, two hours laboratory per week); first semester. Open to those who have completed Course 5.

The course includes the discussion of methods and apparatus used in chemical technology, and the testing of commercial chemical products.

17. Industrial Chemistry Mr. FRARY
Second semester. Continuation of Course 16.
18. Physical Chemistry Mr. DERBY
Four credits (one lecture, six hours laboratory per week); first semester. Open to those who have completed Chemistry 5, Physics 3 and 4.
The course enables the student to gain a wide and varied knowledge of physico-chemical principles and methods, both from the theoretical and practical standpoint.
19. Gas and Coal Analysis Mr. HARDING
Three credits (one lecture, four hours laboratory per week); first semester. Open to those who have completed Course 4.
The course comprises the method of collecting and storing gases previous to their analysis; the methods of manufacturing commercial gases; their chemical analysis, calorific and photometric determination; also the ultimate and proximate analysis of coals and their calorific determination.
21. Organic Analysis Mr. HUNTER
Three credits (one hour lecture or recitation, four hours laboratory per week); both semesters. Open to those who have completed Course 5.
This course will include all the ordinary methods for the elementary analysis of carbon compounds, together with some special methods, such as determinations of important radicals.
22. Electrochemistry Mr. FRARY
Three credits (one lecture, four hours laboratory per week); second semester. Open to those who have completed Course 4 and also Course 3 in Physics.
The course includes a discussion of electro-analytical methods and industrial electrochemical processes.
23. Microchemistry Mr. HARDING
Two credits (four hours laboratory per week); second semester.
Open to those who have completed Course 4.
This course includes the methods for the identification of minute quantities of substances by means of the microscope.
29. Photochemistry Mr. FRARY
Three credits (one lecture, four hours laboratory per week); first semester. Open to those who have completed Course 5.
The course includes a discussion of the general principles of photochemistry and their application to dry-plate photography and the ordinary printing processes.
30. Elements of Photoengraving Mr. FRARY
Three credits (one lecture and four hours laboratory per week); second semester. Open to those who have completed Course 29.
This course includes a study of the preparation of wet plates, zinc etchings, and photogravures.
31. Advanced Photoengraving Mr. FRARY
Three credits (one lecture and four hours laboratory per week); first semester. Open to those who have completed Course 30.
This course includes the preparation of screen negatives and copper half-tones.

32. Color Photography

Mr. FRARY

Three credits (one lecture and four hours laboratory per week); second semester. Open to those who have completed Course 31.

This course includes the theory and practice of the production of photographs and photoengravings in natural colors.

SEMINAR

Candidates for the master's or doctor's degree may select a subject in research along one of the following lines:

Inorganic Chemistry:

General
Analytical
Atomic Weights
Rare Elements

Organic Chemistry:

General
Alkaloids
Terpenes
Phytochemistry
Coal Tar Dyes

Physical Chemistry:

Solutions
Thermochemistry
Chemical Dynamics
Optical Chemistry
Radiochemistry

Electrochemistry:

Electrolytic Dissociation
Electro-analysis
Electrolytic Preparations
Electric Furnaces

Industrial Chemistry:

Foods
Fuel { gases
 liquids
 solids
Paints, pigment oils, etc.
Ceramics
Wood and Wood Products

Photochemistry:

General
Developer and Development
Color Photography
Photomechanical Processes

COMPARATIVE PHILOLOGY*

FREDERICK KLAEBER, Ph.D., Professor, Head of Department of Comparative Philology
222 Folwell Hall

This department, besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies in comparative Indo-European Philology, and more particularly the investigation of Old Germanic dialects. Related courses in English Philology will be found under English Language and Literature.

As a matter of course, candidates for the master's degree must have a knowledge of Latin and German; candidates for the doctor's degree must have a knowledge of Greek also.

5. Science of Language, Advanced Course

Mr. KLAEBER

Two credits (two hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 1. Alternates with Course 6.

Investigation of linguistic problems. Study of standard works (Paul, Delbrück, Wundt, Jespersen, etc.). Reports on recent publications.

6. Comparative Phonology of English and German

Mr. KLAEBER

Two credits (two hours per week); second semester. Open to juniors, seniors, and graduate students who have a fair knowledge of German.

Elements of phonetics; history of English and German sounds; orthography. The lectures will be supplemented by practical exercises.

*See note page.18.

7. Comparative Grammar of the Greek, Latin, and Germanic Languages
Mr. KLAEBER

Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.

A general survey of the field of Indo-Germanic Philology will be included.

8. Gothic Mr. KLAEBER

Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.

The relation of Gothic to other Germanic dialects will be particularly emphasized. Study of the grammar (Braune, J. Wright, Streitberg) and reading of texts (Stamm-Heyne-Wrede's *Ulfilas*, or Streitberg's *Gotische Bibel*).

9. Urgermanische Grammatik Mr. KLAEBER

Open to graduate students who have completed Course 8; other arrangements may be ascertained upon application to the department.

Lectures and study of standard works (Brugmann, Kluge, Noreen, Streitberg, *et al.*).

10. Old Saxon Mr. KLAEBER

Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.

Old Saxon Grammar and interpretation of the *Heliand*.

11. Old High German Mr. KLAEBER

Open to graduate students who have taken an undergraduate major in a linguistic subject; other arrangements may be ascertained upon application to the department.

Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch*. This course is identical with German 14.

12. Research Seminar Mr. KLAEBER

Competent graduate students will be advised and assisted in research along special lines.

DAIRY AND ANIMAL HUSBANDRY

THEOPHILUS L. HAECKER, Professor of Dairy and Animal Husbandry
and Chief of Division 29 Dairy Hall, University Farm

HOWARD R. SMITH, B.S., Professor of Animal Husbandry
2 2d fl. Live Stock Pavilion, University Farm

14. Animal Nutrition Messrs. HAECKER and SMITH

Credit, six hours; both semesters. Open to graduate students.

A study of the laws of Animal Nutrition with special reference to the relation of feed nutrients to animal growth and animal products. Research demonstrations will be conducted, tracing ingo and outgo of certain domestic animals from birth to maturity. For the current year the bovine for meat production will be under investigation from birth to block; analyses will be made periodically of feeds and animals.

9. Meats: Structure, Composition, and Preparation for Use Mr. SMITH
Six hours per week. Open to graduate students.

A course in which special consideration is given to the structure and composition of meats and to processes of ripening and curing them for food purposes. Original investigations will be required and equipment and material furnished for extensive study in this line.

DRAWING AND DESCRIPTIVE GEOMETRY

WILLIAM H. KIRCHNER, B.S., Professor, Head of Department of Drawing
and Descriptive Geometry 209 Main Engineering Building

15. Descriptive Geometry Mr. KIRCHNER

Four credits (two hours per week); both semesters. An advanced course. Open to those who have completed courses in Drawing 1 to 4 inclusive. Both semesters must be completed before credit is given for the first semester.

Methods of representation; parallel and central projection. Geometrography, axonometry, and photogrammetry.

16. Perspective Mr. KIRCHNER

Three credits (three times per week); either semester. An advanced course open to those who have completed Course 15.

The principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse constructions.

17. Projective Geometry Mr. KIRCHNER

Four credits (two hours per week); both semesters. Open to those who have completed Course 15.

Projective properties of plane figures. Theory of conics, and surfaces of the second order. Transformations and applications.

ECONOMICS AND POLITICAL SCIENCE

*JOHN H. GRAY, Ph.D., Professor, Head of the Department of Economics
and Political Science Mechanic Arts Building

EDWARD VAN DYKE ROBINSON, Ph.D., Professor, Acting Head of Department
of Economics and Political Science, February 1912 - February
1913 Mechanics Arts Building

WILLIAM A. SCHAPER, Ph.D., Professor Mechanic Arts Building

CARL W. THOMPSON, M.A., Associate Professor and Director of the Bureau
of Research in Agricultural Economics Mechanic Arts Building

THOMAS WARNER MITCHELL, Ph.D., Assistant Professor
Mechanic Arts Building

JEREMIAH S. YOUNG, Ph.D., Assistant Professor
Mechanic Arts Building

J. FRANKLIN EBERSOLE, M.A., Assistant Professor
Mechanic Arts Building

*Absent on leave from February 1, 1912 to February 1, 1913.

CEPHAS D. ALLIN, M.A., LL.B., Assistant Professor	Mechanic Arts Building
LOUIS D. H. WELD, Ph.D., Assistant Professor	Extension Work Mechanic Arts Building
RAYMOND V. PHELAN, Ph.D., Instructor	Extension Work Mechanic Arts Building
CHARLES H. PRESTON, B.A., Instructor	Extension Work Mechanic Arts Building
ALBERT B. BALCOM, M.A., Instructor	Extension Work Mechanic Arts Building

Any candidate for an advanced degree taking a major in Economics or Political Science is permitted to elect sufficient law in the Law School to make up a minor; such election being subject to the approval of the Dean of the Graduate School, and the Faculties of the Department of Economics and Political Science and Law School. Any candidate who has attained both the B.A. and LL.B. degrees will be permitted to offer his law course as a minor in the Graduate School towards the degree of Master of Arts or Doctor of Philosophy, provided that after obtaining the degree in law a full year's work be given to the master's degree (unless such period be reduced to not less than one semester by special action of the Executive Committee of the Graduate School) and two full years' work be devoted to attaining the doctor's degree.

ECONOMICS

- 8b. Economics of Colonization Mr. ROBINSON
 Three credits (three hours per week); first semester. Open to those who have six credits in Economics.

The economic causes of human migration; historical survey of colonization and classification of colonies with reference to their economic basis; colonial commerce in relation to modern commercial and foreign policies; preferential tariff and imperial federation. Lectures, assigned readings; and reports on special topics. Alternates with Course 8a. Not given in 1912-13.

17. Corporation and Cost Accounting Mr. MITCHELL
 Three credits (three hours per week); second semester. Open to those who have completed Courses 1 and 16.

The books and accounts peculiar to a corporation. Cost accounting; the classification of production costs; methods of managing materials, labor, and machines; methods of distributing indirect costs; methods of compiling process and contract costs; relation of cost to general accounts; use of cost data to show forth and enforce economy of operation. A laboratory course supplemented by lectures.

24. Investment and Speculation Mr. EBERSOLE
 Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Courses 1 and 5.

The social significance of the processes of saving and investing; private property and the corporate organization of industry as a basis of investment; investment markets; laws of investment values and causes affecting values; the various classes of investments; organization and working of stock and produce exchanges; Wall Street; investment vs. speculation vs. gambling. Lectures, assigned readings, and interpretation of quotations, financial articles, and market reports.

27. Theory and Practice of Statistics

Mr. WELD

Three credits (three hours per week); first semester. Open to juniors, seniors and graduate students who have six credits in Economics.

Statistical method and the work of the statistician; general critical survey of present-day statistical information; correct principles of collection, tabulation, classification, and interpretation of statistical material. A first-hand investigation into some practical problem by the class. Lectures, assigned readings, and work on the special problem.

28. Pro-Seminar in the History, Scope, and Methods of Economics

Mr. ROBINSON

Three credits (three hours per week); first semester. Open to graduate students and juniors and seniors who have completed Courses 1 and 4.

In 1912-13 the general topic will be the history of economic thought in ancient, medieval, and modern times. In alternate years, emphasis will be placed on the scope and logical methods of Economics, the relation of Economics to the other social sciences and to Ethics, and on methods of investigation and instruction in Economics. Assigned readings, reports on special topics, and class discussions. Method of work informal, approaching the seminar plan.

Courses 2 and 11 in Philosophy (Logic and Ethics) may profitably precede or accompany Course 28.

18. Problems in Expert Accounting

Mr. MITCHELL

Three credits (three hours per week); first semester. Open to graduate students and seniors who have completed Courses 16 and 17.

A selection from C. P. A. examinations and other courses of difficult problems that confront the professional accountant; the analysis of railway and other corporation reports.

19. Auditing

Mr. MITCHELL

Three credits (three hours per week); second semester. Open to graduate students and seniors who have completed Courses 16, 17, and 18.

The duties and qualifications of an auditor; the method of preparing for, and conducting, an audit; the auditor's report and certification; legal responsibilities of auditors. Based on Dicksee's *Auditing*, Montgomery's American Edition; assigned readings, class discussion, and lectures.

29. Seminar in the Economic Development of the Middle West

Mr. ROBINSON

Three credits (three hours per week); second semester. Open to graduate students and seniors who have completed Courses 1 and 4. Course 2b should also precede Course 29.

In 1912-13 members of the seminar will undertake original investigations relating to the development of various industries in the Middle West. In alternate years, attention will be given to the development of tax systems and present problems in taxation, viewed as functions of economic development. Reference reading, discussions, and thesis work.

30. Seminar in Corporation and Trust Problems

Mr. GRAY

Six credits (three hours per week); both semesters. Open to graduate students and seniors who have completed Courses 1 and 4, and are capable of original investigation. Both semesters must be completed before credit is given.

Practical investigation of problems pertaining to corporations, trusts, and other monopolies.

31. Seminar in Accounting Mr. MITCHELL
Six credits (three hours per week); both semesters. Open to graduate students and seniors who have completed Courses 16 and 17. Both semesters must be completed before credit is given.

Student reports dealing with the accounting systems, published reports, and interpretation of the accounts of business establishments located in or near the Twin Cities.

32. Pro-Seminar in Labor Problems
Six credits (three hours per week); both semesters. Open to graduate students and seniors who have completed Course 13. No credit is given unless both semesters are completed.

Original investigation and research; conducted in co-operation with the various agencies interested in promoting investigation of labor problems, and affording training for practical work in the field of the labor problem.

33. Seminar in Agricultural Economics Mr. THOMPSON
Six credits (three hours per week); both semesters. Open to graduate students and seniors who have completed Courses 1 and 22. Both semesters must be completed before credit is given.

Research problems in the marketing and distribution of farm products, agricultural credit, farm ownership, and tenancy, and agricultural organizations.

34. Economic Conference All the instructors in Economics and the Librarian

Once a month (no credit); both semesters.

A monthly meeting of the instructional staff, the scholars, graduate students, and seniors taking majors in Economics. Required of students electing any of the Economic seminars. Lectures on bibliographical aids by Mr. Gerould; papers presented for various advanced courses presented for criticism; reports by members of the conference on current economic events and literature.

POLITICAL SCIENCE

2. Comparative Government Mr. ALLIN
Three credits (three hours per week); first semester. Open to those who have completed Course 1 and three additional credits in the department.

The organization and working of the governments of the great European powers of to-day, especially of France, Germany, Great Britain, and Italy. Text, with lectures and assigned readings.

3. The Elements of Jurisprudence Mr. SCHAPER
Three credits (three hours per week); first semester. Open to those who have completed Course 1 and three additional credits in the department.

Those human relations requiring legal regulation considered from the American point of view; the nature and source of law, status, rights and wrongs, partnerships, corporations, etc.; practice in looking up cases and summarizing leading principles. Intended for active citizenship and for the study of law. Text, with lectures and assigned readings.

8. Theory of the State Mr. SCHAPER
Three credits (three hours per week); second semester. Open to those who have completed Courses 1, and 2 or 7 or 15.

Modern political theory; the origin, nature, and purpose of the state; fundamental principles common to all states and governments; the leading theories of the individualists, socialists, anarchists, and other groups. A text-book with readings in the sources, and lectures.

9. Political Parties

Mr. SCHAPER

Three credits (three hours per week); first semester. Open to those who have completed Courses 1, and 2 or 15.

An advanced course in political parties, their origin, development, and function. Methods of making nominations, securing minority representation, the recall, the initiative, the referendum, etc. Text, lectures, and special topics. Offered in 1912-13.

10. Diplomacy

Mr. ALLIN

Three credits (three hours per week); first semester. Open to those who have completed Courses 1, and 7 or 15.

Outline of the growth of international relations; the mode of conducting foreign affairs; the relation of the treaty-making power to legislation; the duties and immunities of diplomats; the consular service; the framing, interpretation, and termination of treaties and compacts; the character and procedure of courts of arbitration. Text, lectures, and supplementary reading.

19. The Police Power

Mr. YOUNG

Three credits (three hours per week); first semester. Open to those who have six credits in Political Science.

The nature and scope of the police power; the public welfare, including safety, order, morals, and protection against fraud and oppression; the fundamental rights under the police power. Freund's *Police Power* with lectures, cases, and class reports. Offered in 1912-13.

4. American Constitutional Law

Mr. SCHAPER

Six credits (three hours per week); both semesters. Open to those who have completed Courses 1, 2, and 8 or 15. Both semesters must be completed before credit is given for the first semester. Not offered in 1912-13.

An advanced course in the study of the principles of our constitutional law based on important Supreme Court decisions and standard works.

5. International Law

Mr. ALLIN

Three credits (three hours per week); second semester. Open to those who have completed Courses 1, and 2 or 10.

Nature, sources, and sanction of international law; general principles as developed by positive agreement, common usage, and judicial decisions, in particular of the status of nations, the rules of peace, neutrality, and war, and the arbitration movement. Text, lectures, and supplementary reading.

11. Seminar in Political Science Messrs. SCHAPER, YOUNG, and ALLIN

Six credits (three hours per week); both semesters. Open to graduate students and seniors of suitable preparation.

Research in the field of Political Science; the discussion of current problems in politics and administration.

14. Comparative Administration

Mr. YOUNG

Three credits (three hours per week); first semester. Open to those who have completed Courses 1, and 2 or 15.

Administration as a science, its origin and development; an analysis of the administrative systems of the United States, England, France, and Germany, with special reference to the law of officers, the merit systems, and the growth of special administrative tribunals. Text, lectures, and cases. Not offered in 1912-13.

18. Comparative Federal Government Mr. ALLIN

Three credits (three hours per week); second semester. Open to those who have taken Courses 1, and 2 or 15.

Ancient and modern confederations and federal unions, with special attention to the description and analysis of the federal constitutions of the United States, Switzerland, Canada, and Australia, to the South African Union and the proposals for Imperial federation; the nationalistic tendencies of the federal system; the influence of political parties and commercial policies upon federal organization. Lectures, reports, and assigned readings.

EDUCATION

GEORGE F. JAMES, Ph.D., Professor, Head of Department of Education	125 Folwell Hall
ALBERT W. RANKIN, B.A., Professor	125 Folwell Hall
FLETCHER H. SWIFT, Ph.D., Professor	300 Folwell Hall
*EDWARD G. QUIGLEY, B.A., Assistant Professor	
†SAMUEL QUIGLEY, M.A., Assistant Professor	319 Folwell Hall

Preliminary requirements: Students who desire to undertake graduate work in Education must have a general knowledge of Psychology and of the History of Education, and some acquaintance with the Theory of Education. For a minor in Education the candidate may pursue studies either in the theory and practice of elementary teaching, the organization and methods of secondary education, or in advanced educational theory and administration. Students who undertake a major in Education are expected to do work in at least two of these fields. Selection will be made by the candidate on the approval of the head of the department from the following courses:

8. School Administration Mr. RANKIN

Three credits (three hours per week); first semester. Open to those who have completed Courses 1, and 2 or 3.

An introductory study of school administration, conducted by lectures, reports, and discussions; the organization of school systems, the work of school boards, superintendents, principals, and teachers, school buildings, and hygiene. For students without any teaching experience, who hope later to do work in supervision.

9. School Supervision Mr. RANKIN

Three credits (three hours per week); second semester. Open to those who have completed Courses 1 and 2, or 3; intended only for students with experience in teaching. Credit will not be given both for Course 8 and for Course 9.

An advanced course treating of the duties of principals and superintendents.

*Absent on leave 1911-13.

†Substitute for 1911-13.

11. Philosophy of Education Mr. QUIGLEY
 Three credits (three hours per week); second semester. Open to those who have completed Courses 1 and 2, or 3, and Philosophy 1a or 1b.
 An endeavor to correlate the various educational ideals drawn from biological and psychological studies, with special consideration of recent social phases of education.
12. Current Problems in Elementary Teaching Mr. RANKIN
 Two credits (two hours per week); first semester. Open to those students who have completed Course 5 and one other course.
 A seminar course, involving a general discussion of some current problems in elementary education, one or two of which are worked out practically by the student under the direction of the instructor through readings, the visiting of schools, and through class discussions.
13. Educational Classics Mr. JAMES
 Two credits (two hours per week); first semester. Open to those students who have completed Courses 1 and 2, or 3.
 A course for the reading of selected educational classics and for the detailed study of corresponding periods in educational history.
14. Current Problems in Secondary Teaching Mr. RANKIN
 Two credits (two hours per week); second semester. Open to those who have completed Course 4 and one other course.
 A seminar course for advanced students preferably with teaching experience, or who wish to pursue a theoretical and a practical study of some current problems in connection with secondary teaching. The course will be conducted by lectures, class discussions, readings, and by the visiting of schools.
15. Problems in School Administration Mr. JAMES
 Two credits (two hours per week); second semester. Open to those who have completed Courses 1 and 2, or 3.
 A research course for advanced students, preferably with teaching experience, who desire to take up the investigation of some question of educational administration. Lectures, class discussions, assigned readings, and, when possible, a study of actual school conditions falling within the proposed field.
17. Organization of Higher Education Mr. JAMES
 One credit (one hour per week); second semester. Open to those who have six credits in the department.
 For students who are interested in the general problems of educational administration and who look forward later to college teaching. It includes an historical sketch of the development of the American university, with discussions of modes of organization and administration problems of departmental teaching, and questions of class instruction.
22. Classroom Management Mr. QUIGLEY
 Three credits (three hours per week); second semester. Open to those who have completed Courses 1 and 2, or 3.
 A detailed consideration of the daily practical problems of the schoolroom, both in discipline and in instruction, intended for teachers in high schools and high school training departments, and for principals or superintendents. Observation of school work, with reports and discussions.

23. Principles and Practice of Industrial Training Mr. RANKIN
 Three credits (three hours per week); second semester. Open to those who have six credits in the department.

The principles fundamental to vocational training in the public school system, as affecting the arrangement of school years, the course of study, and the methods of teaching. Lectures, assigned readings on topics, and reports on observations of school work.

ELECTRICAL ENGINEERING

GEORGE D. SHEPARDSON, M.A., M.E., Professor, Head of Department of
 Electrical Engineering 30 Electrical Engineering Building

FRANK W. SPRINGER, E.E., Professor of Electrical Engineering
15 Electrical Engineering Building

WILLIAM T. RYAN, E.E., Assistant Professor of Electrical Engineering
14 Electrical Engineering Building

6. Alternating Currents Mr. SHEPARDSON
 Four to six credits (two or three hours per week); both semesters. Post senior year. Open to those who have completed Courses 1, 2.
 Phenomena, measurement, and use of alternating currents; theory of line, transformer, generator, and motor; types of apparatus.

7. Electrical Engineering Practice: Batteries Mr. RYAN
 One credit (one hour per week); first semester. Post senior year. Open to those who have completed Course 2.
 General theory of primary and secondary cells, types and methods of construction; commercial applications; operation of battery plants; construction and test of cells by students; test of a commercial plant.

8. Electrical Engineering Practice: Lighting Mr. SHEPARDSON
 One credit (one hour per week); first or second semester. Post senior year. Open to those who have completed Course 2.
 Comparison of different sources of light; photometry; physics of the arc; history, design, and regulation of arc lamps; adaptation to constant current, constant potential, and A. C. circuits; carbons; history, manufacture, and economy of incandescent lamps; distribution of light.

9. Electrical Engineering Practice: Central stations Mr. RYAN
 One or two credits (one or two hours per week); second semester. Post senior year. Open to those who have completed Courses 2 and 6.
 Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas, and water power; location, design, and erection of station buildings; boilers, engines, dynamos, storage batteries, switchboard, and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul.

11. Electrical Engineering Practice: Transmission Mr. RYAN
 One credit (one hour per week); second semester. Post senior year. Open to those who have completed Courses 1, 2, and 5.
 Utilization of natural forces; various methods of transmission; theory of electric motor; power distribution with constant current, constant potential, and alternating systems; design of line, study of particular plants.

12. Electrical Engineering Practice: Telegraph and Telephone Mr. SHEPARDSON
 One or two credits (one or two hours per week); second semester.
 Post senior year. Open to those who have completed Courses 1 and 5.
 Various systems and instruments used in local and long distance telegraphy and telephony; design and construction of switchboards and lines; protection from inductive and other disturbances; police, fire alarm, and district messenger systems.
13. Electrochemistry Mr. Shepardson
 One or two credits (one or two hours per week); first or second semester.
 Post senior year.
 Theoretical and experimental study of electrolytic and electrothermal processes.
14. Electrical Design Mr. RYAN
 Three credits (six hours per week); first semester. Post senior year.
 Open to those who have completed Physics 1 and 2, Electrical Engineering 1, 2, and Mechanical Engineering 13.
 The design of direct current generators and motors, and alternating current transformers; complete working drawings and specifications to accompany each design. Text book: Ryan, *Design of Electrical Machinery*.
15. Electrical Design Mr. RYAN
 Three credits (six hours per week); second semester. Post senior year.
 Open to those who have completed Courses 6 and 14.
 Design of alternating current generators and motors, and switchboards.
16. Electrical Design Mr. RYAN
 Two credits (four hours per week); second semester. Post senior year.
 Open to those who have completed Courses 8 and 14.
 Designs, specifications, and estimates for an electric light or power plant.
17. Electrical Laboratory Mr. SPRINGER
 Six credits (six hours per week); first and second semesters. Senior year.
 Open to those who have completed Courses 1, 2, and Physics 5, 6.
 Tracing circuits and locating faults; electrical engineering measurements; calibration of instruments; operation and characteristic curves of generators and motors.
18. Electrical Laboratory Mr. SPRINGER
 Six credits (six hours per week); first and second semesters. Post senior year.
 Experimental study of alternating currents; regulation and efficiency tests of alternators, transformers, motors, and rotaries; photometric tests of incandescent and arc lamps. Lectures and practice.
19. Electrical Laboratory Messrs. SHEPARDSON and SPRINGER
 One or two credits (two or four hours per week); first or second semester. Post senior year.
 Efficiency tests and special problems.
20. Electrical Engineering Measurements Mr. SPRINGER
 Application of measurements to electrical engineering practice. Lectures and laboratory.

23. Precise Electrical Engineering Measurements Mr. SPRINGER
 Open to those who have completed Course 19.
 Lectures and laboratory work. Precise measurements of resistance, voltage, current, self-induction, and capacity; standardization of measuring instruments. Open to limited number subject to approval.
25. Telephone Engineering Mr. SHEPARDSON
 Lectures and laboratory work. Theoretical and experimental study of telephonic apparatus; line and line phenomena, including induction, transpositions, loading coils, etc.
26. Alternating Current Phenomena Mr. SHEPARDSON
 Lectures and laboratory work. Study of wave forms, transient phenomena; oscillographic investigations; tests of apparatus.

ENGLISH LANGUAGE AND LITERATURE*

RICHARD BURTON, Ph.D., Professor, Head of Department of English	220 Folwell Hall
FREDERICK KLAEBER, Ph.D., Professor	222 Folwell Hall
HARDIN CRAIG, Ph.D., Professor	123 Folwell Hall
JOSEPH W. BEACH, Ph.D., Assistant Professor	207 Library Building
OSCAR A. FIRKINS, M.A., Assistant Professor	116 Folwell Hall
GEORGE N. NORTHPRO, M.A., Instructor	116 Folwell Hall

3. Introduction to Middle English Language and Literature Mr. KLAEBER
 Two credits (two hours per week); first semester. Open to sophomores, juniors, and seniors, who have taken the first semester of Course 2; alternates with Course 4.
 An outline of Middle English grammar, including the interpretation of selected texts.
4. Piers the Plowman Mr. KLAEBER
 Two credits (two hours per week); first semester. Open to sophomores, juniors, and seniors, who have taken the first semester of Course 2; alternates with Course 3. Not given in 1912-13.
 A critical study of Piers the Plowman.
- 9a. Eighteenth Century Literature: The Rise of Naturalism and Romanticism Mr. CRAIG
 Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Course 1 and to graduates.
 Eighteenth century English literature from Pope to Burns, with special reference to the rise and growth of naturalism and romanticism.
- 9b. The Romantic Movement Mr. CRAIG
 Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 1 and to graduates.
 The Romantic School of poets from Wordsworth to Keats and the influence of the revolution in France.

*See note page 18.

10. The English Humorist Mr. BEACH
Six credits (three hours per week); both semesters. Open to juniors, seniors and graduate students who have completed Course 1.
The manifestations of the comic spirit in modern literature, chiefly in England. An attempt to define humor, wit, comedy, and satire, with special reference to their use in a criticism of life and with extended illustrations from the dramatists, novelists, essayists and poets.
11. Seventeenth Century Prose Mr. NORTHROP
Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed one year in English. Course 2 in History is a desirable prerequisite.
First semester: General survey of the prose of the century to 1660.
Second semester: Literature of the Restoration, with particular study of Dryden.
13. The Drama: Structure and Evolution Mr. FIRKINS
Six credits (three hours per week); both semesters. Open to seniors who have completed two years of work in English, which must include Course 7a (Shakespeare).
First semester: Theory of the drama, and history up to the nineteenth century.
Second semester: Recent drama, continental, English. Open only to those who have completed first semester.
- 14a. English Idiom Mr. BURTON
Three credits (three hours per week); first semester. Open to juniors and seniors who have completed one year of work in English.
A discussion of current idiom with the purpose of relating it to the underlying principles of historic development.
- 14b. English Idiom, Advanced Course Mr. BURTON
Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 14a.
This course of Old English material proceeds to connect the older phenomena with present-day idiom. Not offered in 1912-13.
19. Principles of Literary Criticism Mr. FIRKINS
Six credits (three hours per week); both semesters. Open to graduate students who have taken an undergraduate major in English and to juniors and seniors upon approval of the instructor.
This course comprises: (a) A brief treatment of elements or forces in literature, e. g., clearness, vigor, beauty, precision, art, taste, humor, ethics, truth, and the like. (b) An exposition of literary types, e. g., the lyric, epic, drama, short story, novel, biography, etc., in relation to the standards and methods of judging each.
31. Seminar in George Meredith Mr. BEACH
Two credits (one hour per week); both semesters. Open to graduate students and to competent seniors and unclassified students.
A study of Meredith's personality, literary method and philosophy of life, as seen chiefly in his novels and poems.
32. The Drama in England before Shakespeare Mr. CRAIG
Both semesters. Open to graduate students who have taken an

undergraduate major in English; other arrangements may be ascertained upon application to the department.

The various forms of the early drama; sources and texts of medieval plays, medieval players, the stage, and the function of the early drama.

33. Anglo-Saxon Mr. KLAEBER

First semester. Open to graduate students who have taken an undergraduate major in English or modern language. Other arrangements may be ascertained upon application to the department.

34. Beowulf Mr. KLAEBER

Second Semester. Open to graduate students who have taken an undergraduate major in English or modern language. Other arrangements may be ascertained upon application to the department.

35. The Drama as a Literary Form: Bernard Shaw Mr. BURTON

Both semesters. Open in alternate years to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department. Offered in 1912-13.

36. Fiction as a Literary Form Mr. BURTON

Both semesters. Open in alternate years to graduate students who have taken an undergraduate major in English; other arrangements may be ascertained upon application to the department. Not offered in 1912-13.

37. The Metaphysical Poets Mr. NORTHROP

One credit (one hour per week); first semester. Open to graduate students who have taken an undergraduate major in English. Given in 1912-13 and in alternate years following.

The religious poetry of the early Stuart period, with particular attention to Crashaw, Donne, and Herbert.

38. Political Prose of the Protectorate Mr. NORTHROP

One credit (one hour per week); second semester. Open to graduate students who have had an undergraduate major in English. Given in 1912-13 and alternate years following.

Intensive study of Clarendon and of the letters of this period. Students entering this course are strongly urged to take the correlative course in English History, History 19b.

ENTOMOLOGY

FREDERIC L. WASHBURN, M.A., Professor of Entomology and Chief of
Division 302 Main Bldg., University Farm

ARTHUR G. RUGGLES, M.A., Assistant Professor
301 Main Bldg., University Farm

A seminar of one hour a week is required of all graduate students.

- 2a. Economic Entomology Mr. WASHBURN
 Three credits (three hours per week); second semester. Elective.
 Open to juniors and seniors. Open to those who have completed Entomology 2 or its equivalent.
4. Comparative Anatomy and Histology of Insects Mr. RUGGLES
 Three credits (six hours per week); first or second semester. Elective.
 Open to juniors and seniors. Open to those who have completed Zoology 1 and Entomology 2 or equivalents.
6. Special Problems Mr. WASHBURN
 Six credits (minimum); first and second semesters. Open to graduate students who have had General Zoology 1, and Courses in Entomology 2 and 2a.
9. Advanced Histology and Morphology of Insects Mr. RUGGLES
 Four credits (minimum). Open to graduate students who have had Course 4 or its equivalent.
 Laboratory work with a research problem.

EXPERIMENTAL ENGINEERING

WILLIAM H. KAVANAUGH, M.E., Professor of Experimental Engineering
 107 Experimental Engineering Building
 CHARLES F. SHOOP, B.S., Assistant Professor
 107 Experimental Engineering Building
 FRANKLIN R. McMILLAN, C.E., Instructor

6. Experimental Laboratory Mr. KAVANAUGH
 Three credits; first semester. Required of post seniors in Mechanical Engineering. Open to those who have completed Courses 3 and 4.
 Calibration of dynamometers and measurement of power. Testing lubricating value of oils. Tests of injectors and ejectors. Tests of steam-turbines, steam-engines, and boilers, and complete power and lighting plants.
7. Experimental Laboratory Mr. KAVANAUGH
 Two credits; first semester. Required of post seniors in Electrical Engineering. Open to those who have completed Mathematics 8 and Mechanical Engineering 21.
 Hydraulic measurements. Tests of water motors, rams, steam and power pumps. Measurement of power. Tests of gas and steam engines, boilers, and complete power and lighting plants.
8. Experimental Laboratory Messrs. KAVANAUGH and McMILLAN
 Three credits; first semester. Elective for post seniors. Open to those who have completed Course 1 and Mathematics Course 7.
 Tests of the properties of cements, concrete, and reinforced concrete. Strength of beams, columns, joints, and framed structures.

9. Gas Engine Laboratory Mr. KAVANAUGH
 Three credits; second semester. Required of post seniors in Mechanical Engineering. Open to those who have completed Mechanical Engineering 21 and Experimental Engineering 6.

A continuation of Course 6; also tests of gas, gasoline, and hot-air engines, gas producers, air compressors, automobile and locomotive testing, and special work.

10. Experimental Laboratory Messrs. KAVANAUGH and McMILLAN
 Two or four credits; second semester. Elective for post seniors. Open to those who have completed one year in the department.
 Special research work and commercial tests.

FORESTRY

EDWARD G. CHEYNEY, B.A., Professor and Director of the College of Forestry 3 1st fl. Horticultural Building, University Farm

JOHN P. WENTLING, M.A., Assistant Professor 3 1st fl. Horticultural Building, University Farm

16. Special Sylviculture Problems Mr. WENTLING
 Six credits (minimum). Open to those who have had Botany 1 and 3 and Forestry 2 and 3, or their equivalent.

The choice of subject must be made by the candidate and approved by the Director and instructor. The laboratories of the Botany Department and the facilities of the Forest Experiment Station at Cloquet are available to students taking this work. May be elected as a major or a minor.

GEOLOGY, GEOGRAPHY, AND MINERALOGY

WILLIAM H. EMMONS, Ph.D., Professor, Head of Department of Geology and Mineralogy 108 Pillsbury Hall

EDWARD M. LEHNERTS, M.A., Assistant Professor 107 Pillsbury Hall

FREDERICK W. SARDESON, Ph.D., Assistant Professor 103 Pillsbury Hall

FRANK F. GROUT, M.S., Assistant Professor 102 Pillsbury Hall

OLIVER BOWLES, M.A., Instructor 102 Pillsbury Hall

EDGAR K. SOPER, B.A., Instructor 112 Pillsbury Hall

A. WOLFRED JOHNSTON, M.A., Instructor 112 Pillsbury Hall

GEOLOGY

5. Petrology Messrs. GROUT and BOWLES
 Three credits (six hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 4.

Laboratory work, lectures, and reference reading. The identification of minerals and rocks by optical study; a study of igneous rocks, crystalline schists, and metamorphic rocks; the origin and classification of rocks.

7. Paleontology Mr. SARDESON
Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have taken Courses in Geology and Biology, aggregating at least six credits.
The chief types of organisms as represented by fossils; leading fossils and their phylogenetic history. Lectures and demonstrations.
8. Paleontologic Practice Mr. SARDESON
Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed or are pursuing Course 7.
The collection, preparation, and study of materials, examination of collections, and reading with a view to complete knowledge of the groups of fossils and organisms as presented in Course 7.
12. Ore Deposits Messrs. EMMONS and SOPER
Four credits (four hours per week); first semester. Open to seniors and graduate students who have completed Courses 1a, 3a, 4, 18, 19.
Ore deposition; the nature, distribution, and genesis of metalliferous ore deposits of the United States; relation of ore deposits to geologic structure and the changes which ore deposits undergo through oxidation and related processes. Lectures, laboratory work illustrating the use of mine maps and geologic cross sections through mines, and detailed laboratory studies of reports on mining districts.
- 13a. Special Problems in Ore Deposits Messrs. EMMONS and SOPER
Two credits (four hours per week); second semester. Open to seniors and graduate students who have completed Course 12.
Metallogenic epochs and metallographic provinces, particularly those of the United States. Lectures on field and laboratory methods.
- 13b. Seminar in Ore Deposits Mr. EMMONS
Three credits (three hours per week); second semester. Open to graduate students of advanced standing who have completed Course 13a or its equivalent.
40. Field Geology Mr. JOHNSTON
Six credits (six weeks in the field). Open to juniors, seniors, and graduate students who have completed Courses 1a, 3a, and 19.
A field course in geologic mapping in the summer vacation period. The fields for 1912 are on the Mesabi and Vermilion Iron Ranges. Credit is given only on completion of a satisfactory report.
41. Field Course in Geology
Open to graduate students of advanced standing who have completed Course 40 or its equivalent. To be arranged with individual students upon application to the department.
By action of the Faculty, credit will be given for field work done satisfactorily, as prescribed in the joint announcements of various universities for the summer 1912-13.

GEOGRAPHY

32. Climatology Mr. LEBNERTS
Three credits (three hours per week); first semester. Open to seniors who have completed Course 31.

Principles of meteorology applied to a study of the climates of the world and the factors on which these climates depend; climatic influences on the distribution and characteristics of plants and animals, and on man's needs and occupations. Lectures, recitations, and reference reading.

34. Problems in Geography Mr. LEHNERTS

Three credits (three hours per week); first semester. Open to seniors who have completed Course 33.

The effects of coast lines and harbors, navigable rivers, water powers, mountains and plains, rock formations and soils; ground and surface waters for municipal and farm supplies; the utilization and conservation of natural resources. A series of special problems in geography.

39. Research Course in Geography Mr. LEHNERTS

Six credits (three hours per week); both semesters. Open to graduate students who have completed a major in Geography.

Principles and problems in the several fields of geography; mathematical, physical industrial, and regional. Students will be required to do semi-independent work on selected subjects and problems.

9. Paleontologic Geology Mr. SARDESON

Three credits (three hours per week); each semester. Open to graduate students who have completed Courses 1a, 3a, and 7.

The Ordovician fauna, with special illustrations from the Ordovician of Minnesota and neighboring states.

10. Advanced Paleontology Mr. SARDESON

Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Course 7.

Selected groups of fossils; forms and literature of the group. Class work supplemented by a thesis.

17. Glacial Geology Mr. SARDESON

Credits according to work; second semester. Open to graduate students of advanced standing in Geology or Geography.

The drift, glacial lakes, the gorge and Falls of St. Anthony, the Dalles of the St. Croix, and other problems. Lectures, reading, and field work.

MINERALOGY

20. Physical Mineralogy Mr. BOWLES

Three credits (two lectures and two laboratory hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 19.

The form and optical properties of minerals; other physical properties in greater detail than in Course 18; thermal properties, as coefficient of expansion and conductivity; pyro-electricity; cohesion as hardness, percussion and etch figures; cleavage and gliding planes.

21. Chemical Mineralogy Mr. GROUT

Three credits (six hours per week); second semester. Open to those who have completed Course 19.

Minerals as chemical materials; the preparation and properties of artificial minerals; the limitations of natural chemical action; dimorphism, isomorphism, and similar phenomena; microchemical methods of identification.

24a. Morphology of Minerals**Mr. BOWLES**

Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 18.

A study of crystallography, embracing projection and the geometric relations of crystal planes; crystal nomenclature; a brief outline of the relation of optical properties to morphology. The laboratory work embraces a study of crystal models and crystals; crystal drawing; the identification of minerals from crystal measurement and mathematical calculation.

24b. CRYSTAL MEASUREMENT**Mr. BOWLES**

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 24a.

The measurement of crystal angles with the two-circle goniometer; gnomonic projection and crystal drawing; the mathematical and graphic determination of crystallographic constants; the determination of minerals by means of crystal measurements.

25. Optical Mineralogy**Mr. GROUT**

Three credits (six hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 18.

A study of the microscopic structure of crystals and crystal grains; an application of methods used in determining minerals by their optical properties; goniometric and stauroped practice, embracing the elements of lithology. Lectures and laboratory work.

27. An Outline of Mineralogy**Mr. GROUT**

Two credits (two hours per week); both semesters. Open to juniors, and seniors and graduate students who have completed Courses 18 and 19.

A study of methods of identification of minerals, with their applications. Conferences, reading, and demonstrations.

28. Original Problems in Morphological and Physical Mineralogy**Messrs. GROUT and BOWLES**

Hours and credits to be arranged; both semesters. Open to graduate students and others by individual arrangement.

Any branch of mineralogy and many groups of materials will furnish problems.

GERMAN*

JOHN G. MOORE, B.A., Professor, Head of Department of German

210 Folwell Hall

†**CARL SCHLENKER, B.A., Professor**

211 Folwell Hall

‡**HANS JUERGENSEN, M.A., Assistant Professor**

215 Folwell Hall

OSCAR BURKHARD, M.A., Assistant Professor

214 Folwell Hall

Course 9 will count only towards a minor. Courses 10-18 will count either towards a minor or a major.

9. German Literature of the Classic Period**Mr. MOORE**

Six credits (three hours per week); both semesters. Open to those who have completed Courses 1 and 2 (by special permission) or 3 and 7, or 4 and 6. Both semesters must be completed before credit is given

*See note page 18.

†Absent on leave 1912-13.

‡Died September 5, 1912.

for the first semester. Required of those who obtain a teacher's recommendation in German.

First semester: Goethe's *Faust*; its genesis; the Faust legend; its treatment in literature before and since Goethe's time; plan of Goethe's *Faust*; solution of the Faust problem in Part II. Second semester: Schiller's ballads and other representative poems of this period. German versification. Reading and discussion of Lessing's more important critiques, the *Laocoon* and *Dramaturgie*. History of German literature of the classic period. Lectures and collateral reading; essays.

10. Modern Authors

Mr. MOORE

Six credits (three hours per week); both semesters. Open to those who have completed Courses 1, 2, and 9 (by special permission) or 4, 6, and 9, or 3, 7, and 9. Both semesters must be completed before credit is given for the first semester. Required of those who obtain a teacher's recommendation in German.

First semester: Romantic school and *Junge Deutschland*. Second semester: German literature since 1848.

12a. History and Literature of the Reformation

Mr. MOORE

Four credits (two hours per week); both semesters. Open to seniors and graduate students who have completed Course 9 or Course 10. Both semesters must be completed before credit is given for the first semester.

Brandt, Luther, Hutton, Sachs, Murner, and Fischart. Selections from Jansen and Egelhaaf. Offered in 1912-13.

12b. Faust, Part II

Mr. MOORE

Four credits (two hours per week); both semesters. Open to graduate students and seniors who have completed Course 9 or Course 10. Both semesters must be completed before credit is given for the first semester.

Recitations, collateral reading in Faust literature, and reports, lectures and discussions. Given alternate years with Course 12a. Offered in 1913-14.

13a. Middle High German

Mr. SCHLENKER

Four credits (two hours per week); both semesters. Open to seniors and graduate students who have completed Course 9. Both semesters must be completed before credit is given for the first semester.

Study of the language and literature of the period. Paul's *Mittelhochdeutsche Grammatik*. Selected readings from *Armer Heinrich*, *Nibelungen Lied*, *Gudrun*, the poems of Walter von der Vogelweide, *Parsifal*, etc. Course conducted in German. Offered in 1912-13.

13b. The Age of Frederic the Great

Mr. SCHLENKER

Four credits (two hours per week); both semesters. Open to graduate students and seniors who have completed Course 9. Both semesters must be completed before credit is given for the first semester.

I. A survey of the literature from the Thirty Years' War to the age of Frederic. II. A study of the so-called Age of Enlightenment. (Klopstock, Wieland, Lessing and Herder.) Recitations, readings and reports, lectures. Course conducted in German. Given alternate years with Course 13a. Offered in 1913-14.

- 17a. History of German Literature Mr. JUERGENSEN
 Four credits (two hours per week); both semesters. Open to graduate students and seniors who have completed Course 9. Both semesters must be completed before credit is given for the first semester.
 The development of German literature from its origin down to the classic period. The class work and lectures in the German language. Offered in 1912-13.
- 17b. German Lyric Poetry of the Seventeenth and Eighteenth Centuries Mr. JUERGENSEN
 Four credits (two hours per week); both semesters. Open to graduate students and seniors who have completed Course 9. Both semesters must be completed before credit is given for the first semester.
 Courses conducted in German. Special attention will be given to literary schools and movements. Given alternate years with Course 17a. Offered in 1913-14.
14. Old High German Mr. KLAEBER
 Four credits (two hours per week); both semesters. Open to seniors and graduate students who have taken Course 9. Both semesters must be completed before credit is given for the first semester.
 This course is identical with Comparative Philology 11.
15. Seminar in German Drama Mr. SCHLENKER
 Two hours per week; both semesters. Open to graduate students and, by permission of the department, to undergraduates but without credit.
 An outline of the history of the German dramatic literature from its beginning to and including the so-called classic drama. Assigned readings, reports, and discussions.
- 16a. History of the German Language Mr. BURKHARD
 Four credits (two hours per week); both semesters. Open to graduate students who have completed Course 9.
 A survey of its development, with special reference to modern German. Based on Behagel's *Deutsche Sprache*. Etymology, word formation, syntax, comparison of English and German, etc. Arranged to meet the needs of teachers. Offered in 1913-14.
- 16b. The Drama of Schiller Mr. BURKHARD
 Four credits (two hours per week); both semesters. Open to graduate students and seniors who have completed Course 9.
 I. Schiller's Drama as a reflection of the thoughts of his age. II. The plays will be considered in chronological order with reference to the development of the dramatic idea, from the expression of the Storm and Stress movement in the early drama to the classic form of his last works. Given alternate years with Course 16a. Offered in 1912-13.
- 18a. Seminar in Philosophic Reading Mr. JUERGENSEN
 Two hours per week; both semesters.
 First Semester: Schopenhauer as a model of style and philosophic method. Second semester: The work will be adapted to students pursuing either the more literary aspect of the subject (Lessing, Herder, Schiller), or the more speculative (Kant, Hegel, *et al.*). Given alternate years with Course 18b. Offered in 1912-13.

- 18b. Seminar in Scientific Reading Mr. JUERGENSEN
 Two hours per week; both semesters. Open to graduate students who have completed Course 9 or 10. Both semesters must be completed before credit is given for the first semester.
 1913-14. The literature of evolution (Haeckel, Reinke, *et al.*).

GREEK

JOHN CORRIN HUTCHINSON, B.A., Professor, Head of Department of Greek 112 Folwell Hall
 CHARLES ALBERT SAVAGE, Ph.D., Professor 112 Folwell Hall

6. Lyrics Mr. HUTCHINSON
 Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Course 4 or 5.
 Various forms of Greek poetry other than the epic and dramatic; selections from the elegiac, iambic, lyric, and bucolic poets.
7. Tragedy: Aeschylus or Sophocles Mr. SAVAGE
 Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 4 or 6.
 The reading of the text is supplemented by intensive study of the play read with special reference to literary form and dramatic representation.
8. Philosophy (Advanced): Plato's *Republic* Mr. HUTCHINSON
 Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Course 4. Alternates with Course 9.
 The *Republic* of Plato is read, not primarily for its philosophic interest, but as one of the masterpieces of Greek literature. The study is, therefore, in the main a study of literary style.
9. Oratory (Advanced): Demosthenes' *De Corona* Mr. SAVAGE
 Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Course 5. Alternates with Course 8. Not offered in 1912-13.
 A careful study of the development of oratorical style among the Greeks, and its culmination in this acknowledged masterpiece.
10. Epic Poetry (Advanced): The *Iliad* Mr. HUTCHINSON
 Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 7 or 11.
 The object of this course is to secure as intimate an acquaintance as possible, at first hand, with Homer. The Homeric question is given but scanty attention, its place being in the graduate work (Course 19). Literary values receive chief attention, and that these may be realized by the student as much of the text is read as is consistent with careful work.
11. Dramatic Poetry: Euripides and Aristophanes Mr. SAVAGE
 Four credits (two hours per week); both semesters. Open in the first semester to those who have completed Course 2 or 3, and in the

second semester to those who have completed the first semester's work or Course 7.

First semester, one of the plays of Euripides; second semester, the *Frogs* of Aristophanes. Special attention is given to metre, literary style, and mythology, supplemented by lectures on the authors studied.

12. Greek Composition Mr. HUTCHINSON

Two credits (one hour per week); both semesters. Open to juniors and seniors who have completed Courses 4 and 5. Both semesters must be completed before credit is given for the first semester. Recommended to those who expect to teach Greek.

A systematic review of Greek syntax and the retranslation into Greek of passages translated from various classic authors, illustrative of various styles.

13. Later Greek Mr. HUTCHINSON

Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Course 4.

Selected readings from the Septuagint and the New Testament. Credit will be given for either half of the course.

14. Seminar in Oratory or Philosophy Mr. HUTCHINSON

One credit (one hour per week); first semester. Open to juniors and seniors who have completed Course 4 or 5.

The work is given in connection with Plato's *Republic*.

15. Seminar in Greek Tragedy Mr. SAVAGE

One credit (one hour per week); second semester. Open to juniors and seniors who have completed Course 5.

16. Advanced Course in Epic Poetry Mr. HUTCHINSON

Open to graduate students only.‡

17. Advanced Course in Greek Dramatic Poetry Mr. SAVAGE

Open to graduate students only.‡

18. Advanced Course in Greek Oratory Mr. SAVAGE

Open to graduate students only.‡

19. Later Greek (322 B. C. to 200 A. D.) Mr. HUTCHINSON

Open to graduate students only.‡

HISTORY

FRANK MALOY ANDERSON, M.A., Professor	Library Building
ALBERT BEEBE WHITE, Ph. D., Professor	Library Building
WILLIAM STEARNS DAVIS, Ph.D., Professor	Library Building
WALLACE NOTESTEIN, Ph.D., Assistant Professor	Library Building

‡For further information students are requested to confer with the Professor in charge of the subject.

The Departments of Economics and Political Science, History, and Sociology and Anthropology constitute a Social Science Group. The subjects are intimately inter-related, and they are all of especial importance to students who intend to engage in law, business, public service at home or abroad, journalism, the work of charities and corrections, or to give instruction in one of the social sciences. Students who are interested in the work of any one of the departments of the Social Science Group ought to be familiar at least with the elements of the subjects offered in the other departments. A student who takes his major in any one of them ought to have more than the elements of the others.

Facilities

The Department of History is equipped with library material for "practice courses" in research in American History, especially the colonial and revolutionary periods, in French Medieval History, in English History for the Middle Ages and the seventeenth century, in the French Revolution, and in certain phases of European nineteenth century history. Valuable additions to the University resources in some of these lines are to be found in the excellent library of the State Historical Society and in the State Library at the Capitol in St. Paul (forty minutes distant), and in the City and Athenaeum libraries in Minneapolis.

In none of the lines mentioned, however, is the department satisfactorily prepared to give more than two years of graduate work, with due regard for economy of the student's time and energy. Therefore, if a student desires to take his doctorate in history here, he must be prepared, until the library facilities are materially improved, to do at least a third of his work in libraries elsewhere, under direction of the department.

The following are "general courses" (lectures and readings, with study of selected documents and some research work). They are open to upper classmen in the undergraduate college who have completed one or two elementary courses there; and they may be taken as minors, or parts of minors, for the master's degree. Any one of them may be taken, also, for part of a major towards the master's degree, provided (1) that the applicant has made large preparation in other fields of History, and (2) that the course chosen be accompanied by sufficient work in more intensive courses in the same field. Thus, if an applicant is well prepared in European History, including English Constitutional History, but has had little American History, he might be allowed a major in 5, followed by two, three, or four courses selected from 7-14.

GENERAL COURSES

3. The Renaissance and Reformation Mr. WHITE

Three credits (three hours per week); first semester. Open to those who have completed Course 1 or 2 or 8.

The Renaissance and Reformation as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions; how the medieval world became the modern world.

4. Europe since 1789 Mr. ANDERSON
Six credits (three hours per week); both semesters. Open to those who have completed Course 1 or 2 or 8.

The history of France, with that of other countries grouped about it; political history of the leading European states. Lectures, recitations, and the study of important historical documents, drawn principally from Anderson's *Constitutions and other Select Documents Illustrative of the History of France, 1789-1907*.

5. American Constitutional History to 1840 Mr. ANDERSON
Six credits (three hours per week); both semesters. Open to those who have completed Course 2; required for Courses 7, 9, 11, and 14, and, therefore, of students who intend to specialize in History; recommended for the sophomore year.

6. English History, 1689-1912 Mr. NOTESTEIN
Six credits (three hours per week); both semesters. Open to those who have completed any introductory course. Especially for students of English Literature, Economics and Political Science. Not given in 1912-13.

- a. 1689-1815.
b. 1815-1912.

15. Historical Method and Bibliography Mr. WHITE
Two credits (two hours per week); second semester. Open to those who have completed Course 1 or 2, but designed only for those who intend to specialize in History.

Genesis of the modern historical method and use of the best tools in historical study. Exercises in historical criticism and interpretation; history of historical writings, especially the work of Ranke and his followers and the origin of the seminar system; present methods and advantages of study in Germany and France; existing helps to historical study, such as standard bibliographies, historical magazines, source material, etc.

16. Teachers' Course Mr. ANDERSON
One credit (one hour per week); second semester. Open to seniors and graduate students who have, including courses in progress, twenty-four credits in History; required for those who obtain a teacher's recommendation in History.

To assist those who expect to teach History in high schools. Mr. Anderson will be aided by other members of the department.

21. History of Greece Mr. DAVIS
Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Course 1 or 2, but not to any who have had a course in Greek History.

The political and social development of the Greek states to the time of their incorporation into the Roman Empire, with special attention to the permanent influence of Greek civilization. To alternate with Course 24. Not given in 1912-13.

22. Selected Topics in Greek History Mr. DAVIS
Three credits (three hours per week); second semester. Open to juniors and seniors eligible for Course 21 but desiring a shorter course. Given in alternate years. Offered in 1912-13.

23. Selected Topics in Roman History Mr. DAVIS

Three credits (three hours per week); second semester. Open to students eligible for Course 24 but desiring a shorter course.

To alternate with Course 22. Not offered in 1912-13.

24. History of Rome Mr. DAVIS

Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Course 2, and, on approval, to those who have taken Course 1.

Social and political development, with considerable attention to cultural subjects. In alternate years. Given in 1912-13.

26. History of Europe since 1878 Mr. ANDERSON

Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Course 1 or 2.

A considerable knowledge of European History for the preceding thirty years is indispensable for an intelligent interest in contemporary European politics. The object of this course is to furnish that knowledge and to develop the habit of observing recent and current political events in an historical spirit. Not given in 1912-13.

ADVANCED OR INTENSIVE COURSES

7. The making of the Constitution

Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Course 5, but only on approval of the instructor.

Each member of the class studies in detail the transition in one of the original American colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia Convention; the accounts of later writers compared with the sources; "we the people," the "compact" theory, and the province of the Supreme Court as "final arbiter" the writings of the day and the discussions of the ratifying state conventions.

9. Studies in American Statesmen Mr. ANDERSON

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 2 and at least the first semester of Course 5.

A research course. Each member of the class makes a study of some prominent American statesman; the sifting of the materials and the preparation of brief reports in regard to points assigned for investigation; the criticism of these reports and the synthesis of the results thus obtained. Not given in 1912-13.

10. A Critical Study of an Historical Masterpiece Mr. ANDERSON

Three credits (three hours per week); first semester. Open to those who have completed Courses 3, 4, or 5.

To develop the habit of reading history critically. Each year a masterpiece of historical literature is minutely and critically studied. In 1912-13 Rhodes' *History of the United States from the Compromise of 1850* will be read.

11. The History of American Diplomacy Mr. ANDERSON

Three credits (three hours per week); second semester. Open to seniors and graduate students who have completed Course 5.

A research course dealing principally with the more important features of American foreign policy during the earlier years of the Federal Government.

12. The History of European Diplomacy since 1789 Mr. ANDERSON
 Three credits (three hours per week); second semester. Open to seniors and graduate students who have completed or are taking Course 4; ability to read easy French is required.

Critical reading of the principal treaties and numerous state papers dealing with international relations. Not given in 1912-13.

13. Colonial Expansion and Administration Mr. WEST
 Three credits (three hours per week); second semester. Open to seniors and graduate students who have completed Course 4 or 5. In alternate years. Not given in 1912-13.

The history of the colonial acquisitions of the great nations; colonial institutions and governments studied and compared in detail.

14. A Critical Study of Authorities for Early New England History Mr. WEST

Four credits (two hours per week); both semesters. Open to seniors and graduate students who have completed eighteen credits including Course 5. Given in alternate years.

Historical criticism, based on a minute study of Winthrop's *History of New England*. Each member of the seminar has a group of secondary authorities assigned him which he is to criticize in the light of the original sources. A careful comparison of the chief sources with one another; a minute treatment of political, social, and economic development in early New England. The number admitted to the course is limited to seven.

17. Beginnings of Parliament Mr. WHITE

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed twelve credits, including Course 2, and who obtain the permission of the instructor. Students should have a knowledge of at least high school Latin.

Parliamentary beginnings based wholly upon original sources, dealing with the period from the middle of the twelfth to the middle of the fourteenth century. The origins of representation and popular election; the genesis of England's present two-house assembly; its procedure and powers. Given in alternate years with Course 18. Offered in 1912-13.

18. Origin of the English Judicial System Mr. WHITE

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed twelve credits, including Course 2, and who obtain the permission of the instructor. Students should have a knowledge of at least high school Latin.

Detailed studies in the source material of the period from the seventh to the thirteenth century; the origin and early development of the most distinctive features in England's present-day court system and procedure. Given in alternate years with Course 17. Not offered in 1912-13.

19. Cromwellian England Mr. NOTESTEIN

Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed twelve credits in History, including Course 2. (English 11 is strongly recommended as a desirable reinforcing subject.) Given in two sub-courses, which may be taken independently one of the other.

20. Church and State in the Middle Ages

Mr. DAVIS

Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have twelve credits in History exclusive of courses in American History.

Devoted to the study of the institutions of the Holy Roman Empire and the Papacy between the years 918 and 1254 A. D.

HORTICULTURE

LEROY CADY, B.S. in Agr., Associate Professor of Horticulture and Acting Chief of Division 20 Horticultural Bldg., University Farm

5. Floriculture

Mr. CADY

Three credits; second semester. Open to juniors and seniors. Open to those who have completed Horticulture 10.

Lectures and laboratory work. Greenhouse management; temperature; soil; watering; benches; propagation; prevention of diseases and extermination of insects; rest and growth periods of plants; plants for greenhouse cultivation.

6. Landscape Gardening

Mr. CADY

Three credits (three hours per week); first semester. Required of seniors in Forestry Course.

A general course in the practice and principles of landscape gardening, special attention being given to the planting of small grounds.

12. Advanced Horticulture

Mr. CADY

Six credits (minimum). The advanced course in Horticulture is open to graduates who have completed undergraduate work preparatory to advanced special work in Horticulture along the lines selected.

The parks, greenhouses, orchards, and nurseries in the vicinity of the Twin Cities afford convenient opportunities for contact with the best commercial methods of Horticulture. The facilities in this line are unexcelled perhaps by any other college in the country. A fruit-breeding farm consisting of eighty acres at Zumbra Heights in Carver County, furnishes unique and exceptional facilities for study of plant breeding problems.

LATIN

JOSEPH B. PIKE, M.A., Professor, Head of Department of Latin

118 Folwell Hall

JOHN S. CLARK, B.A., Professor

111 Folwell Hall

JOHN E. GRANRUD, Ph.D., Professor

126 Folwell Hall

For general rules governing the higher degrees, see page 15 and following.

For the Degree of Master of Arts.—For a major in Latin, Courses 17 and 18. The student will be expected to select for his thesis some topic in connection with one of these courses. The course in which he selects his topic will constitute his seminar course. In addition a minor is to be carried throughout the year in one of the following departments: Comparative Philology, English, German, Greek, History, Romance Languages, Scandinavian, or Semetic Languages.

Candidates for the Degree of Doctor of Philosophy in Latin will be expected to spend at least three years in preparation and will carry in addition to one seminar and one graduate course per semester in Latin, one course per semester in advanced Greek (i. e. in advance of two years of preparatory Greek).

A knowledge of Greek and Roman History, Greek and Latin Literature, and a special knowledge of a particular Latin Author or Authors will be required.

*6. Advanced Course in Caesar Mr. PIKE

Three credits (three hours per week); first semester. Open to those who have completed Courses 1 to 4 inclusive; required for a teacher's recommendation in Latin.

Selections from books five to seven of the Gallic War and from the Civil War; the principles of indirect discourse; intermediate Latin composition; class drill work and discussion of various problems connected with secondary school work in Latin.

*7. Advanced Course in Virgil Mr. PIKE

Three credits (three hours per week); second semester. Open to those who have completed Courses 1 to 4 inclusive; required for a teacher's recommendation in Latin.

An interpretation of selections from books seven to twelve of the Aeneid; a study of the quantitative method of pronouncing Latin verse; practice in the metrical rendering of selected passages.

8a. Pliny's Letters Mr. PIKE

Two credits (two hours per week); first semester. Open to those who have completed Courses 1 to 4 inclusive.

Selections from the correspondence of Pliny the Younger with a study of his times.

8b. Latin Romance Mr. PIKE

Two credits (two hours per week); first semester. Open to those who have completed Courses 1 to 4 inclusive.

The *Cena Trimalchionis* and the *Cupid and Psyche* of Apuleius. Courses 8a and 8b are offered in alternate years. Course 8b is offered for 1912-13.

10. Latin Composition Mr. PIKE

Two credits (two hours per week); second semester. Open to those who have completed Courses 1 to 4 inclusive; required for degree with distinction.

Advanced Latin composition and a study of Latin prose style.

11. Roman Elegiac Poetry Mr. CLARK

Three credits (three hours per week); first semester. Open to those who have completed Courses 1 to 4 inclusive.

Selections from Catullus, Tibullus, Propertius, and Ovid, with a study of the rise, development, and characteristics of Roman elegiac poetry.

*Only in special cases will Courses 6 and 7 be allowed to count toward the M.A. degree.

12. Correspondence of Cicero Mr. CLARK
 Three credits (three hours per week); first semester. Open to those who have completed Courses 1 to 4 inclusive.

Selections from the letters of Cicero, with a study of his life and the history of his times.

- 14a. Roman Drama Mr. CLARK
 Three credits (three hours per week); second semester. Open to those who have completed Courses 1 to 4 inclusive.

Selections from Seneca's tragedies and from the comedies of Plautus and Terence, with a study of the rise and development of the drama at Rome.

- 14b. Roman Law Mr. CLARK
 Three credits (three hours per week); second semester. Open to those who have completed Courses 1 to 4 inclusive.

Translations of the text of the *Institutes of Justinian* and of Robinson's *Selections* with an outline study (1) of the sources and development of Roman Law and (2) of Roman private law. Courses 14a and 14b are offered in alternate years. Course 14a is offered for 1912-13.

17. Lucretius Mr. CLARK
 Six credits (three hours per week); both semesters. Open to graduate students who have had at least seven years of Latin. Other arrangements may be ascertained upon application to the department.

The reading and interpretation of the text of Lucretius, with a study of his philosophy and its sources.

18. Seneca Mr. PIKE
 Six credits (three hours per week); both semesters. Open to graduate students who have had at least seven years of Latin. Other arrangements may be ascertained upon application to the department.

Reading, interpretation, and annotation of the *Dialogues* of Seneca, with a study of Stoicism at Rome.

MATHEMATICS

JOHN F. DOWNEY, M.A., C.E., Professor, Head of Department of Mathematics	119 Folwell Hall
GEORGE N. BAUER, Ph.D., Professor	100 Folwell Hall
WILLIAM H. BUSSEY, Ph.D., Assistant Professor	122 Folwell Hall
ANTHONY LISPENARD UNDERHILL, Ph.D., Assistant Professor	121 Folwell Hall
ROYAL R. SHUMWAY, M.A., Assistant Professor	122 Folwell Hall
HERMAN L. SLOBIN, Ph.D., Instructor	121 Folwell Hall

9. Integral Calculus Mr. DOWNEY
 Three credits (three hours per week); each semester. Open to those who have completed Course 8.

Integration of the various forms, integration as summation, rectification of curves, quadrature of plane and curved surfaces, cubature of volumes, equations of loci by means

of the calculus, successive integration with applications to moment of inertia, areas and volumes. Credit toward a minor but not toward a major for a master's degree will be allowed.

10. Advanced Course in Plane Analytical Geometry Mr. BAUER
Three credits (three hours per week); second semester. Open to those who have completed Course 8.

Supplementary to Course 7, treating more fully of the subjects of that course and taking up additional subjects. Not offered in 1912-13.

11. Solid Analytical Geometry Mr. BUSSEY
Three credits (three hours per week); first semester. Open to those who have completed Course 8.

Elementary theorems of projection, co-ordinates, the plane, the line in space, quadric surfaces, transformation of co-ordinates, tangents, poles and polars, the general equation of the second degree. Numerous examples are assigned to illustrate the theory.

12. Differential Equations Mr. UNDERHILL
Three credits (three hours per week); second semester. Open to those who have completed Course 9.

Text and lectures.

14. Modern Synthetic Geometry Mr. BUSSEY
Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 8.

A study of geometry based upon the method of central projection without the use of co-ordinates.

22. Modern Higher Algebra Mr. SHUMWAY
Three credits (three hours per week); first semester. Open to seniors and graduate students who have completed Course 9.

Not offered in 1912-13.

29. Differential Geometry Mr. UNDERHILL
Six credits (three hours per week); both semesters. Open to seniors and graduate students who have completed Courses 11 and 12.

Course 11 may be taken simultaneously with Course 29.

25. Theory of Numbers Mr. BUSSEY
Four credits (two hours per week); both semesters. Open to graduate students who have completed Course 9.

Not offered in 1912-13.

26. Infinite Series Mr. BAUER
Three credits (three hours per week); first semester. Open to seniors and graduate students who have completed Courses 9, 11, 12, and 10 or 14.

27. Advanced Calculus Mr. BAUER
Three credits (three hours per week); second semester. Open to seniors and graduate students who have completed Course 26.

This course goes farther into some of the subjects treated in Courses 8 and 9, and takes up some important subjects not included in those courses.

28. Theory of Functions of a Complex Variable Mr. BAUER
Six credits (three hours per week); both semesters. Open to graduate students who have completed Course 12.

Lectures, readings, and problems. Not offered in 1912-13.

30. Advanced Differential Equations Mr. SLOBIN
Six credits (three hours per week); both semesters. Open to graduate students who have completed Course 12.

Ordinary and partial differential equations, including differential equations with infinitesimal transformations; general theory of linear differential equations; the most important partial differential equations of mathematical physics: Gauss's, Legendre's, Laplace's, Lamé's, and Bessel's functions; the elements and applications of the theory of functions which arise in the theory of differential equations. Not offered in 1912-13.

31. Theory of Functions of Real Variables and Calculus of Variations

Mr. UNDERHILL

Six credits (three hours per week); both semesters. Open to graduate students who have completed Course 12.

Not offered in 1912-13.

MATHEMATICS AND MECHANICS

WILLIAM E. BROOKE, B.C.E., M.A., Professor, Head of Department
of Mathematics and Mechanics 114 Main Engineering Building

BURT L. NEWKIRK, Ph.D., Assistant Professor

105 Main Engineering Building

HANS DALAKER, M.A., Assistant Professor

112 Main Engineering Building

7. Strength and Resistance of Materials Messrs. BROOKE and NEWKIRK
Four credits (four hours per week); first semester.

Before registration for this course the student must pass the required Physics of the sophomore year in addition to the required Mathematics of the two preceding years. Bars, beams, shafts, columns, reinforced concrete, hollow cylinders and spheres, rollers, and plates, and the general theory of internal stress.

8. Hydraulics and Pumping Machinery Messrs. BROOKE and NEWKIRK
Four credits (four hours per week); second semester. Open to those who have completed Course 7.

Laws of the equilibrium, pressure, and flow of liquids; theory of the action of pumps, compression and flow of gases.

9. Thermodynamics of Steam and Gas Engines Mr. BROOKE
Three credits (three hours per week); first semester. Open to those who have completed Course 8.

The mechanical theory of heat as applied to steam, oil, gas and hot air engines, and to compressors, including the use of steam tables, entropy diagrams, etc.

10. Water Turbines Mr. BROOKE
 Two credits (two hours per week); second semester. Open to those who have completed Courses 7 and 8.
 Required for all candidates for degrees in mechanical and electrical engineering, except those who elect either railway engineering or telephony. Theory of the operation, construction, and regulation of turbine wheels.
11. Steam Turbines Mr. BROOKE
 Two credits (two hours per week); second semester. Open to all who have completed Course 9.
 Various types of turbines, velocity, impulse, and reaction; nozzles, vanes, discs, bearings, governors, thermodynamic analysis and efficiency.
12. Analytical Mechanics Mr. BROOKE
 Six credits (three hours per week); both semesters. An advanced Course. Open to those who have completed Courses 5 and 6.
13. Vector Analysis Mr. BROOKE
 Three credits (three hours per week); either semester. Open to those who have completed Course 5.
14. Advanced Calculus Mr. NEWKIRK
 Three credits (three hours per week); either semester. Open to those who have completed Course 5.
15. Differential Equations Mr. NEWKIRK
 Four credits (two hours per week); both semesters. Open to those who have completed Course 5.
16. Partial Differential Equations of Mathematical Physics Mr. BROOKE
 Four credits (two hours per week); both semesters. Open to those who have completed Course 15.
17. Theory of Functions Mr. DALAKER
 Four credits (two hours per week); both semesters. Open to those who have completed Course 15.
18. Applications of Elliptic Functions Mr. BROOKE
 Four credits (two hours per week); both semesters. Open to those who have completed Courses 5, 6, and 15.

MECHANICAL ENGINEERING

JOHN J. FLATHER, Ph.B., M.M.E., Professor, Head of Department of
 Mechanical Engineering 12 Mechanical Engineering Building
 JOHN V. MARTENIS, M.E., Assistant Professor
 21 Mechanical Engineering Building
 WALLACE H. MARTIN, M.E., Instructor
 Mechanical Engineering Building

13. Machine Design Messrs. FLATHER and MARTENIS
 Five credits (ten hours per week); first semester. Required of seniors in Mechanical and Electrical Engineering. Open to those who have completed Courses 11 and 12, Mechanical Engineering. Open only to students pursuing Mathematics 7.

Calculation and design of such machine parts as fastenings, bearings, rotating pieces, pulleys, spur gearing, rope driving, bevel gears, and spiral gears. Recitations, lectures, and drawing-room practice.

14. Machine Design Messrs. FLATHER and MARTENIS
 Three credits (six hours per week); second semester. Required of seniors in Mechanical Engineering. Open only to those pursuing Course 20.

Application of graphical methods to the design of valve gears and link motions. Zeuner diagrams, indicator cards. Lectures and drawing-room practice.

15. Machine Design Messrs. FLATHER and MARTIN
 Four credits (eight hours per week); first semester. Required in post senior year in Mechanical Engineering. Open to those who have completed Courses 14 and 19.

Steam engine: Calculations and working drawings for a high speed automatic steam engine; theoretical diagrams and determination of details.

Gas engine: An alternative course in gas engine design is offered those who have completed Course 21.

16. Machine Design Messrs. FLATHER and MARTIN
 Four credits (eight hours per week); second semester. Required in post senior year in Mechanical Engineering. Open to those who have completed Course 13.

Original designing, including machinery for changing size and form. Boiler design, cranes, pumping and transmission machinery, and engineering appliances. Lectures, problems, and drawing-room practice.

17. Tool Design Mr. FLATHER
 Two to four credits (four to eight hours per week); first or second semester. Elective. Open to those who have completed Courses 6, 13. Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures.

18. Power Plant Design Mr. FLATHER
 Two or four credits (four or eight hours per week); first or second semester. Elective. Open to those who have completed Courses 19, 20.

Problems, designs, and estimates for power plants, central stations and factory equipment. Selection of motive powers, relative advantages of steam and producer gas plants; choice of engines and boilers; water powers; power distribution, dynamos, and motors; pumps, shafting, piping, and accessory plant.

19. Steam Boilers Mr. MARTENIS
 One credit (one hour per week); first semester. Senior year. Open only to students pursuing Mathematics 7.

Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings, and accessories, smoke prevention, mechanical stokers; methods of operating boilers with safety and economy.

20. Steam Engine Mr. FLATHER
 Three credits (three hours per week); second semester. Senior year.
 Open to those who have completed Mathematics 7.

Mechanics of the steam engine. Work in the cylinder; effect of reciprocating parts; steam distribution. Mechanism of the steam engine. A study of the details of modern steam engines, valves and valve gears. A study of the slide valve, link motions, and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instrument, indicator rigging, indicator cards; compounding.

21. Gas Engines and Producers Mr. MARTIN
 Two credits (two hours per week); second semester. Senior year.
 Open only to those taking Course 20, and Chemistry Course 19.

Principles of operation of two-cycle and four-cycle engines; cylinder construction and arrangement; valve gears and starting mechanisms; system of speed control, ignition and cooling. Application of the indicator and consideration of indicator diagrams.

A study of the power gas producer, including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures.

22. Measurement of Power Mr. FLATHER
 (a) Two credits (two hours per week); first semester. Post senior year. Open to those who have completed Mathematics 8.

A study of the methods employed in measuring power. Dynamometers. Prony brakes; measurement of water power; water meters; weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors, power required to drive machine tools and shafting. Recitations and lectures.

- (b) Two credits (two hours per week); second semester. Open to those who have completed Mathematics 8.

Air compressors and motors, and the transmission of power by compressed air. Recitations and lectures.

23. Heating and Ventilation Mr. MARTENIS
 Three credits (six hours per week); first semester. Elective. Post senior year. Open to those who have completed Course 8 Mathematics.

Principles of heating and ventilation. Construction and operation of heating apparatus. Steam, hot water, exhaust, vacuum and fan systems. Lectures, recitations, and design.

Seminar

Open to seniors and post seniors once a week.

The following courses are available to students desiring to prepare themselves for special work in railway engineering.

24. Railway Technology Mr. MARTENIS
 Two credits (four hours per week); first semester. Post senior year, Railway Mechanical Engineering Course. Open to those who have completed Course 20.

The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists in part of a systematic course of visits to the various railroad shops in the vicinity; lectures and recitations.

25. Railway Design Messrs. FLATHER and MARTENIS
 Eight credits (eight hours per week); first and second semesters.
 Post senior year. Open to those who have completed Course 24.

(a) Of link and valve motions. Continuation of Course 14 with special applications of the Stephenson and Walschaert link.

(b) Of locomotive and car details.

(c) Of the locomotive boiler.

(d) Of assembled parts.

26. Locomotive Construction Mr. FLATHER
 Two credits (two hours per week); second semester. Post senior year. Open to those who have completed Course 24.

Lectures, reading, and recitations on design and construction of locomotives, supplementing Course 21. This treats:

(a) Of parts not involving the boiler and the use of steam; but including the carriage, as frames, springs, and equalizing arrangements, running gear, brakes, trucks, lubrication.

(b) Of locomotive boilers and connected parts. Types, proportions, grates, flues, smoke-box, arrangements and stacks, riveted joints bracing and staying. Lagging, smoke prevention.

(c) Of the locomotive engine. Details, heat insulation, cylinder proportion for various types, weight on drivers, special service; crank effort diagrams with inertia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.

27. Locomotive Road Testing Mr. FLATHER
 Two credits; second semester. Post senior year. Open to those who have completed Course 20, and Course 6 Experimental Engineering.

28. Specifications Mr. FLATHER
 One credit (one hour per week); second semester. Post senior year in Mechanical Engineering. Open to those who have completed Courses 19 and 20.

A study of engineering specifications. Classes of specifications; essential features; clauses; details. Examples. Lectures, recitations, and practice in writing specifications.

Advanced Courses are offered in:

Engineering Design

Experimental Investigation

Railway Engineering

PATHOLOGY, BACTERIOLOGY, AND HYGIENE

FRANK F. WESBROOK, M.A., M.D., C.M., Professor and Director of Department of Pathology and Bacteriology

HAROLD E. ROBERTSON, B.A., M.D., Associate Professor

ROBERT H. MULLIN, B.A., M.B., Associate Professor

E. T. BELL, B.S., M.D., Associate Professor

WINFORD P. LARSON, M.D., Demonstrator

GUSTAV A. MAGNUSON, M.D., Demonstrator

The present courses in General Pathology, Bacteriology and Hygiene for medical and engineering students are offered as minors for the graduate degrees.

A major for these degrees shall consist of research in Pathology, Bacteriology or Hygiene, prerequisite to which certain of the regular courses offered in this department must be completed satisfactorily.

Before entrance into any course offered in this department, the student must have a working knowledge of certain groups of subjects, such as Histology, Embryology, Animal Biology, Anatomy, Physiology, Chemistry, Physics, Botany, etc.

1. General Bacteriology Messrs. WESBROOK, MULLIN, MAGNUSSON,
and LARSON

Five and one-half credits (six lecture and recitation hours and ten laboratory hours per week).

Lectures and demonstrations. The general scope of bacteriology, the history of its development, and the biological and chemical problems involved in the life history of bacteria are dealt with.

The classification of the various bacterial forms, the methods of isolation and culture, and the composition and manufacture of culture media are studied until a thorough knowledge of technique is acquired. General and special studies of the various antiseptics, disinfectants, and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, is thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water form an important part of the work. Bacterial activities concerned in sewage purification, etc., will receive attention.

2. General Pathology Messrs. WESBROOK, ROBERTSON, and BELL

Five and one-half credits (seven lecture and recitation hours, and nine laboratory hours per week); fourth year, first quarter.

Lectures, demonstrations, and laboratory work on the general processes involved in disease, which includes:

(a) Inflammation. The cell reaction to various irritants is carefully studied throughout a variety of tissues and animals, so as to be comparative. As soon as familiarity with cell reaction is insured, the inflammatory processes in the various organs and systems are studied.

(b) Regeneration not already dealt with under inflammation is illustrated by specimens especially prepared from experimental animals and clinical and autopsy material.

(c) Inflammatory reactions and pathological processes dependent upon the activities of the circulatory system, including metastasis, thrombosis, embolism, infarction, etc., are systematically studied.

(d) Degeneration. The theories as to causation and the chemical processes involved are presented on the basis afforded by experimental work, together with a large amount of illustrative clinical material.

(e) The general physical, chemical, and biological processes involved in immunity are presented, together with practical and illustrative work on the precipitins, agglutinins, opsonins, etc. The pathology of fever is also fully given.

(f) The theories of causation, the general principles involved, and the classification of tumors are illustrated by a carefully selected assortment of the various types.

3. Obstetric and Gynecologic Pathology (laboratory course) Mr. ADAIR

Course in gross and microscopic pathology of the female generative organs, placenta, membranes, and fetus.

Both anatomical and chemical pathology of diseases peculiar to the pregnant and non-pregnant female will be studied.

4. Pathological Diagnosis and Technique**Mr. ROBERTSON**

Students participate in autopsies, and themselves prepare and examine material from autopsies and operations for final report and record. They thus are able to provide themselves with a set of selected permanent specimens and learn how to describe processes, write reports, and correlate and record results of value to the clinician.

Students become familiar with the various physical, chemical, and staining methods used in modern pathology and gain a knowledge of the preparation of gross and microscopic specimens for demonstration, museum, class, and medical society work. Each reviews the literature of some one or more important pathological process.

5. Public Health Laboratory Technique**Mr. MULLIN**

This course allows the student to become thoroughly familiar with the technique ordinarily employed in a public health diagnostic laboratory. The routine examination of diphtheria and sputum and the Widal test receive considerable attention. In addition the Pasteur treatment for rabies and the methods employed in the sanitary examination of water are demonstrated. Examinations made for other infectious diseases are also shown.

6. Advanced Bacteriological Technique and Special Problems**Mr. LARSON**

This course affords the student an opportunity of studying bacteriological technique in greater detail than can be given in the required course. It deals with special methods of isolation of particular pathogenic species of bacteria, together with special means for their cultivation. It necessitates the bacteriological study of feces, urine, sputum, exudates, etc.

7. Immunity**Messrs. MULLIN and LARSON**

This course gives the student an introduction to the facts of immunity in a practical manner by the study of natural and acquired immunity. Students conduct experiments to show the different types of protective substances mentioned in the theories of immunity and become familiar with the principles and techniques of the modern laboratory methods of serum diagnosis.

1. Advanced Pathology, Bacteriology, and Hygiene

Students will be given opportunity to do any kind of research work for which the laboratory is properly equipped. Each student will be under the direct supervision of some member of the teaching staff.

PHILOSOPHY AND PSYCHOLOGY

NORMAN WILDE, Ph.D., Professor, Head of Department of Philosophy and Psychology 323 Folwell Hall

DAVID F. SWENSON, B.S., Assistant Professor 320 Folwell Hall

JAMES BURT MINER, Ph.D., Assistant Professor 317 Folwell Hall

HERBERT H. WOODROW, Ph.D., Assistant Professor 318 Folwell Hall

CARL L. RAHN, Ph.D., Instructor 320 Folwell Hall

4. Experimental Psychology: The senses**Mr. WOODROW**

Three credits (three hours per week); first semester.

Open to juniors and seniors who have completed Course 1a.

As the number in each laboratory section will be limited, students should arrange with the instructor for their section before registration.

A general survey of experimental methods and results, as well as a training for laboratory research in psychology. Typical experiments on sensation and movement. One hour of class discussion and two double hour laboratory periods.

5. **Experimental Psychology: Higher Mental Processes** Mr. WOODROW
Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 4.

A continuation of Course 4 with experiments on affection, memory, attention, and such other processes as can be studied by laboratory methods. The quantitative phase of experimental psychology.

6. **The Philosophy of the Nineteenth Century** Mr. WILDE
Three credits (three hours per week); second semester. Open to juniors and seniors who have six credits in the department.

This course is the natural conclusion of Course 10 which should, if possible, be taken before, or along with it. The main tendencies discussed are the Idealism of Fichte and Hegel, the Pessimism of Schopenhauer and Von Hartmann, the Associationism of Hartley, James, and John Stuart Mill, the Philosophy of Evolution, the Positivism of Comte, Pragmatism, Materialism, the New Realism.

9. **Ancient and Medieval Philosophy** Mr. WILDE
Three credits (three hours per week); first semester. Open to juniors and seniors who have six credits in the department.

This and the following course is designed to give such an outline of the history of thought as is desirable in a general education. Emphasis is placed upon the human significance of philosophy rather than upon its purely technical aspect. In the first semester the main work will be upon the philosophies of Plato and Aristotle, but the later development will be traced as far as the Renaissance.

10. **Modern Philosophy** Mr. WILDE
Three credits (three hours per week); second semester. Open to juniors and seniors who have six credits in the department.

Lectures on the representative systems of modern philosophy from the Renaissance to the beginning of the nineteenth century, the purpose of the course being to prepare the student to understand the philosophical tendencies of the present. The work will include a study of Bacon, Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume, Kant.

13. **Psychology of Moral and Religious Development** Mr. RAHN
Three credits (three hours per week); first semester. Open to juniors and seniors who have 6 credits in the department.

The purposes of this course are (1) to give a psychological analysis of moral and religious experience, (2) to trace the usual course of development in the individual of these forms of experience, and (3) to suggest the application of these facts to moral and religious education.

14. **Logic of Science** Mr. SWENSON
Three credits (three hours per week); second semester. Open to juniors and seniors who have completed Course 2 and Course 1a or 1b.

An introduction to philosophy through the medium of the special sciences, its aim being to suggest a system of the sciences through a discussion of the nature and relations of their fundamental principles.

15. **Mental Retardation** Mr. WOODROW
Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 1a.

A study of the nature and conditions of retarded and perverted development in children with a view to the detection of mental defects and the devising of special methods for the training of backward children. The course is specially designed for those contemplating teaching or social work. The observation of backward children will be part of the work required.

16. Advanced Educational Psychology Mr. MINER
 Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 1a.

The experimental and statistical methods used in the study of problems in development and education, together with the results of researches in these lines; training for independent psychological investigation of such problems.

17. Seminar in Psychology Mr. MINER
 Six credits (three hours per week); both semesters. Open to seniors and graduate students who have twelve credits in Psychology. Both semesters must be taken before credit is given for the first semester.

Minor or major research in experimental, educational, analytic, genetic, or comparative Psychology.

21. Psychological Principles Mr. SWENSON
 Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Courses 1a or 1b, and 2.

An advanced course, treating in detail some of the more important theoretical problems connected with Psychology. The methods and aim of the science, its fundamental principles, and its relations to other sciences, regard being had to the general outlines of historical development in these respects.

22. Seminar in Philosophy Messrs. WILDE and SWENSON
 Six credits (three hours per week); both semesters. Open to graduate students and suitably prepared seniors.

Individual investigation in the field of philosophy. The general problems studied will vary each year but the work falls naturally into two divisions:

A. *Historical*: Studies in the history of either ancient or modern philosophy and ethics.

B. *Systematic*: Critical and constructive studies in the field of logic, metaphysics, or ethics.

The character of the work and the general topic for the year can be ascertained by consultation with the department.

25. The Philosophy of Plato Mr. WILDE
 Three credits (three hours per week); first semester. Open to seniors, and graduate students who have taken, or are taking, Course 9, 10 or 6.

The reading and discussion of the principal dialogues with a view to understanding the problem and method of Greek philosophy as illustrated in the writings of Plato.

26. The Nervous System and Mental Life Mr. JOHNSTON
 Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students by consent of the instructor.

This course is given in the neurological laboratory of the College of Medicine and Surgery and is recommended for advanced students in psychology and education.

An analysis of nervous mechanisms on the basis of function, followed by a study of the mechanisms of correlation, the growth and education of the nervous system, cerebral functions and localizations, and the neural basis of elementary phenomena of consciousness.

CLINIC IN MENTAL DEVELOPMENT

A free clinic for the study of irregular mental development has been organized by the department. Dr. J. P. Sedgwick, of the College of

Medicine and Surgery, has charge of the physical examinations. Besides the diagnosis of physical and mental condition, treatment is outlined and methods of training are suggested or carried out under the direction of Mr. Miner and Mr. Woodrow. The clinic is of special advantage to those who are studying retardation.

PHYSICS

JOHN ZELENY, Ph.D., Professor, Head of Department of Physics	15 Physics Building
ANTHONY ZELENY, Ph.D., Professor	20 Physics Building
HENRY A. ERIKSON, Ph.D., Assistant Professor	18 Physics Building
ALOIS F. KOVARIK, Ph.D., Assistant Professor	18 Physics Building
LOUIS W. MCKEEHAN, Ph.D., Instructor	19 Physics Building
RUFUS C. SHELLENBARGER, M.A., Instructor	19 Physics Building
JAMES C. SANDERSON, Ph.D., Instructor	32 Physics Building
PAUL E. KLOPSTEG, B.S., Assistant	

7. Electrokinetics Messrs. J. ZELENY, SHELLENBARGER, MCKEEHAN, and ASSISTANT

Four credits (one lecture, two recitations, and two hours laboratory); first semester. Open to those who have completed Course 6.*

The phenomena accompanying the passage of electricity through solids, liquids, and gases; the various laws which govern such discharges; the basic principles of electrical engineering; a brief study of ionization, the X-rays, radioactivity, electric waves and wireless telegraphy, measurements of the various electrical quantities.

8. Sound and Light Messrs. J. ZELENY, SHELLENBARGER, MCKEEHAN, and ASSISTANT

Four credits (one lecture, two recitations, and two hours laboratory); second semester. Open to those who have completed Course 6.

Wave motion and the various phenomena of sound and light; lectures, illustrated with experiments showing the various effects studied; laboratory work to aid the student to a better insight into some of the relations.

9. Advanced Electrical Measurements Messrs. A. ZELENY and KLOPSTEG

Two credits (four hours per week); second semester. Open to those who have completed Course 7.

Devoted mainly to the study and measurements of capacity, inductance, and magnetic induction.

10. Physical Manipulation and Laboratory Technique Mr. JOHN ZELENY

Three credits (six hours per week); first semester. Open to juniors and seniors who have completed Courses 5 and 6.

Especially useful to those who intend to teach the science or to specialize in it. The essential physical manipulations (such as the cleaning and distilling of mercury, soldering,

*See Bulletin of the College of Science, Literature, and the Arts.

glass blowing, glass cutting, glass grinding, making of quartz fibers, etc.), the use of some instruments of precision (such as the cathetometer, the dividing engine, the balance, mercury air pumps and gauges, etc.).

11. **Mechanics** Mr. ERIKSON
Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Courses 1 and 3, or 5 and 6, and Mathematics 8 and 9 (Calculus).
Some problems in mechanics which are essential for advanced physics and chemistry.
12. **Advanced Physical Measurements** Mr. JOHN ZELENY
Three credits (six hours per week); first or second semester. Open to juniors, seniors, and graduate students who have completed Courses 5 and 6.
Individual work in the laboratory on topics specially chosen to serve best the needs and capacity of each student; intended to introduce him to some of the more intricate physical measurements and to teach him self-reliance.
13. **Advanced Physical Measurements** Mr. JOHN ZELENY
Six credits (twelve hours per week); first or second semester. Open to juniors, seniors, and graduate students who have completed Courses 5 and 6.
The same as Course 12 except that twice as much time is devoted to the subject.
14. **Advanced Optics** Mr. KOVARIK
Three credits (three hours per week); second semester. Open to graduate students who have completed Course 8 and Mathematics 8 and 9 (Calculus).
The important optical phenomena.
15. **Electrical Measurements of Precision** Mr. ANTHONY ZELENY
Three credits (six hours per week); first semester. Open to seniors who have completed Course 9.
For electrical engineering and scientific students who desire to specialize in electrical work of the highest precision. Chiefly experimental and includes the following: Making of standard cells; calibration of Wheatstone box bridge; adjustment of resistances, ammeters, and voltmeters; use of the potentiometer in measurements of highest precision; experimental problems involving capacity; inductance, and magnetic flux; measurement of temperatures by electrical methods.
16. **Radioactivity** Mr. KOVARIK
Three credits (three hours per week); first semester. Open to seniors and graduate students who have completed Courses 5, 6, 7, and 8.
Lectures, experimental and descriptive, the various theories and methods of investigation.
17. **Advanced Physical Measurements** Mr. JOHN ZELENY
Three credits (six hours per week); first or second semester. Open to seniors and graduate students who have completed Courses 5, 6, 7, and 8.
The experimental study of some physical phenomena, the nature or laws of which are not yet understood.

18. Advanced Physical Measurements Mr. JOHN ZELENY
Six credits (twelve hours per week); first or second semester. Open to seniors and graduate students who have completed Courses 5, 6, 7, and 8.

The same as Course 17, except that twice as much time is devoted to the subject.

19. The Kinetic Theory of Gases Mr. ERIKSON
Three credits (three hours per week); second semester. Open to graduate students who have completed Courses 5 and 6, and Mathematics 8 and 9 (Calculus).

A study of Meyer's *Kinetic Theory of Gases*.

20. Discharge of Electricity through Gases Mr. JOHN ZELENY
Three credits (three hours per week); first semester. Open to graduate students who have completed Courses 6 and 7, and Mathematics 8 and 9 (Calculus).

Lectures, with experimental illustrations, on the conduction of electricity through gases; the conductivity imparted to gases by the action of X-rays, ultra-violet light, radioactive substances, and glowing metals; the discharge of electricity from points and in vacuum tubes; the spark and arc discharges; the methods of measuring the velocity of the ions and the charges carried by them.

21. The Mathematical Theory of Electricity and Magnetism

Mr. ANTHONY ZELENY

Three credits (three hours per week); first semester. Open to graduate students who have completed Courses 6 and 7, and Mathematics 8 and 9 (Calculus).

The study of J. J. Thomson's *Elements of the Mathematical Theory of Electricity and Magnetism*.

PHYSIOLOGY AND PHARMACOLOGY

RICHARD OLDING BEARD, M.D., Director of the Department and Professor of Physiology

FREDERICK H. SCOTT, M.B., Ph.D., D.Sc., Assistant Professor

Departmental Office in Millard Hall

PHYSIOLOGY

The department offers major and minor courses in general physiology and in physiologic chemistry to graduate students. These courses will be so planned as to give students the opportunities of individual study, of training in physiologic technique and in bio-chemical methods and of investigation of special problems. They will be conducted independently of undergraduate courses, but graduate students will have access to the general laboratories and may observe and assist in the direction of undergraduate work.

A major may be taken in general physiology and a minor in physiologic chemistry, or vice versa. The periods of study will be arranged to conform to such selection.

If either subject is elected as a major, it will cover periods of two to three lecture hours and ten to twelve laboratory hours a week throughout the year; if elected as a minor, it will be planned to cover one-half this number of weekly periods.

Open to those graduates, who, electing these courses as their major, have successfully completed two years' work in biology or in the medical sciences and have had suitable preparation in physics and physical chemistry; or, who, electing these courses as a minor, have completed one year in these preliminary studies.

1. Cellular Physiology

Messrs. BEARD and SCOTT

a. A study of the fundamental properties of tissue-cells in general; of the progress of functional specialization; of the physico-chemical processes in tissue cells; of the phenomena of cell stimulation.

b. The physiology of special cell types; of epithelial tissues, connective tissues, muscle tissues, and nerve cells. The study of the media of cell nutrition. The technique of blood examinations.

2. The Neuro-muscular Mechanisms

Messrs. BEARD and SCOTT

Study of the fundamental principles of nerve and muscle action; of the distinctive properties of each element in the nerve-muscle machine; of the relation of stimuli to response; of the factors of influence in the functions of nerve and muscle.

3. Vascular and Lymph Mechanisms

Messrs. BEARD and SCOTT

Studies in the circulation of blood and lymph; methods of observation, including the technique of blood-pressure estimation; the use of cardiographic and sphygmographic apparatus; the interpretation of tracings and the recognition of heart sounds.

4. The Alimentary Tract

Messrs. BEARD and SCOTT

A study of the secretory and mechanical factors in digestion; the process of secretion and the relations to it of blood supply; the process and mechanisms of absorption; the neuro-muscular mechanisms of the digestive tract.

5. The Respiratory Tract

Mr. SCOTT

The mechanics of respiration; the study of respiratory interchanges; the nervous mechanism of respiration; a study of influences affecting the respiratory rhythm.

6. The Physiology of Excretion

Mr. SCOTT

a. The functions of the skin; the influence of atmospheric conditions; the relations of blood supply; the nervous mechanism of perspiration.

b. The mechanism and functions of the kidney; the physical and physiological processes of excretion; the relations of blood supply; the compensatory relations of skin and kidney.

7. The Physiology of the Nervous System

Messrs. BEARD and SCOTT

a. A practical study of special sense function, including the technique of methods of determining acuity, threshold, reaction time, range, etc.

b. The central nervous system; a study of the functional development and relations of fibre tracts and cell groups, of association paths and of central peripheral localizations of function.

Open to those, who, electing these courses as their major, have satisfactorily completed two years' work in quantitative, organic, and physical chemistry and who have had suitable preparation in morphology or who are graduates in medicine; and to those, who, electing these studies as their minor, have pursued one year's work in quantitative, organic, and physical chemistry.

1. The Material Bases of the Animal Body Messrs. BEARD and SCOTT

A practical study of the physiological components and their relations in the tissue cell; the physiologic chemistry of the several types of tissue and of the fluids of the body.

2. The Physiologic Chemistry of Digestion Messrs. BEARD and SCOTT

The preparation and analysis of the digestive fluids; the study of digestive ferments and hormones; the processes of digestion; the determination of digestive products; the examination of the debris of digestion.

3. The Chemistry of Respiration Mr. SCOTT

The analysis of atmospheric and alveolar air; the gas analysis of the blood; the chemical and spectroscopic examination of hemoglobins; the determination of respiratory quotients.

4. The Physiologic Chemistry of the Urine Messrs. BEARD and SCOTT

The qualitative and quantitative analyses of the urine, including the determination and differentiation of the urinary nitrogens; the study of urinary pigments; the crystallogeny of the urine; the physico-chemistry of the urine, etc.

5. Studies in Metabolism and Nutrition Messrs. BEARD and SCOTT

The study of standard dietaries and the estimation of food values; the analysis of foods; the determination of nutritive balance upon varying diets, including the statistical examination of the urine and of the feces; the phenomena of heat production and heat loss.

PLANT PATHOLOGY AND AGRICULTURAL BOTANY

EDWARD M. FREEMAN, Ph.D., Professor of Plant Pathology and Botany,
and Chief of Division 30 Horticultural Bldg., University Farm

WIELAND L. OSWALD, Instructor in Agricultural Botany
31 Horticultural Bldg., University Farm

E. C. STAKMAN, M.A., Instructor in Vegetable Pathology
35 Horticultural Bldg., University Farm

4. Advanced Pathology Mr. STAKMAN

Six credits (six hours per week); both semesters. Elective. Open to seniors who have completed Vegetable Pathology, Mycology.

Special cultural and laboratory methods in Plant Pathology. Special practical problems in plant diseases. Laboratory, reference, and lecture work.

6. Advanced Agricultural Botany Mr. OSWALD

Six credits (six hours per week); both semesters. Elective. Open to seniors who have completed Vegetable Pathology 3.

Special work along agricultural botanical lines. Special problems in seed testing and weed work.

5. Advanced Pathology Mr. FREEMAN
Six credits (minimum). Open to graduate students who have completed three years of Botany and one year of Pathology.

Special problems will be assigned, usually including work during the summer months, given as minor or major work for advanced degrees.

7. Advanced Agricultural Botany Mr. FREEMAN
Six credits (minimum). Open to graduate students who have had a total of four years in Botany.

Special problems in agricultural botanical lines, given as minor or major toward higher degrees.

RHETORIC AND PUBLIC SPEAKING

JOSEPH M. THOMAS, Ph.D., Professor, Head of Department of Rhetoric and Public Speaking 310 Folwell Hall

FRANK M. RARIG, M.A., Assistant Professor 309 Folwell Hall

EDWARD A. COOK, B.L., Assistant Professor 314 Folwell Hall

3. Advanced Rhetoric Mr. FORD
Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Courses 1 and 2.

Structure and style, theoretically and practically considered; the oral presentation of topics. In the composition work the student is allowed to select his own subjects and methods of treatment.

5. Analysis of Prose Mr. THOMAS
Three credits (three hours per week); first semester. Open to juniors and seniors who have completed Courses 1 and 2.

The principles of structure, diction, and style, which underlie the work of leading English writers; application of these principles in both imitative and original compositions.

6. Short-Story Writing Mr. THOMAS
Three credits (three hours per week); second semester. Open to juniors and seniors who have shown exceptional proficiency in Course 2.

Analytical studies in the technique of the short story, accompanied by constructive work in story writing.

7. Essay Writing Mr. COOK
Six credits (three hours per week); both semesters. Open to juniors and seniors who have completed Courses 1 and 2.

Practice in the writing of such forms of the essay as the didactic essay, the biographical essay, the book-review, the critical essay, the informal essay; opportunity for extended composition. About three essays a semester will be written. Through conferences, individual aid will be given to the student in the gathering of material, the planning of each paper, and the criticism of each essay. An analysis of a considerable body of modern essays will be part of the class-room work.

9. Seminar in Rhetoric Mr. THOMAS
Four credits (two hours per week); both semesters. Open to seniors and graduate students who have completed Courses 1 and 2 and at least one other course.

This is intended for those who are specializing in Rhetoric and Composition. The course will be devoted to lectures, reports, and theses on special problems of rhetorical theory.

10. Seminar in Composition

Mr. THOMAS

Four credits (two hours per week); both semesters.

This course is intended for a limited number of advanced students who write with facility, and who desire personal criticism and direction. The criticism of manuscripts submitted for inspection will be accompanied by lectures upon the fundamental principles of English composition.

PUBLIC SPEAKING

21. Interpretative Reading

Mr. RARIG

Six credits (three hours per week); both semesters. Open to those who have completed Rhetoric 1 and 20.

This course aims to develop intelligent, suggestive, sympathetic reading. The text used is Shakespeare's plays.

23. Oratorical Composition

Mr. RARIG

Six credits (three hours per week); both semesters. Open to those who have completed Rhetoric 1 and 20.

Masterpieces of oratory are read and analyzed. Students write orations with special reference to the occasion, the timeliness of the material used, and the nature of the audience.

ROMANCE LANGUAGES

CHARLES W. BENTON, Litt.D., Professor, Head of Department of Romance Languages	200 Folwell Hall
CHARLES M. ANDRIST, M.L., Professor	228 Folwell Hall
JULES T. FRELIN, B.A., Assistant Professor	228 Folwell Hall
CARL M. MELOM, M.A., Instructor	225 Folwell Hall
RUTH SHEPARD PHELPS, M.A., Instructor	223 Folwell Hall

5. The Classical Period of French Literature

Messrs. BENTON, ANDRIST, and FRELIN

Six credits (three hours per week); both semesters. Open to those who have completed Course 2 or 3. Both semesters must be completed before credit is given for the first semester.

The reading of works and selections produced during the classical period of French literature and conversations in French concerning the same. The works of Corneille, Racine, Moliere, La Fontaine, *et al.* Compositions.

6. Advanced French Conversation

Mr. BENTON

Four credits (two hours per week); both semesters. Open to those who have completed Course 2 or 3. Both semesters must be completed before credit is given for the first semester.

Conversations on French history, literature, the drama, etc.

7. French Literature of the Nineteenth Century Mr. BENTON
Six credits (three hours per week); both semesters. Open to those who have completed Course 2 or 3, and Course 5. Both semesters must be completed before credit is given for the first semester.

Lectures in French on the history of modern literature. Select works of some of the authors read and discussed. Compositions and essays.

8. Teachers' Course in French Mr. BENTON
Two credits (one hour per week); both semesters. Open to those who have completed Course 5. Both semesters must be completed before credit is given for the first semester.

Special practice in pronunciation. Discussion in French of methods of teaching the French language and literature.

9. Romance Philology Mr. BENTON
Two credits (one hour per week); both semesters. Open to those who have completed Course 5. Both semesters must be completed before credit is given for the first semester.

Lectures on the phonetical development of the French and other Romance languages from popular Latin. Reading of Old French texts.

14. Advanced Spanish Mr. MELOM
Six credits (three hours per week); both semesters. Open to those who have completed Courses 11 and 13. Both semesters must be completed before credit is given for the first semester.

Lectures and collateral readings of representative Spanish authors.

15. Romance Languages: Old French Mr. BENTON
Two hours per week; both semesters. Open to graduate students; other arrangements may be ascertained upon application to the department.

Comparative phonetics and grammar of French and other Romance languages. Some of the oldest monuments of the French languages are studied and the phonetic changes compared with modern French and English. Special attention is given to the period when French words came into the English language.

16. History of French Literature Mr. BENTON
One hour per week; both semesters. Open to graduate students; both semesters must be completed before credit is given for the first semester.

A discussion of the evolution of the various schools and doctrines in French literature.

17. Italian Literature Miss PHELPS
Two credits (one hour per week); both semesters. Open to juniors, seniors, and graduate students who have completed Course 10. Both semesters must be completed before credit is given for the first semester.

History of Italian Literature; special, *The Divine Comedy*.

SCANDINAVIAN*

GISLE BOTHNE, M.A., Professor, Head of Department of Scandinavian Languages 218 Folwell Hall

ANDREW A. STOMBERG, M.S., Professor 217 Folwell Hall

*See note page 18.

5. Old Norse (Icelandic) Mr. BOTHNE
 Four credits (two hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Courses 1 and 2, or 3 and 4.
 Grammar and reading. *Gunnlaugs Saga Ormstungu*.
6. Modern Norwegian Literature Mr. BOTHNE
 Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Courses 1 and 2. Both semesters must be completed before credit is given for the first semester.
 History of Norwegian literature from 1814 to the present day.
7. Swedish Literature Mr. STOMBERG
 Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Courses 3 and 4. Both semesters must be completed before credit is given for the first semester.
 History of Swedish literature from 1719 to the present time. History of the literature and study of modern authors, including Selma Lagerlof, Geijerstam, Strindberg.
8. Ibsen Mr. BOTHNE
 Two credits (two hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 6.
 Lectures, reading, and interpretation.
9. History of Northern Europe Mr. STOMBERG
 Six credits (three hours per week); both semesters. Open to juniors, seniors, and graduate students who have completed Course 1 or 3 or the equivalent, or Course 1, 2, or 3 in History.
 History of the Scandinavian countries from the earliest period to recent times. First semester: The archaeology of the Scandinavian countries and the Viking expeditions and settlements. Second semester: Sweden's role as a leading power of Europe in the sixteenth and seventeenth centuries, political and administrative changes in Denmark, the growth of nationality in Norway.
10. Early Norwegian Literature Mr. BOTHNE
 Two credits (two hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 6.
 Selected sagas, Norwegian and Danish folk-songs, Holberg, Wessel.
11. Modern Danish Literature Mr. BOTHNE
 Two credits (two hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Courses 1 and 2, or 3 and 4.
 From Oehlenschlaeger to the present time.
12. Modern Swedish Language and Literature Mr. STOMBERG
 Four credits (two hours per week); both semesters. Open to graduate students who have completed Courses 1 and 2, or 3 and 4.
 The course is based upon Schuck & Warburg's *Illustrerad Svensk Litteraturhistoria* and includes a study of special authors.

13. History of the Scandinavian Languages Mr. BOTHNE
Two credits (one hour per week); both semesters. Open to graduate students who have completed Course 5.
14. Old Norse (advanced course); The Elder Edda Mr. BOTHNE
Four credits (two hours per week); both semesters. Open to graduate students who have completed Course 5.
For courses in Scandinavian Philology, see statement of the Department of Comparative Philology.
15. Strindberg Mr. STOMBERG
Two credits (two hours per week); first semester. Open to seniors and graduate students who have completed Courses 3, 4, and 7.
Lectures, reading, and interpretation.

SOCIOLOGY AND ANTHROPOLOGY

SAMUEL G. SMITH, Ph.D., LL.D., Professor, Head of Department of Sociology and Anthropology	14 Folwell Hall
ALBERT ERNEST JENKS, Ph.D., Professor	13 Folwell Hall
SAMUEL N. REEF, Ph.D., Assistant Professor	13 Folwell Hall

GENERAL LECTURES IN SOCIOLOGY

President Vincent will lecture to the students in the Department of Sociology and Anthropology from time to time during the year on Social Theories and Methods of Investigation.

9. Social Theory Mr. REEF
Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 2 or 8, and one other course.
A study of the foundations of sociology. A study of the leading American, English, French, and German writers to discover their methods of approach to the science and the leading results they have secured.
10. Biblical Sociology Mr. SMITH
Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and 4.
The development of Hebrew institutions, especially the church, the family and the state; a comparison of similar institutions among people of like condition of culture; the effect upon Israel of the geography of Palestine; an account of its contact with other peoples; and the development of its religious ideas.
11. The Philippine People Mr. JENKS
Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and one other course.
The geography, natural resources, and ethnology of the Philippine Islands; comparative study of the four large ethnic and culture groups of people; tropical influences; the

present policy of the Insular Civil Government so far as it tends to modify the natural characteristics and modern culture of the inhabitants, and to effect American home interests in the Orient. Lectures, illustrated lectures, assigned readings, and thesis.

12. Physical Anthropology

Mr. JENKS

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 7 or Course 1 in Animal Biology, and one other course in the department.

The physical variations in the human body, with special attention to those variations which distinguish one race or group of men from another; the cause and significance of such variations; the physical evolution of the human body and forecast of its future. Six lectures on the development and anatomy of the human brain are given by Dr. Charles A. Erdmann, of the Medical Faculty. This course is of prime importance to advanced students preparing for the medical course. Text-book, lectures, laboratory work, assigned readings, and thesis.

13. The American Negro

Mr. JENKS

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and one other course.

The negro's African tribal kinsman, and the rise and development of the American negro race from the birth of American slavery; the present characteristics, traits, and conditions of the negro; the developing tendencies; and the probable future of the American negro race. Text-book, lectures, assigned readings, and thesis.

14. The American People

Mr. JENKS

Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and one other course.

The distribution in the United States of the different peoples of the world found here; the natural genius of the peculiar home development of these peoples, and the modifications of this development in America; the dominant physical, mental, moral, and cultural characteristics of each people, and their relative importance to the nation. Text-book lectures, assigned readings, and thesis.

15. The American People (Continued)

Mr. JENKS

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have credit for Course 14.

A continuation of Course 14. The facts and forces of amalgamation and assimilation in America; essential and unique historical Americanisms and their value and virility for the future; America's ethnic problems. Lectures, assigned readings, and thesis.

16. Modern Social Institutions

Mr. REEP

Three credits (three hours per week); first semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and one other course.

The fundamental social institution, the family, and the development of modern industrial, political, educational, and ecclesiastical institutions in their relation to human progress.

17. Social Evolution

Mr. REEP

Three credits (three hours per week); second semester. Open to juniors, seniors, and graduate students who have completed Course 1 or 2, and one other course.

Evolution in its relation to social progress; the factors which compose a standard of social progress; the direction of social progress. The comparative study of the different standards and rational sanctions by which social progress may be determined.

18. Seminar in Sociology and Anthropology

Messrs. SMITH, JENKS, and REEP

Three credits (three hours per week); first semester. Open to seniors, having twelve hours of correlated work, and to graduate students. An advanced course of method and independent research.

STRUCTURAL ENGINEERING

FRANK H. CONSTANT, C.E., Professor of Structural Engineering

133 Main Engineering Building

JOHN I. PARCEL, B.S., Instructor in Structural Engineering

223 Main Engineering Building

23. Structural Design

Messrs. CONSTANT and PARCEL

Five credits (ten hours per week); first semester. Post senior year. Open to students who have completed Courses 20 and 22.

Theory and design of steel structures, including mill buildings, railway and highway bridges, standpipes and towers, and other problems of structural interest. Lectures, problems, and design.

24. Structural Design

Messrs. CONSTANT and PARCEL

Five credits (ten hours per week); second semester. Post senior year. Continuation of Civil Engineering 23.

With special reference to the design of steel railway bridges and the theory and design of steel arch bridges. Lectures, problems, and designs.

25. Swing Bridges

Mr. CONSTANT

Four credits (eight hours per week); second semester. Post senior year in Civil Engineering.

Theory and design of swing and bascule bridges, with special attention to the design of the operating machinery. Moving structures. Lectures, problems, and design.

26. Masonry Construction

Mr. CONSTANT

Five credits (eight hours per week); first semester. Post senior year. Open to those who have completed Civil Engineering 20.

Foundations, design, and use of cribs, cofferdams, and pneumatic caissons, pressure of earth, design of retaining walls, piers, abutments, dams, and chimneys. Properties of stones, bricks, cement, and concrete. Recitations and lectures, two hours per week; drawing room work, six hours per week.

27. Reinforced Concrete

Mr. CONSTANT

Three credits (six hours per week); second semester. Post senior year. Open to those who have completed Civil Engineering 26.

Theory and design of reinforced concrete beams, slabs, and columns; application of reinforced concrete to buildings, dams, retaining walls, and arches. Lectures, problems, and design.

28. Higher Structures Messrs. CONSTANT and PARCEL
 Three credits; either semester. Open to those who have completed Courses 20, 22, and 23.
 Theory and design of cantilever, arch, and suspension bridges.
29. Higher Structures Mr. CONSTANT
 Three credits; either semester. Open to those who have completed four semester credits in Structural Engineering.
 Analysis and design of spacial structures, including domes, complex and unsymmetrical towers and roofs.
30. Higher Structures Mr. CONSTANT
 Three credits; either semester. Open to those who have completed four semester credits in Structural Engineering.
 Analysis of statically indeterminate structures. Stress and deflection influence lines for statically determinate and indeterminate structures. Applications of general methods to practical design.
31. Secondary Stresses Mr. CONSTANT
 Three credits; either semester. Open to those who have completed four semester credits in Structural Engineering.
 Study of secondary stresses arising in various classes of structures.

VETERINARY MEDICINE

MYRON H. REYNOLDS, B.S., M.D., D.V.M., Professor of Veterinary Medicine and Surgery, and Chief of Division 12 Veterinary Building
 CHARLES C. LIPP, D.V.M., Assistant Professor 12 Veterinary Building

6. Problems in Domestic Animal Sanitation Mr. REYNOLDS
 Six credits (minimum). Open to graduate students in Animal Husbandry, Dairy Husbandry, or Veterinary Medicine.
 This covers problems of live stock sanitation. It includes studies of losses to animal husbandry by disease, and the causes of those losses. It includes also studies of live stock sanitary control work at home and abroad.
 The students who have had suitable training in bacteriology may select special problems in state control work with any of the most serious infectious diseases of live stock. Direct connection is had with the Minnesota State live stock sanitary board work for the study of records. An extensive veterinary library is available for reference.
7. Problems in the Higher Physiology of Nutrition Mr. LIPP
 Six credits (minimum). Open to graduate students in Animal or Dairy Husbandry or Veterinary graduates having suitable preliminary training.
 This course covers problems in the histologic and physiologic features of nutrition, including a study of the juices and secretions involved in the process.

STUDENTS

CANDIDATES FOR DEGREES OF JUNE 1912

For Doctor of Philosophy—2

- Francis Cowles Frary, Analytical Chemist '05; M.S. '06, Minnesota Minneapolis
 Major, Chemistry; Minors, Electrical Engineering, Electrochemistry
 Thesis, Equilibria in Systems Containing Alcohols, Salts, and Waters, including
 a New Method of Alcohol Analysis
- Charles Eugene Johnson, B.A. '06; M.A. '07, Minnesota Minneapolis
 Major, Comparative Anatomy; Minors, General Physiology, Ornithology
 Thesis, The Development of the Prootic Head Somites and Eye Muscles of *Chelydra serpentina*

For Master of Arts—21

- Doris Lilian Brown, B.A. '11, Minnesota Minneapolis
 Major, Mathematics; Minors, Astronomy, Philosophy
 Thesis, Infinite Products
- Louise Hedwig Bruhn, B.A. '09, Minnesota Minneapolis
 Major, German; Minors, English, Philology
 Thesis, Contrast as a Dramatic Principle in Schiller's Dramas
- Arthur C. Burkhard, B.A. '11, Minnesota Minneapolis
 Major, German; Minors, Philology, English
 Thesis, The Sources of Schiller's *Die Rauber*
- Carl Graham Campbell, B.A. '07, Minnesota Burkeville, Va.
 Major, Education; Minor, Agriculture
 Thesis, The Introduction of Agriculture into the High School
- Walter Maurice Crawford, Ph.B. '03, Hamline Kasson
 Major, Psychology; Minors, Education, Philosophy
 Thesis, Reaction Times to the Cessation of Stimuli
- Nevada Sutherland Evans, B.A. '10, Minnesota Minneapolis
 Major, Plant Pathology; Minors, Mycology, Entomology
 Thesis, Studies on the Life History of *Sclerotinia fructigena* (Persoon) Schroeter
- Richard Arthur Graves, B.A. '09, Minnesota Minneapolis
 Major, Economics; Minors, Political Science, Education
 Thesis, The Development of Agriculture in Minnesota
- Ruth Elizabeth Hermann, B.A. in Education, '11, Minnesota Minneapolis
 Major, Blood of Vertebrates; Minor, Industrial Botany
 Thesis, The Blood of the Garter Snake (*Eutaenia radix* and *E. Sirtalis*)
- D. Edward Hickey, B.A. in Education, '10, Minnesota St. Paul
 Major, Education; Minor, Agriculture
 Thesis, Agriculture in our High Schools
- Henry John, B.A. '11, Kansas Minneapolis
 Major, Mammalian Embryology; Minors, Anatomical Technique, Physical Chemistry
 Thesis, The Changes in the Mucosa and Glands of the Rodent Uterus during
 Pregnancy
- Elta Lenart, B.A. '10, Minnesota Minneapolis
 Major, Rhetoric; Minors, Philosophy, English
 Thesis, Plato's Conception of Rhetoric
- Marie Caroline Lyle, B.A. '11, Minnesota Minneapolis
 Major, English; Minors, English, Education
 Thesis, The Relation of the Lucifer Tradition in the Literary Compositions of the
 Middle Ages to the Story of the Fall of the Angels in the Mystery Plays
- David McCaslin, B.A. '04, Coe College; B.S. '07, James Milliken University St. Paul
 Major, Rhetoric; Minor, English
 Thesis, Wordsworth's Theory of Poetic Diction

- Wallace MacMurray, B.A. '11, Minnesota St. Paul
 Major, English; Minors, English, Sociology
 Thesis, Elements in the Composition of the Medieval Play of the Nativity and their Relation to the Final Form
- Gustav S. Petterson, B.A. '11, Minnesota St. Paul
 Major, Sociology; Minors, Psychology, Education
 Thesis, Some Social Possibilities of the School Curriculum
- Frances H. Relf, B.A. in Education, '11, Minnesota St. Paul
 Major, History; Minor, Economics
 Thesis, The Sources for the Debates in the House of Commons during the Session of 1629; Being a Part of the Introduction to a Critical Edition of the *Nicholas Notes*
- Clifford Griffith Schultz, B.A. '11, Minnesota Minneapolis
 Major, History; Minors, History, Philosophy
 Thesis, Commercial Relations of the United States and Great Britain, 1783 to 1795
- Hazel Louise Wheeler Storr, B.A. '11, Minnesota St. Paul
 Major, English; Minors, Education, Sociology
 Thesis, The Subjectivity of Ibsen
- Sweyne W. Swenson, B.A. '07, Minnesota Minneapolis
 Major, Political Science; Minors, Economics, History
 Thesis, Representation in the Minnesota State Legislature
- Ruth Thompson, B.A. '08, Ripon College Minneapolis
 Major, History; Minor, Economics
 Thesis, The Sioux Treaties at Traverse des Sioux and Mendota in 1851 and their outcome
- Huldah Lucile Winsted, B.A. '11, Minnesota Minneapolis
 Major, Education; Minors, Geography, Sociology
 Thesis, The Open-Air School Movement

For Masters of Science—8

- Basil M. Benzin, B.S. in Agriculture, '10, Minnesota St. Petersburg, Russia
 Major, Plant Breeding; Minors, Ecology, Agricultural Botany
 Thesis, Drouth Resistance as a Factor in Plant Breeding
- Einer Johnson, B.A. '10; B.S. in Chemistry, '11, Minnesota Minneapolis
 Major, Hydrogen Sulphide in Illuminating Gas; Minors, Paint Analysis, Physical Chemistry
 Thesis, An Apparatus and Method for Determining Hydrogen Sulphide in Illuminating Gas
- William H. Kenety, B.S. in Forestry, '11, Minnesota Fulda
 Major, Forest Ecology; Minors, Physiology, Advanced Plant Pathology
 Thesis, Natural Reproduction in the Cloquet Forest
- Alfred Rudolph Kohler, B.S. in Agriculture, '06, Iowa State College St. Paul
 Major, Plant Breeding; Minors, Plant Pathology, Economics
 Thesis, Inheritance in Potatoes under Asexual Reproduction
- Masaji Kugimoto, M.S. in Agriculture, '08, Imperial University of Tokyo Tokyo, Japan
 Major, Animal Nutrition; Minors, Meat, Stock Judging
 Thesis, The Relation of Food Nutrients to the Production of Milk Solids
- Earl Pettjohn, B.A. '06; B.S. '11, Minnesota Minneapolis
 Major, Organic Chemistry; Minors, Industrial Botany, Physical Chemistry
 Thesis, A Chemical Study of the Fruit of the Hawthorn (*Crataegus*)
- Mark Joseph Thompson, B.S. in Agriculture, '11, Minnesota St. Paul
 Major, Agriculture; Minors, Soils, Botany
 Thesis, Crop Production in Relation to Physical Factors
- Arne G. Tolaas, B.S. in Agriculture, '11, Minnesota St. Paul
 Major, Plant Pathology; Minors, Bacteriology, Plant Physiology
 Thesis, Bacteriosis of Cultivated Mushrooms

For Master of Forestry—1

- Julius V. Hofmann, B.S. in Forestry, '11, Minnesota Janesville
 Major, Advanced Sylviculture; Minors, Advanced Ecology, Taxonomy
 Thesis, The Cottonwood (*Populus deltoides*): A Tree Study

LIST OF CANDIDATES ENROLLED

For Doctor of Philosophy and Doctor of Science—19

William Bethke, B.A. '10, M.A. '11, Minnesota	Franklin
Major, Political Science; Minors, Economics, Sociology, and Anthropology	
Harold H. Brown, B.A. '09, M.A. '10, Syracuse University	Minneapolis
Major, Organic Industrial Chemistry; Minors, Physical Chemistry, Mineralogy	
Lillian Cohen, B.S. '00, M.S. '01, Minnesota	Minneapolis
Major, Chemistry; Minors, Food Analysis, Physics	
Alfred Davis, B.A. '09, M.A. '10, Minnesota	Minneapolis
Major, Astronomy; Minor, Mathematics	
Henry D. Funk	
Major, History	
Glenn W. Goldsmith, B.A. '11, Minnesota	Minneapolis
Major, Botany; Minors, Botany, Chemistry	
Frank F. Grout, B.S. '04, M.S. '08, Minnesota	Minneapolis
Major, Economic Geology; Minors, Petrography, Analytical Chemistry	
Harry V. Harlan, B.S. '04, M.S. '09, Kansas Agricultural College	St. Paul
Major, Plant Breeding; Minor, Morphology, Taxonomy	
Louise Jensen, B.A. '09, Minnesota; M.A. '10, Smith College	Minneapolis
Major, Ecology; Minors, Mycology, Plant Pathology	
Alfred Edmund Koenig, B.A. '06, Redfield College; M.A. '10, Minnesota	Minneapolis
Major, German; Minor, Philology	
Rasmus Malmin, Ex.Ar. '82, Phil. '84, Heb. '85, Theol. '89, M.A. '06, Christiania	Thompson, Iowa
Major, Hebrew and Aramaic; Minors, Jewish History, Modern Norwegian Literature	
Leonard Pitchford, B.S. '07, Nebraska; M.S. '10, Minnesota	Minneapolis
Major, Technical Chemistry; Minor, Physical Chemistry	
Frederick W. Poppe, B.A. '10, Lawrence College; M.S. '11, Minnesota	Appleton, Wis.
Major, Contributions to our Knowledge of the Terpenes; Minors, Mineralogy, Physical Chemistry	
Frederic W. Schlutz, B.A. '98, Wartburg; M.D. '02, Maryland	Minneapolis
Major, Physiologic Chemistry; Minors, Anatomy and Pathology, Organic and Physical Chemistry	
John Hasey Wheeler, B.A. '96, Harvard; M.A. '09, Minnesota	St. Paul
Major, French; Minor, Italian	
Gilbert L. Wilson, B.A. '96, M.A. '99, Wittenberg College	Minneapolis
Major, Anthropology; Minors, English, Spanish	
Roger Wilson, B.A. '10, M.A. '11, Wabash College	Minneapolis
Major, Chemistry; Minors, Industrial Chemistry, Mineralogy	
Parley Paul Womer, B.A. '92, B.S. '95, Yale	St. Paul
Major, Economics; Minor, Sociology	
Benjamin F. Zuehl	St. Paul
Major, Psychology; Minor, Sociology	

For Master of Arts—41

Elsie M. Barquist, B.A. '06, Minnesota	Minneapolis
German, Latin, Scandinavian	
Maud G. Beck, B.A. '05, Minnesota	Minneapolis
Food Analysis, Physical Chemistry, German	
Margaret Bieri, B.Sc. '05, Carleton College	Blue Earth
Education, Psychology	
F. Auguste Boncquet	Minneapolis
Botany, Geology	
Alta P. Churchill, B.A. '09, Minnesota	Minneapolis
English, Education	
Margaret Elwell Cook, B.A. '08, Minnesota	Minneapolis
Sociology	

Izella M. Dart, B.A. '07, Minnesota English	Minneapolis
Homer Desmarais French, Latin, Spanish	Minneapolis
Alice F. Drechsler, B.A. '12, Minnesota German, Biology, Art	St. Paul
Margaret K. Dunphy, Ph.B. '11, Wisconsin History, English, Political Science	St. Paul
Michael H. Ebert, B.A. '07, Minnesota Education, Botany	St. Paul
Ruth F. Eliot, B.A. '08, Smith College English, Philosophy	Minneapolis
Arthur O. Garrison, Ph.B. '09, Hamline Economics, Political Science	St. Paul
Lois Goodrich, B.A. '05, Minnesota History, English	Minneapolis
Anna M. Hansen, B.A. '11, Minnesota Education, German, Biology	Minneapolis
Amanda J. Hanson, Ph.B. '03, Hamline Latin, German, Education	Minneapolis
Cecil Heinsius, B.A. '10, Minnesota Latin, English, History	Minneapolis
Louise Hooper Darrow, B.A. '06, Minnesota English, French	Minneapolis
Dorothy Rose Hudson, B.A. '11, Minnesota Education, English, Rhetoric	Minneapolis
Harry D. Kitson, B.A. '09, Hiram College (Ohio) Psychology, Philosophy	Minneapolis
Luther Malmberg, B.A. '98, Bethany College, Kansas Physics, Mathematics, Astronomy	Minneapolis
Rose Muckley, B.A. in Education, '12, Minnesota German, English, Education	Minneapolis
William Muyskens, B.A. '11, Grinnell College Greek, German, Education	Alton, Iowa
Adolph Olson, B.A. '09, Gustavus Adolphus Education, Psychology	Hopkins
Herman Olof Olson, B.A. '11, Union College Swedish, German, Public Speaking	Artichoke
Ben W. Palmer, B.A. '11, Minnesota Political Science	St. Paul
Gladys Putnam, B.A. '09, Minnesota Education, English	Minneapolis
Adolph Ringoen, B.A., Iowa Blood of Vertebrates, Embryology of Vertebrates, Paleontology	Ridgeway, Iowa
A. Oscar Running, B.S. '09, St. Olaf College English	Odin
Albert Schneiderhan, B.A. '08, Minnesota German, Philology, English	Jordan
Ira E. Schuler, B.S. '09, Dakota Wesleyan University English Literature, Economics, English	Cumnock School of Oratory
C. L. Shavere, B.A. '05, Highland Park College Education, Geology	Minneapolis
P. M. Skartvedt, B.A. '06, St. Olaf Chemistry, Geology, Education	Northfield
Elizabeth Starr, B.A. '12, Minnesota German, English, Philology	Excelsior
Kaia Stearns, B.S. '09, St. Olaf College Education, English, History	Minneapolis
Claude Winship Street, B.S. '06, Carleton College Education, Sociology	Northfield

Esther L. Swenson, B.A. '11, Minnesota English, Philosophy, History	Minneapolis
S. T. Tollefson, B.S. '08, St. Olaf College Education, Psychology, Sociology	Church's Ferry, N. D.
Charlotte Waugh, B.A. '11, Minnesota Botany, Entomology	St. Paul
Katharine Whitney, B.A. '11, Smith College Sociology, English, Italian	Minneapolis
Hartie E. Zabel, B.A. '07, German Wallace College Comparative Philology, German, Education	Deer Creek

For Master of Pharmacy—1

Manley H. Haynes, Phm.B. '11, Minnesota Advanced Organic Pharmacy, Pharmacognosy, Bio-Pharmaceutical Chemistry	Minneapolis
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For Master of Science—12

Paul H. M. P. Brinton, Chemical Engineer, '12, Minnesota Analytical Chemistry, Physical Chemistry	Minneapolis
J. P. Cocayne, B.S. '07, Northwestern University Physics, Mathematics	St. Paul
D. W. Frear, B.S. in Agriculture, '09, Minnesota Farm Management, Field Crops, Soil Physics	Wayzata
Henry A. Halvorson, B.S. in Chemistry, '11, Minnesota Physical Chemistry, Advanced Physical Measurements, Geology	Minneapolis
John A. Handy, B.S. '11, Ph.C. '06, Minnesota Organic Chemistry, Physical Chemistry, Physiological Chemistry	Minneapolis
De Forest Hungerford, B.S. '10, Kansas State Agricultural College Mineralogy	Manhattan, Kan.
L. A. Joel, B.A. '10, Minnesota Chemistry, Physical Chemistry, Geology	Minneapolis
Ward L. Lambert, B.A. '11, Wabash College Food Analysis, Industrial Chemistry, Mineralogy	Crawfordsville, Ind.
Edwin Mayland, B.S. in Agriculture, '09, Minnesota Farm Management, Secondary Agricultural Education, Agricultural Economics	Cokato
Woldemar M. Sternberg, B.S. in Chemical Engineering, '08, Institute of Technology Study of Iron-Titanium Alloy, Physical Chemistry, Testing of Materials	St. Petersburg, Russia
George W. Walker, B.S. in Chemistry, '09, Minnesota Soil Research, Geology, Agronomy	Minneapolis
Frank W. White Animal Nutrition, Chemistry, Peat Investigation	Excelsior

STUDENTS TAKING GRADUATE WORK

Not Enrolled as Candidates for Degrees—54

Mary S. Anderson French	Minneapolis
George Adams Barker, M.D. '84, Bowdoin Special work in the College of Medicine and Surgery	Minneapolis
Walter J. Beggs, B.A. '99, M.A. '00, Harvard Latin, French	St. Paul
William A. C. Benson, B.A. '06, St. Olaf College Education, Psychology, Sociology	Saint Anthony Park
Frances E. Blake, B.A. in Education, '11, Minnesota Education, Psychology	St. Paul
Oliver Bowles, B.A. '07, M.A. '08, Toronto Geology	Minneapolis

Jessie W. Boyce, B.A. '05, Minnesota Greek Literature, Comparative Philosophy	Minneapolis
Harold Omer Burgess, B.A. '08, Wabash College Latin	St. Paul
Oscar C. Burkhard, B.A. '01, M.A. '04, Minnesota Gothic	Minneapolis
Ida Crogan, B.A. '06, Minnesota Latin, German	Minneapolis
Mattie Crogan, B.A. '10, Minnesota Old English	Minneapolis
Lucretia M. Daniels, B.A. '94, Chicago Latin, English	Minneapolis
M. J. Dorsey, B.S. '06, M.S. in Agriculture, '10, Michigan Plant Breeding	Dresden, Ohio
Marion Douglas, B.A. '01, Wellesley History, French	Minneapolis
Ruth Erickson, B.A. '11, Minnesota English, Rhetoric	Minneapolis
F. W. Gates, M.A. '07, Minnesota Mathematics, Astronomy	Minneapolis
Albert N. Gilbertson, B.A. '08, M.A. '09, Minnesota Philosophy	Minneapolis
Stanley Gillam, B.A. '12, Minnesota Political Science	Windom
Carl G. Hagberg, Grad. Theology '01, Boston Univ.; A.M. '06, Harvard; S.T.B. '07, Boston Economics, Philosophy	St. Paul
Annie M. Hayes, B.A. in Education, '10, M.A. '11, Minnesota English, Philosophy of Education	Minneapolis
Bridget T. Hayes, B.A. in Education, '10, Minnesota English, Philosophy of Education	Minneapolis
Etheleen F. Kemp, B.A. '10, M.A. '11, Minnesota History, Italian	Minneapolis
Paul E. Klopsteg, B.S. '11, Minnesota Physics, Mathematics, Astronomy	Fairmont
Carl F. Knoll English, Philosophy	St. Paul
Ole Gabriel Kvaas, B.A. '11, St. Olaf College Chemistry, Physics, Mathematics	Luverne
George Martin Link, B.A. '98, Wisconsin Mathematics	Minneapolis
Mary L. Longbrake, B.A. '03, Minnesota Greek, Semitic	Minneapolis
Veda H. Loomis, B.A. '10, Minnesota Sociology	Minneapolis
Kate MacDermid, B.S. '97, Minnesota Chemistry	Minneapolis
Mary R. Crozier McIntyre, B.A. '00, Minnesota English	Minneapolis
Irma Martens, B.A. '11, Minnesota Art, Domestic Art, Domestic Science	Minneapolis
J. S. Mikesh, B.A. '08, Minnesota Mathematics	Minneapolis
Justin U. Nixon, B.A. '05, Denison University Embryology, Neurology, Philosophy	Minneapolis
M. N. Olson, B.A. '08, M.A. '09, Minnesota Political Science, Economics	Minneapolis
Paul Perigold, B.A. '01, B.Phil. '02, University of France Sociology, Anthropology	St. Paul

Jesse L. Peterson, B.S. in Horticulture, '11, Utah Agricultural College Botany	Logan, Utah
Richard J. Purcell, B.A. '10, M.A. '11, Minnesota French, German, History	Minneapolis
Carl Leo Rahn, Ph.B. '07, Chicago Psychology	Minneapolis
Eva Christine Reid, B.A. '04, Minnesota English	Minneapolis
Vera S. Reynolds, B.A. '05, Albion College History	Berrien Springs, Mich.
Helen Sanborn, B.A. '11, Minnesota Drawing	Minneapolis
Adolph Sandquist English, German, Swedish	Copas
Theophilus H. Schroedel, B.A. '02, Northwestern College (Wis.) Comparative Philology, Semitics, English	Minneapolis
Frank D. Scott, B.A. '10, Waynesburg College Rhetoric	St. Paul
Bessie Scripture, B.A. '04, Minnesota English	Minneapolis
Wilson P. Shortridge, B.A. '07, Indiana; M.A. '10, Wisconsin History	Minneapolis
Audrey M. Smith, B.A. '09, M.A. '10, Minnesota Philosophy	Minneapolis
B. W. J. Spencer, Kentucky English	Minneapolis
August L. Spohn, B.A. '06, Earlham College English	Minneapolis
James C. Stephens, B.A. '11, Wisconsin History	Minneapolis
Lois Maude Sutton, B.A. '11, North Dakota Spanish	Minneapolis
Arthur W. Van Dervort, B.A. '11, Hiram College Sociology	Minneapolis
Forest Z. Wheeler, B.A. '05, M.A. '07, University of Iowa Agriculture, Education	St. Paul
Stella Gray Whitman, B.L. '99, Minnesota Art	St. Paul

The University of Minnesota

GENERAL INFORMATION

The University of Minnesota was organized in 1862 by the Minnesota Territorial Legislature. It is the oldest and largest university in the state. The University is a public institution and is supported by the State of Minnesota. It is a member of the Association of American Universities and the Association of Universities and Colleges of the Middle West. The University is a member of the Association of American Universities and the Association of Universities and Colleges of the Middle West. The University is a member of the Association of American Universities and the Association of Universities and Colleges of the Middle West.



BULLETIN OF THE UNIVERSITY OF MINNESOTA

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The University catalogues are published by authority of the Board of Regents, as a regular series of bulletins. One bulletin for each college and one for the Summer Session is published every year and in addition a bulletin of general information outlining the entrance requirements of all colleges of the University, and embodying such items as University equipment, organizations and publications, expenses of students, loan and trust funds, scholarships, prizes, etc. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them. In calling for bulletins, the college or school of the University concerning which information is desired should be stated. Address,

THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minnesota

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1912							1913														
JULY							JANUARY							JULY							
Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	Su	Mo	Tu	W	Th	Fr	Sa	
..	1	2	3	4	5	6	1	2	3	4	1	2	3	4	5	
7	8	9	10	11	12	13	5	6	7	8	9	10	11	6	7	8	9	10	11	12	
14	15	16	17	18	19	20	12	13	14	15	16	17	18	13	14	15	16	17	18	19	
21	22	23	24	25	26	27	19	20	21	22	23	24	25	20	21	22	23	24	25	26	
28	29	30	31	26	27	28	29	30	31	..	27	28	29	30	31	
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..	31	
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22	23	24	25	26	27	28	16	17	18	19	20	21	22	21	22	23	24	25	26	27	
29	30	23	24	25	26	27	28	29	28	29	30	
..	30	31	
OCTOBER							APRIL							OCTOBER							
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13	14	15	16	17	18	19	13	14	15	16	17	18	19	12	13	14	15	16	17	18	
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27	28	29	30	31	27	28	29	30	26	27	28	29	30	31	..	
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NOVEMBER							MAY							NOVEMBER							
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17	18	19	20	21	22	23	18	19	20	21	22	23	24	16	17	18	19	20	21	22	
24	25	26	27	28	29	30	25	26	27	28	29	30	31	23	24	25	26	27	28	29	
..	30	
DECEMBER							JUNE							DECEMBER							
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15	16	17	18	19	20	21	15	16	17	18	19	20	21	14	15	16	17	18	19	20	
22	23	24	25	26	27	28	22	23	24	25	26	27	28	21	22	23	24	25	26	27	
29	30	31	29	30	28	29	30	31	
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UNIVERSITY CALENDAR

1912-1913

The University year covers a period of thirty-eight weeks, beginning on the second Tuesday in September. Commencement Day is always the second Thursday in June.

1912

September	3	Tuesday	Registration closes except for new students
September	3-10	Week	Fees payable except for new students
September	10-16	Week	Entrance examinations, registration of new students, and payment of fees
September	11-17	Week	Military encampment of cadets
September	18	Wednesday	First semester begins
Sept. 30 - Oct.	5	Week	Second semester condition examinations in College of S., L., A., Agriculture, and Chemistry
October	7	Monday	School of Agriculture session opens
November	27	Wednesday	Thanksgiving recess begins 6:00 p. m.
December	2	Monday	Thanksgiving recess ends 8:00 a. m.
December	20	Friday	Christmas vacation begins 6:00 p. m.

1913

January	7	Tuesday	Christmas vacation ends 8:00 a. m.
January	21	Tuesday	Registration for second semester closes
January	27	Monday	Final examinations begin
January	28	Tuesday	Payment of fees for second semester closes
February	5	Wednesday	Second semester begins
February	12	Wednesday	Lincoln's Birthday: a holiday
February	13	Thursday	First semester class reports due
February	22	Saturday	Washington's Birthday: a holiday
March	19	Wednesday	Easter recess begins 6:00 p. m.
March	27	Thursday	Easter recess ends 8:00 a. m.
March 31-Apr.	5	Week	First semester condition examinations in College of S., L., A., Agriculture, and Chemistry
May	30	Friday	Decoration Day: a holiday
June	2	Monday	Final examinations begin
June	7	Saturday	Second semester closes
June	8	Sunday	Baccalaureate service
June	9	Monday	Senior class day exercises
June	11	Wednesday	Alumni Day
June	12	Thursday	Forty-first Annual Commencement
June	13	Friday	Summer vacation begins

The University year for 1913-14 will begin Tuesday, September 9.

Program of Entrance Examinations 1912-13

Entrance examinations for admission to the various colleges of the University will be conducted according to the following schedule, in Room 205, Library Building, unless otherwise specified.

Any student finding a conflict in his program should report to the Registrar for adjustment.

Tuesday, Sept. 10	9 a. m.	Astronomy, Botany, Geology, Chemistry, Physiography, Zoology
	2 p. m.	American Government, History, Physics, Economics, Commercial Geography
Wednesday, Sept. 11	9 a. m.	English
	2 p. m.	German, French, Latin, Scandinavian
Thursday, Sept. 12	9 a. m.	Elementary Algebra
	2 p. m.	Higher Algebra
Friday, Sept. 13	9 a. m.	Plane Geometry
	2 p. m.	Solid Geometry

A representative of each department will be at the office of the head of the department each forenoon of entrance examination week from 9 to 12 to give information and advice.

THE UNIVERSITY

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges, and departments:

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

THE COLLEGE OF AGRICULTURE

THE COLLEGE OF FORESTRY, including—

FOREST EXPERIMENT STATIONS AT ITASCA AND CLOQUET

THE SCHOOL OF AGRICULTURE, including—

THE DAIRY SCHOOL

THE SHORT COURSE FOR FARMERS

TEACHERS' SUMMER TRAINING SCHOOL

THE SCHOOL OF TRACTION ENGINEERING

THE SCHOOL OF AGRICULTURE, CROOKSTON

THE SCHOOL OF AGRICULTURE, MORRIS

THE EXPERIMENT STATIONS, including—

THE MAIN STATION AT ST. ANTHONY PARK

THE SUB-STATION AT CROOKSTON

THE SUB-STATION AT GRAND RAPIDS

THE SUB-STATION AT DULUTH

THE SUB-STATION AT WASECA

THE SUB-STATION AT ZUMBRA HEIGHTS

AGRICULTURAL EXTENSION

BUREAU OF RESEARCH IN AGRICULTURAL ECONOMICS

THE LAW SCHOOL

THE COLLEGE OF MEDICINE AND SURGERY, including—

THE SCHOOL FOR NURSES

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES, including—

MINNESOTA SCHOOL OF MINES EXPERIMENT STATION

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

THE BOARD OF REGENTS

The Hon. JOHN LIND, Minneapolis, President of the Board	- - 1914
GEORGE EDGAR VINCENT, Ph.D., LL.D., Minneapolis The President of the University	- - <i>Ex-Officio</i>
The Hon. ADOLPH O. EBERHART, Mankato The Governor of the State	- - <i>Ex-Officio</i>
The Hon. C. G. SCHULZ, St. Paul The State Superintendent of Public Instruction	- - <i>Ex-Officio</i>
The Hon. W. J. MAYO, Rochester	- - - - 1913
The Hon. MILTON M. WILLIAMS, Little Falls	- - - - 1913
The Hon. HENRY B. HOVLAND, Duluth	- - - - 1914
The Hon. A. E. RICE, Willmar	- - - - 1915
The Hon. CHARLES L. SOMMERS, St. Paul	- - - - 1915
The Hon. B. F. NELSON, Minneapolis	- - - - 1916
The Hon. PIERCE BUTLER, St. Paul	- - - - 1916
The Hon. CHARLES A. SMITH, Minneapolis	- - - - 1916

EXECUTIVE OFFICERS

GEORGE EDGAR VINCENT, Ph.D., LL.D., President
 ERNEST B. PIERCE, B.A., Registrar
 GEORGE H. HAYES, University Comptroller and Secretary of the Board of Regents
 JAMES T. GEROULD, B.A., Librarian
 JOHN F. DOWNEY, M.A., C.E., Dean of the College of Science, Literature, and the Arts
 FRANCIS C. SHENEHON, C.E., Dean of the College of Engineering and Mechanic Arts
 ALBERT F. WOODS, M.A., Dean and Director of the Department of Agriculture
 WILLIAM R. VANCE, Ph.D., LL.B., Dean of the Law School
 FRANK FAIRCHILD WESBROOK, M.A., M.D., C. S., Dean of the College of Medicine and Surgery
 ALFRED OWRE, B.A., M.D., C.M., D.M.D., Dean of the College of Dentistry
 FREDERICK J. WULLING, Ph.D., LL.M., Dean of the College of Pharmacy
 WILLIAM R. APPLEBY, M.A., Dean of the School of Mines
 GEORGE B. FRANKFORTER, M.A., Ph.D., Dean of the School of Chemistry
 GEORGE F. JAMES, Ph.D., Dean of the College of Education
 HENRY T. EDDY, C.E., Ph.D., LL.D., Dean of the Graduate School
 ADA L. COMSTOCK, M.A., Dean of Women

THE UNIVERSITY OF MINNESOTA

OFFICERS OF INSTRUCTION AND ADMINISTRATION

FACULTY

GEORGE EDGAR VINCENT, Ph.D., LL.D., President 1005 5th St. S. E.
B.A., Yale, 1885; Ph.D., Chicago, 1896; LL.D., Chicago, 1911; LL.D., Yale, 1911.

CYRUS NORTROP, LL.D., President, Emeritus 519 10th Ave. S. E.
B.A., Yale, 1857; LL.B., Yale, 1859; LL.D., Yale, 1886; LL.D., Wisconsin, Illinois
College, South Carolina College.

AMOS WILSON ABBOTT, M.D., Professor of Gynecology, Emeritus
21 S. 10th St.
M.D., College of Physicians and Surgeons (Columbia), 1869.

EVERTON JUDSON ABBOTT, B.A., M.D., Professor of Clinical Medicine,
Emeritus 425 Dayton Ave., St. Paul
B.A., Western Reserve, 1873; M.D., Western Reserve, 1875.

HOWARD STRICKLAND ABBOTT, B.L., Lecturer on Corporation Law
900 6th St. S. E.
B.L., Minnesota, 1885.

CEPHAS DANIEL ALLIN, LL.B., M.A., Assistant Professor of Political
Science 112 Church St. S. E.
B.A., Toronto, 1897; LL.B., Toronto, 1899; M.A., Harvard, 1900.

FRANK MALOY ANDERSON, M.A., Professor of History
1629 University Ave. S. E.
B.A., Minnesota, 1894; M.A., Minnesota, 1896.

CHARLES MARTIN ANDRIST, M.L., Professor of French
706 Delaware St. S. E.
B.L., Minnesota, 1894; M.L., Minnesota, 1897.

WILLIAM REMSEN APPLEBY, M.A., Dean of the School of Mines and
Professor of Metallurgy 911 5th St. S. E.
B.A., Williams, 1886; M.A., Williams, 1893.

LOUIS BENEDICT BALDWIN, M.D., Superintendent, University Hospitals
304 State St. S. E.
M.D., Minnesota, 1897.

FREDERIC HERBERT BASS, B.S., Professor of Municipal and Sanitary
Engineering 429 Union St. S. E.
B.S., Massachusetts Institute of Technology, 1901.

LOUIS BENJAMIN BASSETT, Assistant Professor of Farm Management
2095 Dudley Ave., St. Paul

GEORGE NEANDER BAUER, Ph.D., Professor of Mathematics
1115 E. River Road
B.S., Minnesota, 1894; M.S., Iowa, 1898; Ph.D., Columbia, 1900.

- JOSEPH WARREN BEACH, Ph.D., Assistant Professor of English**
1801 University Ave. S. E.
B.A., Minnesota, 1900; M.A., Harvard, 1902; Ph.D., Harvard, 1907.
- RICHARD OLDING BEARD, M.D., Professor of Physiology and Director
of the Department of Physiology and Pharmacology**
The Virginia
M.D., Northwestern, 1882.
- ELEXIOUS THOMPSON BELL, B.S., M.D., Assistant Professor of Pathology
and Bacteriology**
222 Harvard St. S. E.
B.S., Missouri, 1901; M.D., Missouri, 1903.
- JOHN WARREN BELL, M.D., Professor of Clinical Medicine and Physical
Diagnosis, Emeritus**
5127 Lake Harriet Blvd.
M.D., Ohio Medical College, 1876.
- HENRY ADAMS BELLOWS, Ph.D., Assistant Professor of Rhetoric**
2318 Grand Ave. S.
B.A., Harvard, 1906; Ph.D., Harvard, 1910.
- CHARLES WILLIAM BENTON, Litt.D., Professor of the French Language
and Literature, Head of Department of Romance Languages**
516 9th Ave. S. E.
B.A., Yale, 1874; B.D., Union Seminary, 1877; M.A., Yale, 1897; Litt.D., Western
University of Pennsylvania, 1897.
- *EMMA BERTIN, Assistant Professor of French** 312 16th Ave. S. E.
- ANDREW BOSS, Professor of Agriculture** 1443 Raymond Ave., St. Paul
- GISLE CHRISTIAN JOHNSON BOTHNE, M.A., Professor of Scandinavian
Languages and Literatures, Head of Department of Scandinavian
Languages**
1105 6th St. S. E.
B.A., Luther, 1878; M.A., Lušher, 1883.
- WILLIAM ELLSWORTH BROOKE, B.C.E., M.A., Professor of Mathematics
and Mechanics**
416 Walnut St. S. E.
B.C.E., Nebraska, 1892; M.A., Nebraska, 1896.
- EDGAR DEWIGHT BROWN, Phm.D., M.D., Professor of Materia Medica
and Pharmacology**
3525 3d Ave. S.
Ph.G., N. Y. College of Pharmacy, 1898; Phm.D., N. Y. College of Pharmacy,
1899; M.D., Western Reserve, 1902.
- ROME G. BROWN, B.A., Lecturer on Water Rights**
1006 Met. Life Bldg.
B.A., Harvard, 1884.
- COATES PRESTON BULL, B.Agr., Associate Professor of Agronomy**
2137 Commonwealth Ave., St. Paul
B.Agr., Minnesota, 1901.
- CHARLES WILSON BUNN, B.S., Lecturer on Federal Jurisdiction**
549 Portland Ave., St. Paul
B.S., Wisconsin, 1874.
- EDWARD PARIS BURCH, E.E., Lecturer in Electric Railway Engineering**
1729 James Ave. S.
B.E.E., Minnesota, 1892; E.E., Minnesota, 1898.

*Until June, 1912.

- FRANK EARL BURCH, M.D.**, Assistant Professor of Ophthalmology and
Otology 930 Lowry Bldg., St. Paul
M.D., Minnesota, 1897.
- OSCAR CARL BURKHARD, M.A.**, Assistant Professor of German
610 13th Ave. S. E.
B.A., Minnesota, 1901; M.A., Minnesota, 1904.
- RICHARD BURTON, Ph.D.**, Professor of English Literature, Head of
Department of English 2109 Blaisdell Ave.
B.A., Trinity, 1883; Ph.D., Johns Hopkins, 1888; L.H.D., Trinity, 1906.
- WILLIAM HENRY BUSSEY, Ph.D.**, Assistant Professor of Mathematics
8 Melbourne Ave. S. E.
B.A., Northwestern, 1900; M.A., Harvard, 1902; Ph.D., Chicago, 1904.
- FREDERIC KING BUTTERS, B.S., B.A.**, Assistant Professor of Botany
815 7th St. S.
B.S., Minnesota, 1899; B.A., Harvard, 1900.
- *EDMUND LUTHER BUTTS, Major U. S. A.**, Professor of Military Science,
Head of Department of Military Science and Tactics
Hotel Plaza
West Point, 1890.
- LE ROY CADY, B.S. in Agr.**, Associate Professor of Horticulture
2081 Buford Ave., St. Paul
B.S. in Agr., Minnesota, 1907.
- AUSTIN CARY, M.A.**, Professor of Forestry 2219 Knapp St., St. Paul
B.A., Bowdoin, 1887; M.A., Bowdoin, 1890.
- ABRAHAM BARKER CATES, M.A., M.D.**, Professor of Obstetrics
413 Pillsbury Bldg.
B.A., Colby College, 1874; M.A., Colby College, 1877; M.D., Harvard Medical
School, 1880.
- EDWARD G. CHEYNEY, B.A.**, Professor of Forestry
2116 Knapp St., St. Paul
B.A., Cornell, 1900.
- PETER CHRISTIANSON, B.S., E.M.**, Professor of Metallurgy
208 Beacon St. S. E.
B.S., Minnesota, 1890; B.E.M., Minnesota, 1894; E.M., Minnesota, 1898.
- JAMES TRENT CHRISTISON, M.D.**, Professor of Pediatrics
535 Lowry Bldg., St. Paul
M.D., Minnesota, 1901.
- JOHN SINCLAIR CLARK, B.A.**, Professor of Latin Language and Litera-
ture 729 10th Ave. S. E.
B.A., Minnesota, 1876.
- FREDERIC EDWARD CLEMENTS, Ph.D.**, Professor of Botany, Head of
Department of Botany 800 4th St. S. E.
B.Sc., Nebraska, 1894; M.A., Nebraska, 1896; Ph.D., Nebraska, 1898.
- ALEXANDER R. COLVIN, M.D.**, Clinical Professor of Surgery
342 Lowry Bldg., St. Paul
M.D., McGill, 1894.

*Resigned June, 1912.

- *ADA LOUISE COMSTOCK, M.A.**, Dean of Women, Professor of Rhetoric
West Sanford Hall
B.L., Smith, 1897; M.A., Columbia, 1899.
- ELTING HOUGHTALING COMSTOCK, M.S.**, Professor of Mechanics and
Mathematics 1416 7th St. S. E.
B.S., Wisconsin, 1897; M.S., Minnesota, 1907.
- FRANK HENRY CONSTANT, C.E.**, Professor of Structural Engineering
615 6th St. S. E.
C.E., Cincinnati, 1891.
- EDWARD ALBERT COOK, B.L.**, Assistant Professor of Rhetoric
702 4th St. S. E.
B.L., Wisconsin, 1900.
- LOUIS JOSEPH COOKE, M.D.**, Medical Examiner and Director of Gym-
nasium 909 6th St. S. E.
M.D., Vermont, 1894.
- JAMES FRANK CORBETT, M.D.**, Associate Professor of Experimental Sur-
gery 2446 Park Ave.
M.D., Minnesota, 1896.
- WILLIAM THOMAS COX, B.S.F.**, State Forester, Special Lecturer in
Forestry 1540 Lincoln Ave., St. Paul
B.S.F., Minnesota, 1906.
- HARDIN CRAIG, Ph.D.**, Professor of English 421 Union St. S. E.
B.A., Center College, 1897; M.A., Princeton, 1899; Ph.D., Princeton, 1901.
- JOHN GROSVENOR CROSS, B.S., M.S., M.D.**, Clinical Professor of Medicine
910 Donaldson Bldg.
B.S., Minnesota, 1892; M.S., Northwestern, 1895; M.D., Northwestern, 1895.
- ALVIN SAYLES CUTLER, C.E.**, Assistant Professor of Railway Engineering
717 E. River Road
C.E., Minnesota, 1905.
- HANS H. DALAKER, B.A.**, Assistant Professor of Mathematics
523 Walnut St. S. E.
B.A., Minnesota, 1902.
- WILLIAM STEARNS DAVIS, Ph.D.**, Professor of Ancient History
806 6th St. S. E.
B.A., Harvard, 1900; M.A., Harvard, 1901; Ph.D., Harvard, 1905.
- WARREN ARTHUR DENNIS, B.L., M.D.**, Clinical Professor of Surgery
942 Lowry Bldg., St. Paul
B.L., Wisconsin, 1891; M.D., Minnesota, 1896.
- IRA HARRIS DERBY, Ph.D.**, Assistant Professor of Chemistry
2157 Commonwealth Ave., St. Paul
B.S., Harvard, 1899; Ph.D., Chicago, 1910.
- HAL DOWNEY, Ph.D.**, Assistant Professor of Comparative Histology
800 4th St. S. E.
B.A., Minnesota, 1903; M.A., Minnesota, 1904; Ph.D., Minnesota, 1909.

*Term of service expires September 1, 1912.

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1115 5th St. S. E.
B.S., Hillsdale College, 1870; M.S., Hillsdale College, 1873; M.A., Hillsdale College, 1877; C.E., State College of Pennsylvania, 1877.
- ARTHUR W. DUNNING, M.D.,** Clinical Professor of Nervous and Mental Diseases
803 Lowry Bldg., St. Paul
M.D., College of Physicians and Surgeons, 1885.
- FREDERICK ALANSON DUNSMOOR, M.D.,** Professor of Clinical Surgery
100 Andrus Bldg.
M.D., Bellevue Hospital Medical College, New York, 1875.
- EDMUND SMITH DURMENT, LL.B.,** Special Lecturer on Eminent Domain
611 Holly Ave., St. Paul
LL.B., George Washington University, 1884.
- JOHN FRANKLIN EBERSOLE, M.A.,** Assistant Professor of Economics and Political Science
312 State St. S. E.
Ph.B., Chicago, 1907; M.A., Harvard, 1909.
- HENRY TURNER EDDY, C.E., Ph.D., LL.D., D.Sc.,** Professor of Mathematics and Mechanics, and Dean, Emeritus
916 6th St. S. E.
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- WILLIAM HARVEY EMMONS, Ph.D.,** Professor of Geology, Head of Department of Geology
112 Church St. S. E.
B.A., Central College, 1897; Ph.D., Chicago, 1904.
- CHARLES ANDREW ERDMANN, M.D.,** Professor of Gross and Applied Anatomy
612 9th Ave. S. E.
Ph.G., Wisconsin, 1887; M.D., Minnesota, 1893.
- HENRY ANTON ERIKSON, Ph.D.,** Assistant Professor of Physics
424 Harvard St. S. E.
B.E.E., Minnesota, 1896; Ph.D., Minnesota, 1908.
- CASSIUS M. FERGUSON,** Lecturer on Minnesota Practice
124 E. 13th St.
- OSCAR W. FIRKINS, M.A.,** Assistant Professor of English
1528 4th St. S. E.
B.A., Minnesota, 1884; M.A., Minnesota, 1898.
- JOHN JOSEPH FLATHER, Ph.B., M.M.E.,** Professor of Mechanical Engineering
315 11th Ave. S. E.
Ph.B., Yale, 1885; M.M.E., Cornell, 1890.
- HENRY JESSE FLETCHER, LL.M.,** Professor of Law
317 17th Ave. S. E.
LL.M., Minnesota, 1902.
- WILLIAM WATTS FOLWELL, LL.D.,** Professor of Political Science, Emeritus
1020 5th St. S. E.
B.A., Hobart, 1857; M.A., Hobart; LL.D., Hobart, 1880.
- DANIEL FORD, M.A.,** Assistant Professor of Rhetoric
1206 7th St. S. E.
B.L., Dartmouth, 1899; M.A., Harvard, 1905.
- BURNSIDE FOSTER, B.A., M.D.,** Professor of Dermatology and Syphilology and Lecturer upon the History of Medicine
821 Lowry Bldg., St. Paul
B.A., Yale, 1882; M.D., Harvard, 1886.

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Professor of Chemistry 525 E. River Road
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- FRANCIS COWLES FRARY**, Ph.D., Assistant Professor of Chemistry
610 13th Ave. S. E.
Analytical Chemist, Minnesota, 1905; M.S., Minnesota, 1906; Ph.D., Minnesota,
1912.
- EDWARD MONROE FREEMAN**, Ph.D., Professor of Vegetable Pathology
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2196 Carter Ave., St. Paul
B.S., Minnesota, 1898; M.S., Minnesota, 1899; Ph.D., Minnesota, 1905.
- JULES THEOPHILE FRELIN**, B.A., Assistant Professor of French
112 Church St. S. E.
B.A., Minnesota, 1905.
- ROBERT BANKS GIBSON**, Ph.B., Ph.D., Assistant Professor of Physiologic
Chemistry 222 Harvard St. S. E.
Ph.B., Yale, 1902; Ph.D., Yale, 1906.
- JAMES STERLING GILFILLAN**, M.D., Clinical Professor of Medicine
910 Lowry Bldg., St. Paul
M.D., Minnesota, 1907; Pennsylvania, 1908.
- ARTHUR JAY GILLETTE**, M.D., Professor of Orthopedic Surgery
Seven Corners, St. Paul
M.D., St. Paul Medical College, 1886; M.D., Minnesota, 1903.
- HENRY SAMUEL GODFREY**, D.M.D., Clinical Professor of Operative
Dentistry 1766 Girard Ave. S.
D.M.D., Minnesota, 1897.
- JOHN EVENSON GRANRUD**, Ph.D., Professor of Latin
605 Delaware St. S. E.
B.A., Luther College, 1886; M.A., Luther, 1890; Ph.D., Cornell, 1892.
- ***JOHN HENRY GRAY**, Ph.D., Professor of Economics and Political Science,
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412 Walnut St. S. E.
B.A., Harvard, 1887; Ph.D., Halle, 1892.
- CHARLES LYMAN GREENE**, M.D., Professor and Chief of the Department
of Medicine 421 Summit Ave., St. Paul
M.D., Minnesota, 1890.
- FRANK FITCH GROUT**, M.S., Assistant Professor of Geology and Mineral-
ogy 1202 7th St. S. E.
B.S., Minnesota, 1904; M.S., Minnesota, 1908.
- THEOPHILUS LEVI HAECKER**, Professor of Dairy and Animal Husbandry
1205 Raymond Ave., St. Paul
- EVERHART PERCY HARDING**, Ph.D., Assistant Professor of Chemistry
1316 7th St. S. E.
B.A., Minnesota, 1894; M.S., Minnesota, 1895; Ph.D., Heidelberg, 1900.
- THOMAS BRADFORD HARTZELL**, D.M.D., M.D., Professor of Oral Surgery,
Therapeutics, and Clinical Pathology 716 Donaldson Bldg.
D.M.D., Minnesota, 1893; M.D., Minnesota, 1894.

*Absent on leave from February 1, 1912, to February 1, 1913.

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Mathematics 703 E. River Road
M.S., Hillsdale, 1877; M.Ph., Hillsdale, 1879; D.Sc., Hillsdale, 1896.
- GEORGE DOUGLAS HEAD, B.S., M.D., Associate Professor of Medicine
503 Donaldson Bldg.
B.S., Minnesota, 1892; M.D., Minnesota, 1895.
- ALBERT CHENEY HEATH, B.A., M.D., Clinical Professor of Rhinology
and Laryngology 339 Lowry Bldg., St. Paul
B.A., Dartmouth, 1891; M.D., Minnesota, 1894.
- ARTHUR LEWELLYN HELLIWELL, LL.M., Lecturer on Examinations of
Abstracts 735 Palace Bldg.
B.A., Minnesota, 1895; LL.B., Minnesota, 1896; LL.M., Minnesota, 1898.
- EDWIN HAWLEY HEWITT, B.A., Lecturer on Architecture
126 E. Franklin Ave.
B.A., Minnesota, 1896.
- *ADAM CLARK HICKMAN, LL.D., Professor of Law 1229 7th St. S. E.
B.A., Allegheny College, 1862; M.A., Allegheny College, 1865; LL.B., Ohio State
and Union Law College, 1863; LL.D., Allegheny College, 1902.
- HIBBERT WINSLOW HILL, M.D., D.P.H., Assistant Professor of Bacteriol-
ogy Minnesota State Board of Health
M.B., Toronto, 1893; M.D., Toronto, 1899; D.P.H., Toronto, 1911.
- RALPH HOAGLAND, B.Agr., Professor of Agricultural Chemistry and Soils
2080 Commonwealth Ave., St. Paul
B.Agr., Minnesota, 1904.
- NED L. HUFF, M.A., Assistant Professor of Botany 1708 Como Ave. S. E.
B.A., Minnesota, 1903; M.A., Minnesota, 1906.
- JOHN CORRIN HUTCHINSON, B.A., Professor of Greek, Head of Depart-
ment of Greek 3806 Blaisdell Ave.
B.A., Minnesota, 1876.
- GEORGE FRANCIS JAMES, Ph.D., Dean of the College of Education, Pro-
fessor of Education 316 10th Ave. S. E.
B.A., Michigan, 1886; M.A., Michigan, 1887; Ph.D., Halle, 1894.
- ALBERT ERNEST JENKS, Ph.D., Professor of Anthropology 825 5th St. S. E.
B.S., Kalamazoo College, 1896; B.S., Chicago, 1897; Ph.D., Wisconsin, 1899.
- WALDRON MIRTALU JEROME, B.S., LL.B., Lecturer on Common Law
Pleading 401 N. Y. Life Bldg.
B.S., Minnesota, 1900; LL.B., Harvard, 1906.
- JOHN BLACK JOHNSTON, Ph.D., Professor of Comparative Neurology
and Secretary of the Faculty of the College of Medicine and
Surgery 715 Fulton St. S. E.
Ph.B., Michigan, 1893; Ph.D., Michigan, 1899.
- WILLIAM ALEXANDER JONES, M.D., Professor of Nervous and Mental
Diseases 513 Pillsbury Bldg.
M.D., Medical Department, University of City of New York, 1881.
- HANS JUERGENSEN, M.A., Assistant Professor of German
1612 11th Ave. S.
M.A., Concordia College, 1904.

*Acting Professor, Session of 1911-12.

- WILLIAM HARRISON KAVANAUGH, M.E.**, Professor of Experimental Engineering
118 State St. S. E.
M.E., Lehigh, 1894.
- DAVID LITCHARD KIEHLE, LL.D.**, Professor of Education, Emeritus
266 25th St. N., Portland, Ore.
B.A., Hamilton College, 1861; M.A., Hamilton, 1864; LL.D., Hamilton, 1887.
- MERTON STEPHEN KINGSTON, E.M.**, Assistant Professor of Mining
1206 7th St. S. E.
E.M., Minnesota, 1904.
- WILLIAM HERMAN KIRCHNER, B.S.**, Professor of Drawing and Descriptive Geometry
217 Beacon St. S. E.
B.S., Worcester Polytechnic, 1887.
- FREDERICK KLAEBER, Ph.D.**, Professor of Comparative and English Philology, Head of Department of Comparative Philology
616 9th Ave. S. E.
Ph.D., Berlin, 1892.
- ROBERT SIMON KOLLINER, LL.B.**, Professor of Law
3340 2nd Ave. S.
B.L., Wisconsin, 1887; LL.B., Minnesota, 1890.
- ALOIS FRANCIS KOVARIK, Ph.D.**, Assistant Professor of Physics
1105 6th St. S. E.
B.A., Minnesota, 1904; M.A., Minnesota, 1907; Ph.D., Minnesota, 1909.
- EDWIN MAXIMILIAN LAMBERT, M.E.**, Assistant Professor of Mechanics and Mathematics
1416 7th St. S. E.
M.E., Minnesota, 1909.
- ROBERT CHEEK LANSING, M.A.**, Assistant Professor of English
2237 Knapp St., St. Paul
B.S., Nebraska, 1899; M.A., Nebraska, 1901.
- WILLIAM FREDERICK LASBY, B.A., D.D.S.**, Clinical Professor of Prosthetic Chemistry
425 Walnut St. S. E.
B.A., Carleton, 1900; D.D.S., Minnesota, 1903.
- ARTHUR AYER LAW, M.D.** Clinical Professor of Surgery
413 Pillsbury Bldg.
M.D., Minnesota, 1894.
- FRANCIS P. LEAVENWORTH, M.A.**, Professor of Astronomy, Head of Department of Astronomy
317 17th Ave. S. E.
B.A., Indiana, 1880; M.A., Indiana, 1887.
- FREDERICK ELMER LEAVITT, M.D.**, Clinical Professor of Obstetrics and Gynecology, and Clerk of Clinics
910 Lowry Bldg., St. Paul
M.D., Minnesota, 1894.
- THOMAS GEORGE LEE, B.S., M.D.**, Professor and Director of the Department of Anatomy, and Librarian, Department of Medicine
509 E. River Road
M.D., Pennsylvania, 1886; B.S., Harvard, 1892.
- EDWARD M. LEHNERTS, M.A.**, Assistant Professor of Geography
800 4th St. S. E.
B.S., Pennsylvania, 1902; M.A., Minnesota, 1908.
- CHARLES CLINTON LIPP, D.V.M.**, Assistant Professor of Veterinary Medicine and Surgery
1460 Raymond Ave., St. Paul
D.V.M., Ohio, 1903.

- JENNINGS CRAWFORD LITZENBERG, B.S., M.D., Associate Professor of
Gynecology and Obstetrics, and Chief of Staff, Out-Patient De-
partment, University Hospitals 910 Donaldson Bldg.
B.S., Minnesota, 1894; M.D., Minnesota, 1899.
- EDWARD PROSPER MCCARTY, E.M., Professor of Mining 428 8th St. S.
E.M., Minnesota, 1900.
- ARCHIBALD MACLAREN, B.S., M.D., Clinical Professor of Surgery
412 Holly Ave., St. Paul
B.S., Princeton, 1880; M.D., College of Physicians and Surgeons, New York, 1883.
- JOHN SILLIMAN MACNIE, B.A., M.D., Clinical Professor of Ophthalmology
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- ARTHUR TEALL MANN, B.S., M.D., Clinical Professor of Surgery, and
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B.S., Minnesota, 1888; M.D., Harvard, 1896.
- JOHN VAN SICKLE MARTENIS, M.E., Assistant Professor of Mechanical
Engineering 217 Harvard St. S. E.
M.E., Lehigh, 1894.
- DEXTER DWIGHT MAYNE, Professor of Agricultural Pedagogics
University Farm, St. Paul
- HUGH VICTOR MERCER, LL.M., D.C.L., Lecturer on Practice in United
States Courts 2671 Lake of Isles Blvd.
LL.B., Minnesota, 1894; LL.M., Minnesota, 1897; D.C.L., Minnesota, 1911.
- JAMES BURT MINER, Ph.D., Assistant Professor of Psychology
428 Walnut St. S. E.
B.S., Minnesota, 1897; LL.B., Minnesota, 1899; M.S., Minnesota, 1901; Ph.D.,
Columbia, 1903.
- THOMAS WARNER MITCHELL, Ph.D., Assistant Professor of Business
Administration 1092 15th Ave. S. E.
B.A., Washington, 1900; Ph.D., Pennsylvania, 1905; C.P.A.
- JOSEPH S. MONTGOMERY, B.S. in Agr., Assistant Professor of Animal
Husbandry 1391 Raymond Ave., St. Paul
B.S. in Agr., Kansas State Agricultural College, 1907.
- JAMES EDWARD MOORE, M.D., Professor and Chief of the Department of
Surgery 616 Syndicate Bldg.
M.D., Bellevue Hospital Medical College, 1873.
- JOHN G. MOORE, B.A., Professor of German, Head of Department of
German 2810 University Ave. S. E.
B.A., Cornell, 1873.
- ROBERT HYNDMAN MULLIN, B.A., M.B., Associate Professor of Pathology
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B.A., Toronto, 1899; M.B., Toronto, 1902.
- WILLIAM ROBBINS MURRAY, Ph.B., M.D., Professor of Rhinology and
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Ph.B., Michigan, 1892; M.D., Rush Medical College, 1897.
- HENRY F. NACHTRIEB, B.S., Professor of Animal Biology, Head of De-
partment of Animal Biology 905 6th St. S. E.
B.S., Minnesota, 1882.

- BERT LEROY NEWKIRK, Ph.D., Assistant Professor of Mathematics and
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B.A., Minnesota, 1897; M.A., Minnesota, 1899; Ph.D., Munich, 1902.
- CHARLES WASHBURN NICHOLS, M.A., Assistant Professor of Rhetoric
220 Harvard St. S. E.
B.A., Yale, 1905; M.A., Yale, 1907.
- EDWARD E. NICHOLSON, M.A., Assistant Professor of Chemistry
914 7th St. S. E.
B.S., Nebraska, 1894; M.A., Nebraska, 1896.
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307 Reid Corner
M.D., Miami Medical College, 1883.
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B.A., Wooster, 1900; M.A., Yale, 1903; Ph.D., Yale, 1908.
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D.M.D., Minnesota, 1894; M.D., and C.M., Minneapolis College of Physicians
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1818 Melbourne Ave. S. E.
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- †JAMES PAIGE, M.A., LL.M., Professor of Law 420 Oak Grove St.
B.A., Princeton, 1887; M.A., Princeton, 1888; LL.B., Minnesota, 1890; LL.M.,
Minnesota, 1893.
- ELMER HIRAM PARKER, B.S., M.D., Assistant Professor of Rhinology
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B.S., Wisconsin, 1885; M.D., Northwestern, 1891.
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820 Donaldson Bldg.
D.D.S., Minnesota, 1903.

*Resigned June, 1912.

†Acting Dean of the Law School, 1911-12.

- JOSEPH BROWN PIKE, M.A., Professor of Latin, Head of Department of Latin
525 10th Ave. S. E.
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417 Delaware St. S. E.
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B.A., Iowa, 1904.
- †SAMUEL QUIGLEY, M.A., Assistant Professor of Education
916 5th St. S. E.
M.Di., Iowa State Teachers' College, 1895; B.A., Iowa, 1906; M.A., Chicago, 1911.
- WALTER REEVE RAMSEY, M.D., Clinical Professor of Pediatrics
214 S. Grotto St., St. Paul
M.D., Minnesota, 1896.
- ALBERT WILLIAM RANKIN, B.A., Professor of Education 916 5th St. S. E.
B.A., Minnesota, 1880.
- FRANK MILLER RARIG, M.A., Assistant Professor of Rhetoric
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B.A., Northwestern, 1903; M.A., Northwestern, 1905.
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B.A., Drake University, 1903; M.A., Northwestern College, 1905; Ph.D., Chicago, 1910.
- SOREN P. REES, B.S., M.D., Clinical Professor of Medicine
1664 Penn Ave. S.
B.S., Minnesota, 1895; M.D., Minnesota, 1897.
- MYRON HERBERT REYNOLDS, B.S., D.V.M., M.D., Ph.G., Professor of Veterinary Medicine and Surgery 2145 Knapp St., St. Paul
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- PARKS RITCHIE, M.D., Professor and Chief of the Department of Obstetrics and Gynecology 910 Lowry Bldg., St. Paul
M. D., Ohio Medical College, 1870.
- THOMAS SADLER ROBERTS, M.D., Clinical Professor of Pediatrics
1603 4th Ave. S.
M.D., Pennsylvania, 1885.
- HAROLD EUGENE ROBERTSON, B.A., M.D., Associate Professor of Pathology and Bacteriology, and Pathologist to the University Hospitals
508 Essex St. S. E.
B.A., Carleton, 1899; M.D., Pennsylvania, 1905.

*Absent on leave 1911-13.

†Substitute for 1911-13.

- EDWARD VAN DYKE ROBINSON, Ph.D., Professor of Economics, Acting
Head of Department of Economics and Political Science, from
February 1, 1912 to February 1, 1913 827 7th St. S. E.
B.A., Michigan, 1890; M.A., Michigan, 1891; Ph.D., Leipzig, 1895.
- JOHN THOMAS ROGERS, M.D., Clinical Professor of Surgery
342 Lowry Bldg., St. Paul
M.D., Minnesota, 1891.
- CARL OTTO ROSENDAHL, Ph.D., Professor of Botany
2191 Commonwealth Ave., St. Paul
B.S., Minnesota, 1901; M.A., Minnesota, 1902; Ph.D., Berlin, 1905.
- JOHN LINCOLN ROTHROCK, M.A., M.D., Clinical Professor of Gynecology
514 Lowry Bldg., St. Paul
B.A., Pennsylvania College, 1885; M.A., Pennsylvania College, 1888; M.D.,
University of Pennsylvania, 1888.
- ARTHUR GORDON RUGGLES, M.A., Assistant Professor of Entomology
1465 Raymond Ave., St. Paul
B.S.A., Cornell, 1901; M.A., Cornell, 1904.
- WILLIAM THOMAS RYAN, E.E., Assistant Professor of Electrical Engineer-
ing 3228 4th St. S. E.
E.E., Minnesota, 1905.
- MARIA LOUISA SANFORD, Professor of Rhetoric, Emeritus
1050 13th Ave. S. E.
- FREDERICK WILLIAM SARDESON, Ph.D., Assistant Professor of Paleon-
tology 414 Harvard St. S. E.
B.L., Minnesota, 1891; M.S., Minnesota, 1892; Ph.D., Freiburg, 1895.
- CHARLES ALBERT SAVAGE, Ph.D., Professor of Greek 618 12th Ave. S. E.
B.A., Johns Hopkins, 1895; Ph.D., Johns Hopkins, 1903.
- RICHARD EVERINGHAM SCAMMON, Ph.D., Assistant Professor of Anatomy
112 Church St. S. E.
B.A., Kansas, 1904; M.A., Kansas, 1906; Ph.D., Harvard, 1909.
- WILLIAM A. SCHAPER, Ph.D., Professor of Political Science
625 Fulton St. S. E.
B.L., Wisconsin, 1895; M.A., Columbia, 1898; Ph.D., Columbia, 1901.
- *CARL SCHLENKER, B.A., Professor of German 514 11th Ave. S. E.
B.A., Michigan, 1892.
- CARLYLE MACROBERTS SCOTT, Professor of Music 36 S. 13th St.
- FREDERICK HUGHES SCOTT, Ph.D., M.B., D.Sc., Assistant Professor of
Physiology 1023 University Ave. S. E.
B.A., Toronto, 1897; Ph.D., Toronto, 1899; M.B., Toronto, 1906; D.Sc., London,
1908.
- JULIUS PARKER SEDGWICK, B.Sc., M.D., Assistant Research Professor
in Physiologic Chemistry and Clinical Instructor in Pediatrics
820 Donaldson Bldg.
B.Sc., Nebraska, 1896; M.D., Rush Medical College, 1899.
- GEORGE E. SENKLER, M.D., Clinical Professor of Medicine
514 Lowry Bldg., St. Paul
M.D., Minnesota, 1892; M.D., Pennsylvania, 1893.

*On leave of absence 1912-13.

- WALTER DEWITT SHELDEN, B.S., M.D., Clinical Professor of Medicine
3233 Irving Ave. S.
B.S., Wisconsin, 1891; M.D., Rush Medical College, 1895.
- FRANCIS CLINTON SHENEHON, C.E., Dean of the College of Engineering
and the Mechanic Arts, and Professor of Civil Engineering
323 11th Ave. S. E.
B.C.E., Minnesota, 1895; C.E., Minnesota, 1900.
- GEORGE DEFREES SHEPARDSON, M.A., M.E., D.Sc., Professor of Elec-
trical Engineering
717 E. River Road
B.A., Denison, 1885; M.A., Denison, 1888; M.E., Cornell, 1889; D.Sc., Harvard,
1912.
- ANTON SHIMONEK, M.D., Clinical Professor of Surgery
514 Lowry Bldg., St. Paul
M.D., Rush Medical College, 1879.
- S. CARL SHIPLEY, B.S., M.E., Assistant Professor of Machine Construc-
tion
1517 E. River Road
B.S., Missouri, 1900; B.S.(Engineering), Cincinnati, 1901; M.E., Cincinnati,
1903.
- CHARLES FRANKLIN SHOOP, B.S., Assistant Professor of Experimental
Engineering
108 Beacon St. S. E.
B.S. (Pure Mathematics), Pennsylvania State, 1901; B.S.(Mechanical Engineer-
ing), Pennsylvania State, 1904.
- ROYAL RUSS SHUMWAY, B.A., Assistant Professor of Mathematics
716 12th Ave. S. E.
B.A., Minnesota, 1903.
- CHARLES FREDERICK SIDENER, B.S., Professor of Chemistry
1320 5th St. S. E.
B.S., Minnesota, 1883.
- CHARLES PETER SIGERFOOS, Ph.D., Professor of Zoology
1023 University Ave. S. E.
B.S., Ohio State, 1889; Ph.D., Johns Hopkins, 1897.
- HOWARD R. SMITH, B.S., Professor of Animal Husbandry
University Farm, St. Paul
B.S., Michigan Agricultural College, 1895.
- SAMUEL GEORGE SMITH, Ph.D., LL.D., Professor of Sociology, Head of
Department of Sociology and Anthropology
The Aberdeen, St. Paul
B.A., Cornell, 1872; M.A., Cornell, 1875; D.D., Upper Iowa, 1887; Ph.D., Syracuse,
1880; LL.D., Cornell, 1900.
- HALDOR SNEVE, M.D., Clinical Professor of Mental and Nervous Diseases
814 Lowry Bldg., St. Paul
M.D., Medical College of Ohio, 1887.
- FRANKLIN WESLEY SPRINGER, E.E., Professor of Electrical Engineering
316 12th Ave. S. E.
B.E.E., Minnesota, 1893; E.E., Minnesota, 1898.
- HENRY LORING STAPLES, M.A., M.D., Clinical Professor of Medicine
405 Andrus Bldg.
B.A., Bowdoin, 1881; M.A., Bowdoin, 1884; M.D., Medical School of Maine, 1886.

- JEREMIAH CLARK STEWART, B.S., M.D.**, Professor of Principles of Surgery
616 Syndicate Bldg.
B.S. and C.E., Minnesota, 1875; M.D., College of Physicians and Surgeons,
N. Y., 1884.
- JOHN T. STEWART, C.E.**, Professor of Agricultural Engineering
2223 Knapp St., St. Paul
B.S., Illinois, 1893; C.E., Illinois, 1909.
- ANDREW ADIN STOMBERG, M.S.**, Professor of Scandinavian Languages
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531 Walnut St. S. E.
B.A., Gustavus Adolphus, 1895; M.S., Minnesota, 1896.
- ARTHUR SWEENEY, B.A., M.D.**, Professor of Medical Jurisprudence
821 Lowry Bldg., St. Paul
B.A., Fordham University, 1880; M.D., Harvard, 1886.
- MARGARET SWEENEY, Ph.D.**, Dean of Women, Professor of Rhetoric
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2509 Pillsbury Ave.
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3101 16th Ave. S.
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B.A., Dartmouth, 1898; D.D., Union Theological Seminary, 1903; M.A., Columbia,
1904; Ph.D., Columbia, 1905.
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623 14th Ave. S. E.
Ph.B., Michigan, 1898; M.A., Michigan, 1903; Ph.D., Michigan, 1910.
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1322 6th St. S. E.
B.A., South Dakota, 1903; M.A., Harvard, 1904.
- EDWARD SAMPSON THURSTON, M.A., LL.B.**, Professor of Law
1212 5th St. S. E.
B.A., Harvard, 1898; M.A., Harvard, 1900; LL.B., Harvard, 1901.
- DILLON PARNELL TIERNEY, M.F.**, Assistant State Forester, Special
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B.S.F., Minnesota, 1906; M.F., Yale, 1908.
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1288 County Road, St. Paul
B.S., Minnesota, 1895; M.S., Minnesota, 1896.
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D.D.S., Minnesota, 1891; M.D., Minnesota, 1892.
- WILLIAM HENRY TOMHAVE, B.S. in Agr.**, Assistant Professor of Animal
Husbandry
2121 Langford Ave., St. Paul
B.S. in Agr., Minnesota, 1907.
- CHARLES JEROME TRAXLER, LL.B.**, Lecturer on Code Pleadings
225 W. 24th St.
LL.B., Iowa, 1882.

- ANTHONY LISPENARD UNDERHILL, Ph.D., Assistant Professor of Mathematics
615 6th St. S. E.
B.S., Chicago, 1900; Ph.D., Chicago, 1906.
- CHARLES EDWIN VAN BARNEVELD, B.A.Sc., E.M., Professor of Mining Engineering
2110 Aldrich Ave. S.
B.A.Sc., E.M., McGill, 1895.
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412 9th Ave. S. E.
B.A., Washington and Lee University, 1892; M.A., Washington and Lee University, 1893; Ph.D., Washington, and Lee University, 1895; LL.B., Washington and Lee University, 1897; M.A. (Honorary), Yale, 1909.
- †MAX P. VANDER HORCK, M.D., Professor of Diseases of the Skin and Genito-Urinary Diseases
- JAMES MARTIN WALLS, D.M.D., Professor of Operative Dentistry
828 Lowry Bldg., St. Paul
D.M.D., Minnesota, 1894.
- FREDERIC LEONARD WASHBURN, M.A., Professor of Entomology
1112 6th St. S. E.
B.A., Harvard, 1882; M.A., Harvard, 1895.
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2122 Knapp St., St. Paul
B.S. in Agr., Minnesota, 1901; M.S.A., Missouri, 1909.
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1601 Fremont Ave. N.
D.M.D., Minnesota, 1893.
- LOUIS DWIGHT HARVELL WELD, Ph.D., Assistant Professor, Extension Work in Economic and Political Science
B.A., Bowdoin, 1905; M.A., Illinois, 1907; Ph.D., Columbia, 1908.
- AMOS SCHUMPERT WELLS, B.A., D.D.S., Clinical Professor of Crown and Bridge Work
801 Andrus Bldg.
B.A., Newberry College (S.C.); D.D.S., Minnesota, 1906.
- JOHN PHILIP WENTLING, M.A., Associate Professor of Forestry
2160 Carter Ave., St. Paul
B.A., Franklin and Marshall, 1902; M.A., Franklin and Marshall, 1905.
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906 5th St. S. E.
B.A., Manitoba, 1887; M.A., M.D., C.M., Manitoba, 1890.
- †WILLIS MASON WEST, M.A., Professor of History, Head of Department of History
Grand Rapids, Minn.
B.A., Minnesota, 1879; M.A., Minnesota, 1881.
- CHARLES AUGUSTUS WHEATON, M.D., Professor of Surgery, Emeritus
329 Summit Ave., St. Paul
M.D., Harvard Medical School, 1877.
- ALBERT BEEBE WHITE, Ph.D., Professor of History
325 6th Ave. S. E.
B.A., Yale, 1893; Ph.D., Yale, 1898.

*To assume office August 1, 1912.

†Died December 5, 1911.

‡Resigned June, 1912.

- SOLON MARX WHITE, B.S., M.D., Associate Professor of Medicine
910 Donaldson Bldg.
B.S., Illinois, 1896; M.D., Northwestern, 1897.
- M. RUSSELL WILCOX, M.D., Assistant Professor of Physiology
802 Donaldson Bldg.
M.D., Minnesota, 1897.
- NORMAN WILDE, Ph.D., Professor of Philosophy and Psychology, Head
of Department of Philosophy and Psychology 901 6th St. S. E.
B.A., Columbia, 1889; M.A., Columbia, 1890; Ph.D., Columbia, 1894.
- DANIEL E. WILLARD, M.A., Special Lecturer, Forest Soils
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- HENRY LANE WILLIAMS, B.A., M.D., Director of Athletics, Instructor
in Gynecology 1313 5th St. S. E.
B.A., Yale, 1891; M.D., Pennsylvania, 1895.
- RICHARD HERMON WILLIAMS, M.S., Assistant Professor of Animal Hus-
bandry 1391 Raymond Ave., St. Paul
B.S.A., Toronto, 1905; M.S., Illinois, 1907.
- HUGH EVANDER WILLIS, M.A., LL.M., Assistant Professor of Law
1016 17th Ave. S. E.
B.A., Yankton College, 1897; M.A., Yankton College, 1899; LL.B., Minnesota,
1901; LL.M., Minnesota, 1902.
- JOHN WILLEY WILLIS, M.A., Special Lecturer on Lawyers, Ancient,
Medieval, and Modern 923 Summit Ave., St. Paul
B.A., Dartmouth, 1877; M.A., Dartmouth, 1880.
- ARCHIE DELL WILSON, B.S. in Agr., Chief of Extension Division, Depart-
ment of Agriculture 1466 Raymond Ave., St. Paul
B.S. in Agr., Minnesota, 1905.
- LOUIS BLANCHARD WILSON, M.D., Assistant Professor of Clinical Path-
ology 830 W. College St., Rochester
M.D., Minnesota 1896.
- HERBERT WOODROW, Ph.D., Assistant Professor of Psychology
806 4th St. S. E.
B.A., Michigan, 1904; Ph.D., Columbia, 1909.
- ALBERT FREDERICK WOODS, M.A., Dean and Director of the Department
of Agriculture 1199 Raymond Ave., St. Paul
B.Sc., Nebraska, 1890; M.A., Nebraska, 1892.
- FRANKLIN RANDOLPH WRIGHT, M.D., Clinical Professor of Genito-
Urinary Diseases 707 Donaldson Bldg.
D.D.S., Minnesota, 1890; M.D., Minnesota, 1894.
- FREDERICK JOHN WULLING, Ph.G., LL.M., Dean of the College of Phar-
macy, Professor of Pharmacology and Director of the University
Medicinal Plant Gardens 3305 2nd Ave. S.
Ph.G., Columbia, 1887; LL.M., Minnesota, 1898.
- JEREMIAH SIMEON YOUNG, Ph.D., Assistant Professor of Political Science
1120 6th St. S. E.
B.A., Kansas, 1890; M.A., Michigan, 1898; Ph.D., Chicago, 1902.
- ANTHONY ZELENY, Ph.D., Professor of Physics 613 Fulton St. S. E.
B.S., Minnesota, 1892; M.S., Minnesota, 1893; Ph.D., Minnesota, 1907.

JOHN ZELNY, Ph.D., Acting Dean of the Graduate School, Professor
of Physics, Head of Department of Physics 712 10th Ave. S. E.
B.S., Minnesota, 1892; B.A., Cambridge, 1899; Ph.D., Minnesota, 1906.

OTTO S. ZELNER, B.S., Assistant Professor of Surveying
729 Fulton St. S. E.

B.S. in C.E., Michigan, 1905.

INSTRUCTORS

FRED LYMAN ADAIR, B.S., M.D., Instructor in Obstetrics and Gynecology
820 Donaldson Bldg.

B.S., Minnesota, 1898; M.D., Rush Medical College, 1901.

LINCOLN KEENEY ADKINS, M.S., Instructor in Mathematics

B.A., Nashville, 1905; B.S., Chicago, 1909; M.S., Chicago, 1912.

WILLIAM F. ALLEN, M.A., Instructor in Histology and Embryology

92 17th St. N.

B.A., Leland Stanford, 1900; M.A., Leland Stanford, 1902.

ALBERT CEDRIC ARNY, B.S. in Agr., Instructor in Agriculture

2115 Dudley St., St. Paul

B.S. in Agr., Minnesota, 1909.

GUSTAV BACHMAN, Phm.D., Phm.M., Instructor in Pharmacy

2624 Fremont Ave. S.

Phm.D., Minnesota, 1900; Phm.M., Minnesota, 1901.

CLYDE HAROLD BAILEY, Instructor in Agricultural Chemistry

251 15th Ave. N.

ALFRED BURPEE BALCOM, M.A., Instructor, Extension Work in Economics
and Political Science

B.S., Acadia (N.S.), 1907; M.A., Harvard, 1909.

CHARLES RIGGS BALL, B.A., M.D., Clinical Instructor in Nervous and
Mental Diseases 942 Lowry Bldg., St. Paul

B.A., Ohio Wesleyan, 1891; M.D., Minnesota, 1894.

GEORGE C. BARTON, M.D., Clinical Instructor in Gynecology

1028 Andrus Bldg.

M.D., Jefferson Medical College, Phila., 1880.

ARTHUR EDWIN BENJAMIN, M.D., Clinical Instructor in Gynecology

1020 Donaldson Bldg.

M.D., Minnesota, 1892.

FRANK S. BISSELL, M.D., Clinical Instructor in Medicine and Radiog-
rapher, University Hospitals 4412 Lake Harriet Blvd.

M.D., Minnesota, 1902.

MARGARET JOSEPHINE BLAIR, Instructor in Domestic Art, In Charge of
Section 1403 Cleveland Ave., St. Paul

FRANK WALKER BLISS, M.S., Instructor in Chemistry

511 15th Ave. S. E.

B.S., Michigan, 1908; M.S., Illinois, 1909.

OSCAR J. BLOSMO, Ph.C., Instructor in Dispensing 529 Oak St. S. E.

Ph.C., Minnesota, 1907.

- FANNIE CARD BOUTELLE, Instructor in Domestic Economics, In Charge of
Section University Farm, St. Paul
- OLIVER BOWLES, M.A., Instructor in Geology 321 19th Ave. S. E.
B.A., Toronto, 1907; M.A., Toronto, 1908.
- JESSIE WADLEIGH BOYCE, B.A., Instructor, University Practice School
1112 4th St. S. E.
B.A., Minnesota, 1905.
- WILLARD L. BOYD, D.V.S., Instructor in Veterinary Medicine and Surgery
2221 Langford Ave., St. Paul
- CHARLES HERBERT BRADLEY, M.D., Clinical Instructor in Medicine
1016 Donaldson Bldg.
M.D., Northwestern, 1890.
- PETER JOHN BREKHUS, B.A., D.D.S., Instructor in Crown and Bridge
Work 3324 18th Ave. S.
B.A., Augsburg, 1902; D.D.S., Minnesota, 1910.
- JOHN B. BRIMHALL, M.D., Clinical Instructor in Orthopedic Surgery
303 Moore Block, St. Paul
M. D., Pennsylvania.
- ALVAH M. BULL, Instructor in Farm Structures
2240 Langford Ave., St. Paul
- *ANNA M. BUTNER, Director of Physical Training for Women
65 11th St. S.
- EDITH SCHWARTZ CLEMENTS, Ph.D., Instructor in Botany
800 4th St. S. E.
B.Sc., Nebraska, 1898; Ph.D., Nebraska, 1904.
- HENRIETTE CLOPATH, Instructor in Drawing, In Charge of Art Department
813 Fulton St. S. E.
- WILFORD OSCAR CLURE, B.A., LL.B., Instructor in Rhetoric
209 Pleasant St. S. E.
B.A., Drake, 1895; LL.B., Iowa College of Law, 1897.
- MARY LURANE COFFIN, Instructor in Music 2914 Portland Ave.
- LILLIAN COHEN, M.S., Instructor in Chemistry 415 E. 14th St.
B.S., Minnesota, 1900; M.S., Minnesota, 1901.
- WILLIAM HENRY CONDIT, B.S., M.D., Clinical Instructor in Therapeutics
636 Syndicate Bldg.
B.S., Minnesota, 1896; M.D., Minnesota, 1899.
- ESTELLE COOK, Instructor in English University Farm, St. Paul
- HENRY WIREMAN COOK, B.A., M.D., Instructor in Clinical Medicine
N. W. Nat'l Life Ins. Bldg.
B.A., Johns Hopkins, 1898; M.D., Johns Hopkins, 1902.
- PAUL BURNS COOK, M.D., Instructor in Genito-Urinary Diseases
710 Lowry Bldg., St. Paul
M.D., Minnesota, 1900.
- OSCAR COOPERMAN, D.D.S., Instructor in Prosthetic Dentistry
637 ½ 6th Ave. N.
D.D.S., Minnesota, 1911.
- *Until June, 1912.

- NORMAN JEFFREY COX, B.S., D.M.D., Instructor in Operative Dentistry
986 15th Ave. S. E.
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D.D.S., Minnesota, 1907.
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304 Masonic Temple
M.D., Minnesota, 1901.
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Ph.B., Boston, 1900; M.A., Boston, 1905; Ph.D., Leipzig, 1906.
- RENE M. DELAMARE, B.L., Instructor in French 501 8th Ave. S. E.
Bachelier Lettres-Philosophie, Sorbonne (Paris), 1897.
- GRACE ELLA DENNY, B.S., Instructor in Physical Training
1836 Dayton Ave., St. Paul
B.S., Columbia.
- CHARLES FREMONT DIGHT, M.D., Lecturer in Pharmacology and Materia
Medica 4818 39th Ave. S.
M.D., Michigan, 1879.
- CHARLES RALPH DRAKE, M.D., Assistant Pathologist, University Hos-
pitals
M.D., Minnesota, 1909.
- AUSTIN SOUTHWICK EDWARDS, Ph.D., Instructor in Psychology
B.S., Columbia, 1908; M.A., Minnesota, 1910; Ph.D., Cornell, 1912.
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University Farm, St. Paul
- CARL OSCAR FLAGSTAD, D.D.S., Instructor in Prosthetic Dentistry
2305 7th St. S.
D.D.S., Minnesota, 1911.
- WILLIAM KERR FOSTER, LL.M., Assistant Director of Gymnasium
210 Pleasant St. S. E.
LL.B., Minnesota, 1908; LL.M., Minnesota, 1909.
- WILLIAM HARDY FRAZIER, B.S., Instructor in Soils
937 17th Ave. S. E.
B.S., Minnesota, 1907.
- ROBERT WILTON FRENCH, B.S., Instructor in Drawing
1035 13th Ave. S. E.
B.S. (Civil Engineering), Michigan, 1907.
- JOHN THEODORE GEISSENDOERFER, Ph.D., Instructor in German
B.A., Wisconsin, 1907; Ph.D., Pennsylvania, 1912.

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Surgery 820 Donaldson Bldg.
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217 Harvard St. S. E.
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779 Summit Ave., St. Paul
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828 Lowry Bldg., St Paul
D.D.S., Minnesota, 1904.
- CHARLES ARTHUR GRIFFITH, D.D.S., Instructor in Operative Dentistry
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D.D.S., Minnesota, 1907.
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B.A., Oberlin, 1904; M.A., Harvard, 1905; Ph.D., Wurzburg, 1910.
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513 Pillsbury Bldg.
B.S., Iowa, 1894; M.D., Pennsylvania, 1897.
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615 University Ave. S. E.
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1224 Mary Place
D.M.D., Minnesota, 1893.
- WILLIAM ATWOOD HILTON, Ph.D., Instructor in Histology and Embry-
ology 113 Church St. S. E.
B.S., Cornell, 1899; Ph.D., Cornell, 1902.
- PEDER A. HOFF, M.D., Clinical Instructor in Medicine
939 Lowry Bldg., St. Paul
M.D., Minnesota, 1900.
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2219 Doswell Ave., St. Paul
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722 E. 24th St.
B.Sc., Nebraska, 1904; M.A., Nebraska, 1906; Ph.D., Göttingen, 1908.

*Died November 30, 1912.

- CHARLES MEAD HOLT, B.A., Instructor in Technique of Reading and
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B.A., Minnesota, 1905.
- WILLIAM HAMMETT HUNTER, Ph.D., Instructor in Chemistry
112 Church St. S. E.
B.A., Harvard, 1904; M.A., Harvard, 1905; Ph.D., Harvard, 1910.
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University Farm, St. Paul
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- CHARLES EUGENE JOHNSON, Ph.D., Instructor in Comparative Anatomy
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B.A., Minnesota, 1906; M.A., Minnesota, 1907; Ph.D., Minnesota, 1912.
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2504 4th Ave. S.
B.A., Minnesota, 1903.
- JANE F. KENNEDY, M.D., Medical Supervisor of Women
1778 Humboldt Ave. S.
M.D., Minnesota, 1900.
- RAY ROBERTS KNIGHT, B.A., M.D., Instructor in the Administration of
Anaesthetics 304 Pillsbury Bldg.
B.A., Minnesota, 1903; M.D., Minnesota, 1906.
- ALFRED EDMUND KOENIG, M.A., Instructor in German
327 6th Ave. S. E.
B.A., Redfield College, 1906; M.A., Minnesota, 1910; D.D., Western Evangelical
Seminary, 1910.
- ALFRED RUDOLPH KOHLER, M.S., Instructor in Horticulture
2130 Carter Ave., St. Paul
B.S.A., Iowa State College, 1906; M.S., Minnesota, 1912.
- DWIGHT JUDSON LANE, Instructor in Poultry Husbandry
1485 Cleveland Ave., St. Paul
- WINFORD PORTER LARSON, M.D., Demonstrator in Pathology and Bac-
teriology 614 9th Ave. S. E.
M.D., Illinois, 1904.

- HARRY COMEGYS LAWTON, D.D.S., Instructor in Prosthetic Dentistry
937 Lowry Bldg., St. Paul
D.D.S., Minnesota, 1908.
- CHARLES NAUMANN MCCLLOUD, M.D., Clinical Instructor in Pediatrics,
Lecturer on First Aids to the Injured 524 Lowry Bldg., St. Paul
Phm.D., Minnesota, 1895; M.D., Minnesota, 1901.
- ERVIN W. MCCULLOUGH, E.M., Instructor in Mining
90 Malcolm Ave. S. E.
E.M., Minnesota, 1911.
- WILLIAM MCDUGALL, D.D.S., Instructor in Crown and Bridge Work
321 14th Ave. S. E.
D.D.S., Minnesota, 1911.
- FLETCHER OLIN MACFARLAND, B.S., M.D., Instructor in Physiology
417 Union St. S. E.
B.S., Chicago, 1908; M.D., Rush Medical College, 1910.
- LOUIS WILLIAMS MCKEEHAN, Ph.D., Instructor in Physics
B.S. in Eng. Minnesota, 1908; M.S., Minnesota, 1909; Ph.D., Minnesota, 1911.
- JENNETTE MATILDA MCLAREN, M.D., Clinical Instructor in Obstetrics
803 Lowry Bldg., St. Paul
M.D., Michigan, 1887.
- FRANKLIN R. MCMILLAN, C.E., Instructor in Experimental Engineering
321 Oak St. S. E.
C.E., Minnesota, 1905.
- GUSTAV ALFRED MAGNUSSON, B.A., M.D., Demonstrator in Pathology
and Bacteriology
B.A., New Mexico; M.D., Minnesota, 1908.
- JAMES WILHELM MALAND, D.D.S., Instructor in Crown and Bridge Work
300 Reid Corner
D.D.S., Minnesota, 1910.
- WALLACE HOPE MARTIN, M.E., Instructor in Mechanical Engineering
1030 14th Ave. S. E.
M.E., Minnesota, 1910.
- HERMAN ALBERT MAVES, D.D.S., Instructor in Operative Dentistry
505 Donaldson Bldg.
D.D.S., Minnesota, 1905.
- RICHARD SAMUEL MAYBURY, D.D.S., Instructor in Operative Dentistry
1931 4th Ave. S.
D.D.S., Minnesota, 1911.
- CHARLES J. MEADE, M.D., Clinical Instructor in Medicine
Moore Block., St. Paul
M.D., McGill, 1892.
- CARL MARCUS MELOM, M.A., Instructor in Spanish and French
112 Arthur Ave. S. E.
B.L., Minnesota, 1901; M.A., Minnesota, 1902.
- LEON METZINGER, Ph.B., Instructor in German 319 Oak St. S. E.
Ph.B., Chicago, 1908.

- JAMES STEPHEN MIKESH, B.A., Instructor in Mathematics
427 12th Ave. S. E.
B.A., Minnesota, 1908.
- ALICE MARGARET MISZ, M.A., Instructor in Botany
651 Otsego St., St. Paul
B.A., Minnesota, 1907; M.A., Minnesota, 1908.
- D. C. MITCHELL, B.Sc. in C.E., Instructor in History, Director of Gymnasium
2132 Carter Ave., St. Paul
B.Sc. in C.E., Nebraska, 1910.
- MARTHA B. MOORHEAD, M.D., Lecturer in Domestic Hygiene
914 2nd Ave. S.
M.D., Women's Medical College of Pennsylvania, 1892.
- JOHN HINCKLEY MORSE, B.A., M.D., Clinical Instructor in Ophthalmology and Otology
2511 S. Washburn Ave.
B.A., Bowdoin, 1897; M.D., Harvard, 1901.
- ALICE JANE RIPLEY MOTT, Ph.D., Principal of the University Practice School
423 Beacon St. S. E.
B.L., Iowa, 1893; M.A., Iowa, 1894; Ph.D., Minnesota, 1900.
- JASON L. MOWRY, Instructor in Mechanics
1057 13th Ave. S. E.
M.Di., Iowa State Teachers' College, 1898.
- LOUIS ALLAN NELSON, M.D., Clinical Instructor in Ophthalmology and Otology
734 Lowry Bldg., St. Paul
M.D., Minnesota, 1896.
- EDWIN LEIGH NEWCOMB, P.D., Instructor in Pharmaceutical Botany and Pharmacognosy
719 6th Ave. S. E.
P.D., Philadelphia College of Pharmacy, 1905.
- EDMUND NEWTON, E.M., Instructor in Metallurgy
1005 University Ave. S. E.
E.M., Columbia, 1911.
- HENRY T. NIPPERT, M.D., Clinical Instructor in Medicine
339 Lowry Bldg., St. Paul
Ph.G., Cincinnati, 1889; M.D., Miami Medical College, 1891.
- GEORGE NORTON NORTHROP, M.A., Instructor in English
2213 Grand Ave.
B.L., Minnesota, 1901; M.A., Minnesota, 1907.
- LILLIAN LYDIA NYE, M.A., Instructor in Chemistry
1625 7th St. S. E.
B.A., Minnesota, 1909; M.A., Minnesota, 1910.
- OLOF AUGUST OLSON, M.D., Clinical Instructor in Surgery
221 Cedar Ave.
M.D., Minnesota, 1902.
- WIELAND LEO OSWALD, Instructor in Agricultural Botany
1268 County Road, St. Paul
- OSCAR OWRE, M.D., C.M., Clinical Instructor in Genito-Urinary Diseases
707 Masonic Temple
M.D., C.M., Minneapolis College of Physicians and Surgeons, 1903.
- ALFRED ALBERT PAGENKOFF, D.D.S., Instructor in Crown and Bridge Work
808 Pittsburgh Bldg., St. Paul
D.D.S., Minnesota, 1909.

- JOHN IRA PARCEL, B.S., Instructor in Structural Engineering
1316 7th St. S. E.
B.A., Westfield College, 1903; B.S. (Civil Engineering), University of Illinois, 1909.
- LUTHER WOOD PARKER, M.A., Instructor in French
B.A., North Carolina, 1907; M.A., North Carolina, 1908.
- MARK OTIS PATTRIDGE, D.D.S., Instructor in Operative Dentistry
802 E. Lake St.
D.D.S., Minnesota, 1910.
- DELILAH PEARCE, Instructor in Home Nursing
University Farm, St. Paul
- PETER E. PETERSON, Instructor in Foundry Practice 3709 Clinton Ave.
- CARL HALMER PETRI, D.D.S., Instructor in Prosthetic Dentistry
1301 E. Franklin
D.D.S., Minnesota, 1910.
- EARL PETTIJOHN, M.S., Instructor in Chemistry 3012 James Ave. S.
B.A., Minnesota, 1906; B.S. (Chemistry), Minnesota, 1911; M.S., Minnesota, 1912.
- ANNA AUGUSTA HELMHOLTZ-PHELAN, Ph.D., Instructor in Rhetoric
612 10th Ave. S. E.
B.A., Wisconsin, 1905; M.A., Wisconsin, 1906; Ph.D., Wisconsin, 1908.
- RAYMOND VINCENT PHELAN, Ph.D., Instructor, Extension Work in
Economics 612 10th Ave. S. E.
Ph.B., Western Reserve, 1902; M.A., Western Reserve, 1904; Ph.D., Wisconsin,
1906.
- RUTH SHEPARD PHELPS, M.A., Instructor in Italian East Sanford Hall
B. L., Smith, 1899; M.A., Columbia, 1910.
- FREDERICK HAROLD POPPE, B.A., M.D., Clinical Instructor in Surgery
702 Donaldson Bldg.
B.A., Minnesota, 1904; M.D., Minnesota, 1907.
- WARREN THOMSON POWELL, M.A., Instructor in Rhetoric
517 Essex St. S. E.
B.A., Ohio, 1907; M.A., Ohio, 1911.
- CHARLES HERBERT PRESTON, B.A., Instructor, Extension Work in Eco-
nomics and Political Science 94 Malcolm Ave. S. E.
B.A., Wisconsin, 1906.
- GEORGE C. PRIESTER, B.E., Instructor in Mathematics
1024 15th Ave. S. E.
B.E., Iowa, 1910.
- EDWARD P. QUIGLEY, Instructor in Forge Work 2442 15th Ave. S.
- CARL LEO RAHN, Ph.B., Instructor in Psychology 119 Union St. S. E.
Ph.B., Chicago, 1907.
- CHARLES ANTHONY REED, B.S., M.D., Clinical Instructor in Orthopedic
Surgery 310 Pillsbury Bldg.
B.S., Minnesota, 1895; M.D., Minnesota, 1898.
- GEORGE WESTFALL REYNOLDS, D.D.S., Instructor in Crown and Bridge
Work 3811 10th Ave. S.
D.D.S., Minnesota, 1910.

- ERNEST THOMSON FRASER RICHARDS, M.D., Clinical Instructor in Medicine
914 Lowry Bldg., St. Paul
M.D., McGill, 1905.
- WILLIAM HENRY RICHARDS, Instructor in Carpentry and Pattern Work
1423 W. 27th St.
- HARRY PARKS RITCHIE, Ph.B., M.D., Clinical Instructor in Surgery
914 Lowry Bldg., St. Paul
Ph.B., Yale, 1893; M.D., Minnesota, 1896.
- HARRY BURGESS ROE, B.S., Instructor in Mathematics
2105 Scudder Ave., St. Paul
B.S. in Eng., Minnesota, 1908.
- WILLIAM A. ROLL, D.D.S., Instructor in Crown and Bridge Work
321 14th Ave. S. E.
D.D.S., Minnesota, 1911.
- BERT AARON ROSE, Instructor of Cadet Band 710 7th St. S. E.
- FRANK BENJAMIN ROWLEY, M.E., Instructor in Drawing and Descriptive
Geometry 414 Oak St. S. E.
B.S., Wisconsin, 1905; M.E., Wisconsin, 1906.
- CHARLES EUGENE RUDOLPH, D.D.S., Instructor in Prosthetic Dentistry
2337 Central Ave. N. E.
D.D.S., Minnesota, 1911.
- JAMES COX SANDERSON, Ph.D., Instructor in Physics
710 13th Ave. S. E.
B.A., Yale, 1907; Ph.D., Yale, 1911.
- JULIUS HENRY SANTO, E.M., Instructor in Mechanics and Mathematics
1406 7th St. S. E.
E.M., Minnesota, 1909.
- FREDERIC WILLIAM SCHLUTZ, B.A., M.D., Clinical Instructor in Pediatrics
and Research Associate in Physiologic Chemistry
802 Donaldson Bldg.
B.A., Wartburg College, 1898; M.D., Maryland, 1902.
- THEOPHILUS HENRY SCHROEDEL, B.A., Instructor in German
800 5th St. S. E.
B.A., Northwestern College, 1902.
- RUFUS CLARK SHELLNBARGER, M.A., Instructor in Physics
1105 6th St. S. E.
B.A., Wittenberg College, 1896; B.A., Michigan, 1903; M.A., Michigan, 1907.
- JUANITA L. SHEPPERD, M.A., Instructor in Domestic Science, In Charge
of Section 1385 Raymond Ave., St. Paul
B.A., Oskaloosa College, 1881; M.A., Drake, 1884.
- CHARLES EVERETT SKINNER, M.A., Instructor in Rhetoric
517 Essex St. S. E.
B.L., Michigan; M.A., Michigan.
- HERMON LESTER SLOBIN, Ph.D., Instructor in Mathematics
2541 Harriet Ave.
B.A., Clark College, 1905; Ph.D., Clark University, 1908.
- ANNA MARY SMITH, Librarian, College of Agriculture, Instructor in
Library Methods 1485 Cleveland Ave., St. Paul

- EDGAR KIRKE SOPER, B.A., Instructor in Geology 417 Union St. S. E.
B.A., Leland Stanford, 1908.
- CHARLES NELSON SPRATT, B.S., M.D., Clinical Instructor in Ophthalmology and Otology 900 Nicollet Ave.
B.S., Minnesota, 1897; M.D., Johns Hopkins, 1901.
- ELVIN CHARLES STAKMAN, M.A., Instructor in Vegetable Pathology 1485 Cleveland Ave., St. Paul
B.A., Minnesota, 1906; M.A., Minnesota, 1910.
- WOLDEMAR MARXOWITZ STERNBERG, B.S. in Chem. Eng., Instructor in Chemistry 2109 Lyndale Ave. S.
B.S. in Chem. Eng., Institute of Technology, St. Petersburg, Russia, 1907.
- ARTHUR CLARENCE STRACHAUER, M.D., Clinical Instructor in Surgery 616 Syndicate Bldg.
M.D., Minnesota, 1908.
- EUGENE SILAS STROUT, M.D., Clinical Instructor in Ophthalmology and Otology 910 Donaldson Bldg.
M.D., Michigan, 1891.
- THOMAS W. STUMM, M.D., Clinical Instructor in Medicine 744 Lowry Bldg., St. Paul
M.D., Rush Medical College, 1901.
- SAMUEL EDWARD SWEITZER, M.D., Clinical Instructor in Dermatology and Genito-Urinary Diseases 1517 Stevens Ave.
M.D., Minnesota, 1901.
- HENRY JOHN UBRICH, Instructor in Carpentry 602 Buchanan St. N. E.
- HENRY LUDWIG ULRICH, B.S., M.D., Instructor in Clinical Medicine 310 Pillsbury Bldg.
B.S., Rutgers, 1897; M.D., Johns Hopkins, 1901.
- ANDREW JOSEPH WEISS, Instructor in Technics 3708 Stevens Ave.
- HENRY JOURNEY WELLES, M.D., Clinical Instructor in Ophthalmology and Otology 306 Masonic Temple
M.D., Minnesota, 1901.
- RODNEY MOTT WEST, B.A., Instructor in Agricultural Chemistry 2128 Knapp St., St. Paul
B.A., Minnesota, 1906.
- FRANK WILLIAM WHITE, B.S. in Agr., Instructor in Animal Husbandry 2089 Carter Ave., St. Paul
B.S. in Agr., Minnesota, 1911.
- HALL BREWER WHITE, B.S. in Agr., Instructor in Carpentry University Farm, St. Paul
B.S. in Agr., Minnesota, 1908.
- HELEN ARDELL WHITNEY, M.A., Instructor in Rhetoric 4432 Stevens Ave.
B.A., Minnesota, 1900; M.A., Minnesota, 1909.
- LLOYD ROBERT WHITSON, E.M., Instructor in Drawing 1125 8th St. S. E.
E.M., Minnesota, 1911.

- CHARLES ALBERT WIETHOFF, D.D.S., Instructor in Crown and Bridge
Work 806 42nd Ave. N.
D.D.S., Minnesota, 1909.
- ARCHA EDWARD WILCOX, M.D., Clinical Instructor in Surgery
204 Donaldson Bldg.
M.D., Pennsylvania, 1899.
- LOUIS EARL WILLEY, D.V.M., Instructor in Veterinary Science
2089 Carter Ave., St. Paul
D.V.M., Iowa State College, 1911.
- RICHARD WISCHKAEMPER, M.A., Instructor in German
504 Beacon St. S. E.
B.A., Wartburg College, 1901; M.A., Iowa, 1908.
- CHARLES BENJAMIN WRIGHT, B.A., M.D., Clinical Instructor in Pedi-
atrics 636 Syndicate Bldg.
B.A., North Dakota, 1898; M.D., Johns Hopkins, 1902.
- ARTHUR ADALBERT ZIEROLD, D.D.S., Instructor in Oral Surgery
307 Donaldson Bldg.
D.D.S., Minnesota, 1907.

ASSISTANTS AND SCHOLARS

- CHESTER ROY ADAMS, M.A., Scholar in Economics and Political Science
715 University Ave. S. E.
B.A., Minnesota, 1909; M.A., Minnesota, 1910.
- WALTER CARL ANDERSON, E.M., Assistant in Drawing
2366 Ellis St., St. Paul
E.M., Minnesota, 1911.
- JOHN MILTON ARMSTRONG, M.D., Clinical Assistant in Genito-Urinary
Diseases 409 Lowry Bldg., St. Paul
M.D., Minnesota, 1901.
- SEILER JOSEPH ASPELUND, B.A., M.D., Clinical Assistant in Obstetrics
and Gynecology 315 Masonic Temple
B.A., Luther College, 1901; M.D., Minnesota, 1906.
- WILLIAM HENRY AURAND, M.D., Clinical Assistant in Medicine
425 Oak St. S. E.
M.D., Minnesota, 1901.
- CLARA L. AUST, B.S. in H.E., Assistant in Domestic Science
320 17th Ave. S. E.
B.S. in H.E., Minnesota, 1911.
- ERNEST LAVERNE BAKER, M.D., Clinical Assistant in Medicine
503 Donaldson Bldg.
M.D., Minnesota, 1909.
- WILLIAM DAVID BEADIE, M.D., C.M., Clinical Assistant in Pediatrics
334 Lowry Bldg. St. Paul
M.D., C.M., McGill, 1900.
- BESSIE E. BEMIS, B.S., Assistant in Domestic Science
2130 Carter Ave., St. Paul
B.S., Michigan Agricultural College, 1905.

- FRANCES ELVIRA BLAKE, B.A., Assistant in the University Practice School
2413 Bayless Ave., St. Paul
B.A., Minnesota, 1911.
- HALLWARD MARTIN BLEGEN, B.A., M.D., Clinical Assistant in Gynecology
1525 E. Franklin Ave.
B.A., Augsburg, 1904; M.D., Minnesota, 1909.
- ELWYN R. BRAY, B.A., M.D., Clinical Assistant in Ophthalmology and Otology
69 N. Milton St., St. Paul
B.A., Minnesota, 1903; M.D., Minnesota, 1906.
- LEVERETT DALE BRISTOL, B.S., M.D., Clinical Assistant in Medicine
923 Lowry Bldg., St. Paul
B.S., Wesleyan (Conn.), 1903; M.D., Johns Hopkins, 1907.
- ELIZABETH FLORENCE BROOKS, B.S. in H.E., Assistant in Domestic Art
1212 Raymond Ave., St. Paul
B.S. in H.E., Minnesota, 1912.
- DORIS LILIAN BROWN, M.A., Scholar in Mathematics
2811 2nd Ave. S.
B.A., Minnesota, 1911; M.A., Minnesota, 1912.
- JOHN C. BROWN, B.A., M.D., Clinical Assistant in Medicine
5 Barton Ave. S. E.
B.A., Leland Stanford, 1899; M.D., Minnesota, 1908.
- PAUL FRANCIS BROWN, B.A., M.D., Clinical Assistant in Surgery
3733 Nicollet Ave.
B.A., Minnesota, 1902; M.D., Minnesota, 1905.
- LOUISE HEDWIG BRUHN, M.A., Scholar in German
1728 4th St. S. E.
B.A., Minnesota, 1909; M.A., Minnesota, 1912.
- OLIVER R. BRYANT, M.D., Clinical Assistant in Medicine
802 E. Lake St.
M.D., Minnesota, 1905.
- ARTHUR CHRISTIAN BURKHARD, M.A., Assistant in German
410 17th Ave. S. E.
B.A., Minnesota, 1911; M.A. Minnesota, 1912.
- JOHN BUTLER, M.D., Clinical Assistant in Dermatology
403 Pillsbury Bldg.
M.D., Minnesota, 1903.
- HARRY E. CANFIELD, M.D., Clinical Assistant in Ophthalmology and Otology
2102 2nd Ave. S.
M.D., Minnesota, 1906.
- HENRY ARNO DAUM, B.S. in Eng., Scholar in Physics
700 15th Ave. S. E.
B.S. in Eng., Minnesota, 1912.
- HOMER ALEXANDER DESMARAIS, B.A., Assistant in French
610 4th St. N. E.
B.A., Petit Seminaire de Montreal, 1907; Ph.B., St. Paul Seminary, 1909.
- HARRY W. DIXON, Assistant in Power Plant Operation
1800 4th St. S. E.
- ZOE DONALDSON, Scholar in Rhetoric
1429 6th St. S. E.

- ELEANOR GRACE EATON, B.A., Assistant in English
1891 Dayton Ave., St. Paul
B.A., Mount Holyoke, 1908.
- GEORGIA BELLE ELWELL, B.S., Assistant in Domestic Art
907 7th St. S. E.
B.S., Columbia, 1911.
- JENNESS BOUGHTON FREAR, M.E., Assistant in Mechanics
1319 7th St. S. E.
M.E., Minnesota, 1910.
- CHARLES DONEY FREEMAN, M.D., Clinical Assistant in Dermatology
and Venereal Diseases 642 Lowry Bldg., St. Paul
M.D., Minnesota, 1904.
- PHYLLIS FRYE, Assistant in Domestic Art 1617 4th St. S. E.
- JAMES WOODWARD GEORGE, B.S., M.D., Clinical Assistant in Obstetrics
412 Reid Corner
B.S., Minnesota, 1896; M.D., Minnesota, 1902.
- STANLEY SLOANE GILLAM, B.A., Scholar in Economics and Political
Science 1108 4th St. S. E.
B.A., Minnesota, 1912.
- GLENNE W. GOLDSMITH, B.A., Scholar in Botany 410 Harvard St. S. E.
B.A., Minnesota, 1911.
- EDWARD VINCENT GOLTZ, M.D., Clinical Assistant in Rhinology and
Laryngology 394 Selby Ave., St. Paul
M.D., Northwestern, 1908.
- EUGENE KIBBEY GREEN, B.A., M.D., Associate in Anatomy
307 Reid Corner
B.A., Minnesota, 1895; M.D., Minnesota, 1903.
- WILLIAM FARNSWORTH HAGERMAN, B.S. in Agr., Assistant in Animal
Husbandry 2089 Carter Ave., St. Paul
B.S. in Agr., Minnesota, 1912.
- JAMES FELTON HAMMOND, M.D., C.M., Clinical Assistant in Pediatrics
334 Lowry Bldg., St. Paul
M.D., C.M., McGill, 1906.
- HAROLD HANSEN, Assistant in Biology 3447 Aldrich Ave. S.
- GEORGE LEAVITT HARRINGTON, E.M., Scholar in Geology and Mineralogy
626 11th Ave. S. E.
E.M., Minnesota, 1912.
- ELIZABETH HAUSE, B.A., Assistant in English
2174 Commonwealth Ave., St. Paul
B.A., Michigan.
- MANLEY HEWITT HAYNES, Phm.B., Assistant in Pharmacognosy
703 E. River Road
Phm.B., Minnesota, 1911.
- RUTH ELIZABETH HERMANN, M.A., Scholar in Biology
2640 2nd Ave. S.
B.A. in Educ., Minnesota, 1911; M.A., Minnesota, 1912.

- EDGAR JOHN HUENEKENS, B.A., M.D., Clinical Assistant in Medicine
1037 Andrus Bldg.
B.A., Marquette College, 1904; M.D., St. Louis, 1908.
- DE FOREST HUNGERFORD, B.S., Assistant in Agricultural Chemistry and
Soils University Farm, St. Paul
B.S., Kansas State Agricultural College, 1910.
- HARRY GARFIELD IRVINE, M.D., Clinical Assistant in Dermatology
601 Syndicate Bldg.
M.D., Minnesota, 1903.
- LOUISE E. JENSEN, M.A., Scholar in Botany 2401 Chicago Ave.
B.A., Minnesota, 1909; M.A., Smith, 1910.
- E. MENDELSSOHN JONES, M.D., Clinical Assistant in Surgery
541 Lowry Bldg., St. Paul
M.D., Minnesota, 1907.
- PAUL E. KLOPSTEG, B.S., Assistant in Physics 410 17th Ave. S. E.
B.S., Minnesota, 1911.
- GEORGE F. KROGH, Assistant in Mechanics 1502 Hythe St., St. Paul
- GURID LAATE, B.S. in H.E., Assistant in Domestic Science
1472 Raymond Ave., St. Paul
B.S. in H.E., Minnesota, 1910.
- ANTOINE A. LAURENT, M.D., Clinical Assistant in Diseases of Children
203 Donaldson Bldg.
M.D., Hamline, 1911.
- RAE THORNTON LA VAKE, B.A., M.D., Temporary Assistant in Pediatrics
203 Donaldson Bldg.
B.A., Yale, 1905; M.D., Columbia, 1909.
- HENRY O. LEE, Clerk, Students' Work Committee
1625 University Ave. S. E.
- JARL FERDINAND LEMSTROM, B.S., M.D., Clinical Assistant in Medicine
2117 4th Ave. N.
B.S., University of Helsingfors, Finland, 1903; M.D., University of Minnesota,
1907.
- ELTA LENART, M.A., Scholar in Rhetoric 420 13th Ave. S. E.
B.A., Minnesota, 1910; M.A., Minnesota, 1912.
- ADOLPH EDWARD LOBERG, M.D., Clinical Assistant in Nervous and
Mental Diseases 221 Cedar Ave.
M.D., Minnesota, 1901.
- HYME LOSSE, B.A., Assistant in French 613 N. 4th St.
B.A., Minnesota, 1910.
- HENRY LYSNE, B.S., M.D., Clinical Assistant in Medicine
700 20th Ave. N.
B.S., St. Olaf, 1906; M.D., Minnesota, 1910.
- DAVIDA MCCASLIN, M.A., Scholar in Rhetoric
2024 Selby Ave., St. Paul
B.A., Coe College, 1904; B.S., James Milliken, 1907; M.A., Minnesota, 1912.
- LOLA MCCLURE, Assistant in Domestic Science
2116 Carter Ave., St. Paul

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1393 Cleveland Ave., St. Paul
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5049 N. Lyndale Ave.
B.S. in H.E., Minnesota, 1907.
- WILLIAM ALLISON McMANIGAL, B.A., LL.B., Scholar in Sociology and
Anthropology 822 Marshall Ave., St. Paul
B.A., Minnesota, 1904; LL.B., Minnesota, 1906.
- SOLVEIG MAGDALENE MAGELSEN, B.A., Scholar in Rhetoric
500 Essex St. S. E.
B.A., Minnesota, 1912.
- CHARLES ALBERT MANEY, Scholar in Astronomy 2409 27th Ave. S.
- CHARLES H. MATTHEWS, Assistant in Poultry Husbandry
1485 Cleveland Ave., St. Paul
- ALICE MARGARET MERSEN, B.A., Assistant in Agricultural Chemistry
2111 Commonwealth Ave., St. Paul
B.A., Minnesota, 1904.
- EDWARD MOREN, M.D., Clinical Assistant in Medicine
307 Donaldson Bldg.
M.D., Minnesota, 1906.
- GRACE NEAL, Assistant in Drawing 633 Holly Ave., St. Paul
- FREDERICK ADOLPH OLSON, B.A., M.D., Research Assistant in Medicine
914 Lowry Bldg., St. Paul
B.A., Minnesota, 1905; M.D., Chicago, 1908.
- CARL F. OTTO, Student Assistant in Dental Anatomy 1620 7th St. S. E.
- BENJAMIN WHIPPLE PALMER, B.A., Scholar in Economics and Political
Science 1175 Churchill Ave., St. Paul
B.A., Minnesota, 1911.
- REUBEN MARTIN PEDERSON, B.A., M.D., Temporary Assistant in Genito-
Urinary Diseases 2901 Washington Ave. N.
B.A., Augsburg, 1902; M.D., Minnesota, 1906.
- CHELSEA CARROLL PRATT, M.D., Clinical Assistant in Medicine
915 E. River Road
M.D., Minnesota, 1906.
- FRED JOHN PRATT, M.D., Clinical Assistant in Ophthalmology and
Otology 328 Central Ave.
M.D., Michigan, 1901.
- RICHARD JOSEPH PURCELL, M.A., Scholar in History
426 14th Ave. S. E.
B.A., Minnesota, 1910; M.A., Minnesota, 1912.
- MARY KATHARINE REELY, B.A., Scholar in Rhetoric 119 Union St. S. E.
B.A., Minnesota, 1912.
- MAUDE BESSIE RICE, B.S. in H.E., Assistant in Domestic Art
2095 Commonwealth Ave., St. Paul
B.S. in H.E., Minnesota, 1911.
- LOUIS SYDNEY B. ROBINSON, B.A., M.D., Clinical Assistant in Obstetrics
937 Lowry Bldg., St. Paul
B.A., Harvard, 1897; M.D., Harvard, 1901.

- CHARLES LE ROY RODGERS, M.D., Clinical Assistant in Obstetrics
59 Lyndale Ave. N.
M.D., Minnesota, 1907.
- HELEN ATHERTON SANBORN, B.A., Assistant in Biology
2602 N. Thomas Ave.
B.A., Minnesota, 1911.
- CLIFFORD GRIFFITH SCHULTZ, M.A., Scholar in History
1609 University Ave. S. E.
B.A., Minnesota, 1911; M.A., Minnesota, 1912.
- IVAR SIVERTSEN, M.D., Clinical Instructor in Gynecology
1028 Andrus Bldg.
M.D., Hamline, 1904.
- IDA MARTHA SLETTA, Assistant in Domestic Science
University Farm, St. Paul
- WILLIAM YALE SMILEY, M.A., Scholar in Sociology and Anthropology
321 14th Ave. S. E.
B.A., Minnesota, 1909; M.A., Yale, 1910.
- AUDREY NINA SMITH, M.A., Scholar in Sociology and Anthropology
4920 39th Ave. S.
B.A., Minnesota, 1909; M.A., Minnesota, 1910.
- GRETA EULALIE SMITH, Assistant in Domestic Art
1070 14th Ave. S. E.
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1465 Raymond Ave., St. Paul
- IRA SWANMAN, Scholar in Biology
1620 4th St. S. E.
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3101 16th Ave. S.
B.A., Minnesota, 1911.
- MARK JOSEPH THOMPSON, M.S., Assistant in Agronomy
University Farm, St. Paul
B.S. in Agr., Minnesota, 1911; M.S. Minnesota, 1912.
- CHARLOTTE WAUGH, B.A., Scholar in Botany
1698 Taylor Ave., St. Paul
B.A., Minnesota, 1911.
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Diseases
325 Cedar Ave.
B.S., Valparaiso, 1898; M.D., Minnesota, 1903.
- ROBERT WILLIAMS, B.A., M.D., Clinical Assistant in Medicine
3408 Chicago Ave.
B.A., Illinois, 1896; M.D., Rush Medical College, 1900.
- HULDAH LUCILE WINSTED, M.A., Scholar in Geology and Mineralogy
1700 4th St. S. E.
B.A., Minnesota, 1911; M.A., Minnesota, 1912.
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1700 N. Dupont Ave.
B.A., Minnesota, 1910.
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gology
3128 Bloomington Ave.
M.D., Minnesota, 1906.

DOUGLAS F. WOOD, M.D., C.M., Clinical Assistant in Rhinology and
Laryngology 307 Donaldson Bldg.
M.D., C.M., McGill, 1900.

CHARLES NELSON YOUNG, E.E., Student Assistant in Dental Electricity
1631 Wesley Ave., St. Paul
E.E., Minnesota, 1912.

HARTIE EMIL ZABEL, B.A., Scholar in Comparative Philology
414 17th Ave. S. E.
B.A., German Wallace College, 1907.

BENJAMIN FRANKLIN ZUEHL, M.A., Scholar in Philosophy and Psychology
450 Grotto St., St. Paul
B.D., Western Union College, 1906; B.A., Western Union College, 1907; M.A.,
Minnesota, 1911.

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HISTORICAL SKETCH

When Minnesota was organized as a territory March 3, 1849, it was understood that a grant of public lands would be made by Congress for the endowment and support of a university as in the case of all other states carved out of this old northwest territory.

On December 10, 1850, Delegate Sibley gave notice of a bill to grant two townships (46,080 acres) which became law on February 19, 1851. Meantime the Minnesota Legislature had by Act, February 13, created the University of Minnesota and made over to that corporation the proceeds of all lands which Congress might grant.

The location of the institution was fixed by this law "at or near the Falls of St. Anthony," by virtue of an understanding relating to the distribution of public buildings. A board of twelve regents elected in classes by the legislature had charge till 1860. In the fall of 1851, a preparatory school was opened. In 1856, intoxicated by the boom which was then raging, the Regents began the erection of the rear part of the "Old Main" Building. Before it was finished, the panic of 1857 came on. The board could not pay the contractors nor meet the interest on the bonds they had been authorized to sell.

In the winter of 1860 the Legislature replaced the old board of twelve regents by one of five appointed by the Governor. At the end of four years this board had not been able to put the finances of the University on a sound footing. Senator John S. Pillsbury laid before the Legislature of 1864 a plan to pay off the accumulated debt by the sale of less than one-third of the land grant. A special board of three regents, headed by Mr. Pillsbury, was created to make the experiment. At the close of 1866 this board reported the debt substantially liquidated. A debt of gratitude is due to the creditors and bondholders for scaling down their just claims and accepting sums far below their dues. By means of a small appropriation the special board renovated the building, purchased furniture and appliances, and in November, 1867, opened the preparatory department, to which girls as well as boys were admitted.

This board having accomplished its purpose prepared for the Legislature the bill which, enacted into law February 13, 1868, became the actual charter of the University. By far the most important element was that which united with the university endowment proper the expected income from the congressional land grant of 1862 for the support of colleges of Agricultural and Mechanic Arts.

At the close of the college year of 1869 a small company of preparatory students were found ready for college instruction. A faculty of nine professors and instructors was elected and began their work in September. In this year William Watts Folwell was appointed president.

In 1873 two students were graduated at the first commencement. Some twenty years now passed in quiet work and growth, mostly in the Academic department. A good beginning was made in that of En-

gineering and Mechanic Arts, but in spite of the most earnest endeavors by the Regents the College of Agriculture developed slowly. There was little demand for proper agricultural instruction and the pedagogy of that branch had not been developed.

In the year 1870 Congress confirmed to the State a second grant of public land for a state University ingeniously embodied in the enabling act of February 26, 1857, which the departmental authorities at Washington had persistently refused to recognize.

In September, 1884, Cyrus Northrop succeeded to the presidency and not long after began that great development familiar to all.

The Colleges of Law and Medicine were organized. New buildings sprang up, nobly equipped, and the faculties were reinforced as means accumulated. The growth of the College of Agriculture has been remarkable. The congressional appropriations for experiment stations and additional endowment have greatly increased its efficiency and prosperity. The College of Engineering has also enjoyed a rapid and cumulative development. The Colleges of Pharmacy, Dentistry, the School of Mines, Chemistry, Education, and the Graduate School have been added in recent years, the result of public demands for special technical training and research.

President Northrop resigned in 1910, and, on April 1, 1911, George Edgar Vincent, Ph.D., LL.D., Dean of the Faculties of Arts, Literature, and Science, of the University of Chicago, succeeded to the presidency of the University.

MILITARY DRILL

The Act of Congress of 1862, providing for the establishment of "Land Grant Colleges," requires that instruction be given in Military Science and Tactics at all institutions that are its beneficiaries. At any such institution where a Professor of Military Science and Tactics is detailed, War Department Orders of 1905 require that it shall be provided in its regular schedule of studies that at least three hours per week for two years or the equivalent thereof shall be assigned for instruction in the Military Department.

The United States government supplies the University with the necessary arms, equipment, and ammunition for instruction in infantry and artillery drill, and details a commissioned officer of the Regular Army to take charge of the department.

All male students in the Colleges of Science, Literature, and the Arts, Engineering, Agriculture, and Chemistry, are required to provide themselves with prescribed uniform and take military training during the first two years of their course. The uniform may be secured at an approximate cost of sixteen dollars.

An encampment of cadets is held at the beginning of each year. Sophomore cadets attending the encampment are excused from all Military Drill of the first semester except on Saturdays. Students due but not reporting for encampment are required to report for all military

exercises during the semester and, unless excused for satisfactory reasons, will be required to report at the next encampment.

THE ONE-MILE LIQUOR LAW

A state law provides that "it shall be unlawful for any person to sell or dispose of any spirituous, vinous, or malt liquors within the distance of one mile of the Main Building of the University of Minnesota, as now located in the city of Minneapolis provided that the provision of this section shall not apply to that part of the city of Minneapolis lying on the west side of the Mississippi River."

DESCRIPTION OF DEPARTMENTS

The College of Science, Literature, and the Arts offers a four-year course of study leading to the degree of Bachelor of Arts. The work of the first two years is elective within certain limitations as to the range of subjects from which the electives may be chosen. The remaining work of the course is entirely elective, with the provision that a certain number of long courses be selected. The course is so elastic that it permits the student to make the general scope of his course classical, scientific, or literary, to suit his individual purpose.

In this college are given also the two years of college work required for entrance to the College of Medicine and Surgery; the first two years of work of the seven-year course in Science and Medicine, leading to the degrees of Bachelor of Science and Doctor of Medicine; the two years of college work required for entrance to the Law School; and various non-professional subjects required in other schools and colleges of the University.

The College of Engineering and the Mechanic Arts offers courses of study, of five years each, in Civil, Mechanical, and Electrical Engineering, and Architecture, leading to the degrees Civil Engineer, Electrical Engineer, Mechanical Engineer, or Architect at the end of five years. On the completion of the fourth year the degree of Bachelor of Science in Engineering or in Architecture is conferred.

The course in Architecture offers work only in the freshman class for the college year 1912-13. Mr. Edwin H. Hewitt, Architect, of Minneapolis, has been appointed Lecturer in Architecture.

In the course in Civil Engineering, a period of five weeks is spent in camp in the months of June and July. This summer survey work is required of all students in this course in the vacation following the junior year.

The College of Agriculture offers four-year courses in Agriculture and Home Economics. The Degree of Bachelor of Science is conferred upon completion of these courses. The courses in Agriculture offer work along both general and special lines. Opportunities are offered to all students in the Agricultural and Home Economics courses to elect educational subjects leading to Teachers' University Certificates in preparation for teaching in Secondary Schools.

Graduate work is offered in all special lines of Agriculture. The graduate work is for the most part correlated with work in the Experiment Station.

A summer session (Summer School of Agriculture) of six weeks offers chiefly general courses in Agriculture and Home Economics, especially designed for teachers who are unable to attend the regular college session. This is held in June and July in connection with the State Teachers' Training School.

The College of Forestry offers a four-year course leading to the degree of Bachelor of Science. In addition to the work given at the University Farm four months' work is given at Itasca State Park where a well-equipped demonstration forest is available as a laboratory. The College also controls a Forest Experiment Station at Cloquet, which offers a good field for graduate students and original research. Provision is made for graduate work in all the various lines of silviculture and utilization.

The Schools of Agriculture offer three-year courses of study adapted especially to the needs and opportunities of farm boys and girls. They offer courses of special training for practical farm life and for practical home economics. The Central School is located at St. Anthony Park; The Northwest School, at Crookston; and the West Central School, at Morris.

The Dairy School offers a four weeks' course of practical instruction in dairying, especially designed for those who are actually engaged in the manufacture of butter and cheese. (November and December.)

A Short Course for Farmers is a four weeks' course of practical work adapted entirely to the needs of those actually engaged in farming and in the management of the farm home. (January and February.)

The School of Traction Engineering is a four weeks' course of practical instruction in the operation and handling of traction engines and other farm machinery. Engineer licenses of different grades are given according to previous experience. (May.)

The Experiment Station conducts experiments along the various lines of Agriculture which are of interest to farmers. It is closely correlated with the College of Agriculture. Its object is the solution of agricultural problems of importance in Minnesota. It offers secondarily educational and research advantages to undergraduate and graduate students of the College of Agriculture. The main Station is located at St. Anthony Park; sub-stations are located at Crookston, Grand Rapids, and Morris. Demonstration experimental farms are also located at Waseca and Duluth.

The Extension Work of the Department of Agriculture is correlated with the Farmers' Institute work and aims to bring to the farmers of the State information leading to the improvement of the farm and home. It reaches farmers by institutes, lectures, demonstration and demonstration farms, industrial and agricultural contests, a press bureau, and by correspondence and personal visits.

The Law School, established in 1888, offers a course covering a period of three academic years, leading to the degree of Bachelor of Laws. Candidates for admission to the Law School must have completed at least two years of work in the College of Science, Literature, and the Arts of the University of Minnesota, or some other college or university of equal grade. A special pre-legal course of two years, covering those subjects which are particularly desirable as a preliminary to the study of law, is offered by the Academic college of the University of Minnesota. Seniors in the Academic college are permitted to take the work of the first-year

class in law and count the same as the equivalent of one year's work towards their Academic degree. This provision enables students to obtain the degrees of Bachelor of Arts and Bachelor of Laws in six years.

The object of the Law School is to provide a thorough and scientific legal education, and to prepare students for the actual practice of law in any jurisdiction where the English and American legal system prevails. Particular emphasis is laid upon the Minnesota Statutes, the special doctrines of law, and the rules of practice that obtain in this State.

In teaching the various branches of the substantive law, and, whenever practicable, the adjective law as well, the so-called "case system" is employed. This method of teaching law, which has been approved by experience and which is now employed in the leading law schools of the country, has the two-fold merit of enabling the student to acquire a thorough and practical knowledge of legal principles, and to become familiar with those processes of legal reasoning which have determined the form and character of our jurisprudence, and will govern its future development.

The Faculty is composed primarily of resident professional law teachers who devote their entire time and energy to teaching. The courses in practice are, however, taught by men who are in active practice at the Minnesota bar.

The College of Medicine and Surgery was organized as a teaching school in 1888, the University Medical Department having been first established in 1883 to examine students and confer degrees.

Medical education has been unified in the State of Minnesota by the absorption of all of the private medical colleges; the Hamline University Medical Department having been merged into that of the University of Minnesota in 1908; and the College of Homeopathic Medicine and Surgery having been discontinued in 1909.

The requirements for entrance are a four-year high school course, including two years of Latin; and two years of college work equivalent to that of the College of Science, Literature, and the Arts, of this University, and including at least one year each of physics, inorganic chemistry, qualitative analysis, and biology; and sufficient German or French to ensure a reading knowledge.

The course in medicine includes four years of thirty-six weeks of laboratory, didactic, and clinical work and a fifth year spent in clinical work in an approved hospital or in advanced laboratory studies in this college.

All students entering in September, 1912, or later, will be required to secure the B.S. or B.A. degree before receiving the M.D. degree.

The college occupies five modern buildings on the University Campus, including two new laboratory buildings completed in June, 1912.

The University Hospitals include the Elliot Memorial Building, occupied in September, 1911, the out-patient department, the hospital for infectious diseases, and several temporary buildings which provide for the hospital service, the School for Nurses, and nurses' homes. The University also controls the St. Paul Dispensary.

The Hospitals and Dispensaries of the Twin Cities, serving a population approximating 550,000, also provide clinical teaching for the College of Medicine and Surgery.

The college offers the following courses of study:

1. Course leading to the degrees of Bachelor of Science and Doctor of Medicine. Five years in the College of Medicine and Surgery, viz., four years of graded study and one year in a hospital internship or in advanced laboratory studies or research. Open to those presenting the preliminary requirements stated above.

2. Courses leading to the degrees of Bachelor of Arts and Doctor of Medicine. Students presenting three years of work in the College of Science, Literature, and the Arts, including the required subjects mentioned, which leads up to the degree of Bachelor of Arts, may elect the first year in medicine in their senior academic year, receiving the B.A. degree at its close, and the M.D. degree upon the successful completion of the remaining four years in medicine.

Similar affiliations exist with certain other colleges, whereby the B.A. degree may be conferred by these colleges under the same conditions.

3. The University School for Nurses, organized in connection with the University Hospital service, is under the control of the Faculty of the College of Medicine and Surgery. (See School Bulletin.)

4. Graduate and research work is offered to qualified students.

The College of Dentistry offers a three-year course of study, of nine months each. Upon completion of the prescribed course the degree of Doctor of Dental Surgery is conferred.

The University now offers an optional six-year course of study. The first three years of the course are given in the College of Science, Literature, and the Arts. The last three years are given in the College of Dentistry. It leads to the degree of Bachelor of Arts at the end of the first four years and to the degree of Doctor of Dental Surgery at the end of the six-year course.

The College of Pharmacy was organized in 1891 upon request of the Minnesota State Pharmaceutical Association. In the organization and conduct of the college, the Board of Regents and the Faculty have had and have the co-operation of the pharmacists of the Northwest. The college is of University grade and maintains a high standard of entrance and graduation requirements. Every effort is made to comply with the demands of the pharmaceutical profession of the Northwest and elsewhere. The college offers a regular course extending over two or three years leading to the degree Bachelor of Pharmacy, and two postgraduate courses, the first requiring at least one additional year of resident work and leading to the degree Master of Pharmacy, and the second requiring one or two additional years of work and leading to the degree Doctor of Pharmacy. It is now contemplated to add a four-year course to include somewhat more than is now included in the regular two-year course and about two years of academic work. This course will lead to the degree Bachelor of Science in Pharmacy, and will in all respects be at least the equal of similar courses given in other university colleges of pharmacy.

The course will begin as soon as the College will be provided with larger quarters. The Board of Regents have also authorized a course somewhat lower than the regular course now given, to comply, however, with the requirements of the American Conference of Pharmaceutical Faculties. It is not certain at this time that this course will be organized.

The School of Mines was established in 1889. Its buildings and laboratories are located on the grounds of the University of Minnesota. Students of the School of Mines have, therefore, all the opportunities afforded by a large university. Three regular courses are offered, namely, Mining Engineering, Mining Engineering (specializing in Geology), and Metallurgy, leading to the degrees of Engineer of Mines (E.M.), Engineer of Mines (in Geology) [E.M. (Geology)], and Metallurgical Engineer (Met. E.), respectively.

Students passing satisfactory entrance examinations in Elementary and Higher Algebra, and Plane and Solid Geometry may graduate in four years. Students presenting high school credentials to the extent indicated on page 65, may graduate in five years.

Courses in the school are designed for the purpose of preparing men to enter their profession with a thorough grounding in mathematics, in the sciences, and in the fundamental principles of mining engineering and metallurgy. The technical courses consist of lecture work in mining, metallurgy, and allied subjects, supplemented by laboratory work in assaying, chemistry, ore dressing, and metallurgy; field work in plane and under-ground surveying; actual practical mining and metallurgical work in Minnesota and Western mining centers. A system of apprenticeship during summer vacations has been inaugurated. This work has become part of the curriculum and is required of all students who are candidates for degrees.

Minnesota's enormous iron ore production continually brings before the public the necessity for trained men to aid in the development of the country's mineral resources. The State has developed its School of Mines with this end in view.

The College of Education offers a practical and a theoretical training for prospective high school teachers and principals, for principals of elementary schools, for supervisors of special studies, and for superintendents of school systems.

Students are admitted to the college only after the completion of at least two full years of college work, during which time they should have pursued at least one course in general psychology, and prospective high school teachers should have given especial attention to one or more of the subjects which they expect to teach. The two years' course of study, beginning with the junior year, leads to the degree of Bachelor of Arts in Education. Preparation for teaching is planned to include a thorough grounding in the correct use of English, and adequate training in general and in educational psychology, in the history and organization of schools, in educational theory, and in the practice of teaching; and also, quite aside from the liberal training of the regular college course, specific preparation in both the subject matter and the methods of those subjects in

the secondary curriculum which each candidate proposes to teach. A third year leads to the degree of Master of Arts, including advanced studies in education and philosophy, and in one or more of the subjects of the secondary curriculum, at the option of the candidate.

In addition to the ordinary academic and professional studies connected with the training of the teacher, the college offers an opportunity for observation and practice teaching under supervision, as well as special facilities in voice culture, public school music, and physical culture, together with elementary and advanced courses in drawing, domestic art, and domestic science, manual training, and business education—those specialized forms of the secondary curriculum which are being introduced so rapidly into the public high schools of Minnesota.

The School of Analytical and Applied Chemistry offers three courses. Two of these, the Analytical and the five-year course in Arts and Chemistry, are designed for those who wish to become teachers of chemistry, analysts, and investigators. The four-year Analytical course leads to the degree of Bachelor of Science in Chemistry, while the five-year course leads to the degree of Bachelor of Arts after four years and Bachelor of Science in Chemistry at the end of the fifth.

The third or Applied course extends over five years, leading to the degree of Bachelor of Science at the end of four years and Chemical Engineer at the end of the fifth. These courses aim to give the student a broad foundation in chemistry and some of the allied sciences.

The two buildings occupied by the school contain six large laboratories and about twenty smaller ones well equipped for carrying on a wide range of work.

The Graduate School gathers into a single organization and unites for the purpose of administration all the activities of the University in all its schools and colleges in so far as they relate to advanced instruction offered for the second or higher degrees, viz., Master of Arts and Doctor of Philosophy conferred for advanced, non-technical study; Master of Science and Doctor of Science for technical study. The privileges of this school are in general open to all who have received bachelor's degrees from reputable colleges and universities, based on courses substantially equivalent to those at this University.

The University Summer Session is organized for six weeks in June and July under the authority of the Board of Regents as a regular part of the University, replacing the summer school formerly held under the State Department of Public Instruction. Courses carrying University credit, amounting in all to more than twice the number required for the bachelor's degree and including all the subjects of the state professional certificate, are offered for college students, experienced teachers, and others who desire the advantage of advanced study. Students may secure not more than six credits at one session.

The work heretofore given for rural and graded school teachers in the elementary section of the summer school is now conducted by the State Department of Public Instruction as a State Training School for Teachers at the University Farm, St. Paul.

Special Courses.—In practically all of the colleges, students of mature age and adequate preparation are permitted to pursue, under the direction of the Faculty, one or two distinct lines of study.

Extension Courses.—The Legislature of 1909 made an appropriation for the biennial period providing for University Extension work, and the Legislature of 1911 has continued it.

The Department of Economics and Political Science, for this period, gives a number of courses in the evening at the University for business men living in the vicinity of the University, and a somewhat similar group of courses by correspondence throughout the State. The Department also offers a series of University Extension lectures in the field of Economics and Political Science at points anywhere in the State. A separate bulletin explaining each of these three kinds of work may be had upon application.

University extension work is conducted by the College of Education in the form (a) of local lectures in series of three to six, where committees are formed for this purpose in various communities; (b) of correspondence courses especially arranged for teachers in the subjects required for the state professional certificate; and (c) of institute lectures for teachers in connection with the various district, county, and local educational associations. A considerable part of the work required for a bachelor's degree may be completed by correspondence.

EQUIPMENT

GROUNDS AND BUILDINGS

The twenty-eight buildings of the University used by all departments of instruction save that of Agriculture, are located upon the University campus, a tract, including the new campus, of about one hundred twenty-three acres lying between University Avenue and the river and between Eleventh and Nineteenth Avenues Southeast, in the city of Minneapolis. The campus is well wooded, having a fine grove of native oaks and commands a beautiful view of St. Anthony Falls and the city, but is sufficiently removed from the business center to insure desirable quiet and retirement. The new campus area to the south of the Northern Pacific Railway is now occupied by the new buildings of the College of Engineering, and Medicine built in accordance with the Cass Gilbert Plans.

The Department of Agriculture and the State Experiment Station are situated at St. Anthony Park, two and one-half miles directly east of the University, on the University Farm, which comprises about four hundred twenty acres. The Department has a very fine campus which commands excellent views of Minneapolis and St. Paul, besides a vast sweep of country to the south, extending beyond the Mississippi. The twenty-seven buildings provided for this Department are located upon this Campus.

ASTRONOMICAL OBSERVATORY

The Astronomical Observatory contains a ten and one-half inch refracting telescope furnished with a third lens for converting it into a photographic telescope; a filar micrometer; a spectroscope by Brashear; a meridian circle and zenith telescope; a Repsold photographic measuring machine; a chronograph, and astronomical clocks.

GYMNASIUM

The gymnasium is located in the Armory, and is well equipped with a variety of gymnastic appliances to which has recently been added a swimming pool. The object of the gymnasium is to provide all of the students of the University opportunity for exercise to build up their general health. It also provides special training to correct physical defects and functional derangements. The gymnasium is in charge of a professional medical director and assistant, and the training is under their direct supervision. A thorough physical examination is offered each student immediately before and after the gymnasium course, and a record is made of the same. The examination of these records shows a marked improvement in the standard of health of the average student during his

college course. The gymnasium is open at all times to students of the University, who are free to use the apparatus and to pursue a course of physical training under the direct supervision of the director and his assistant. In some of the colleges of the University physical training is required of all students.

MUSEUMS AND COLLECTIONS

The museums of the University contain material obtained from various sources, arranged with special reference to its use for illustration. Among the more notable collections are the following:

Geology and Mineralogy.—This museum includes the Kunz collection of minerals, purchased of George F. Kunz; several suits of crystalline rocks secured from various sources; the Ward collection of casts contributed in part by citizens of Minneapolis; collection of rocks, fossils, minerals, and economic products of Minnesota; upwards of 9,000 entries gathered by the Geological Survey of the State; the Sardeson collection of paleozoic fossils of Minnesota, Wisconsin, Iowa, and neighboring states, comprising 30,000 specimens; a series of 3,000 thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material comprising a fine collection of crystals; 5,000 minerals and 3,000 specimens of economic minerals and crystalline rocks, and a collection of over 4,000 photographs and lantern slides.

Mr. Arus S. Williams, of Minneapolis, has given to the University his extensive collection of negatives and photographs. During many years of active work as a photographer, he has collected a series of several thousand plates representing geologic and geographic subjects, commercial views, and historic scenes. These will prove of great value in illustrating the physical, commercial, and political history of the State. They are recognized as the A. S. Williams' Collection of Photographs and Photographic Negatives.

Zoology.—The zoological museum contains all the material collected by the Zoological Survey; a collection of mounted Minnesota birds representing about one-third of the species found in the State; a number of the mammals of the State and a few from the more western states; a collection of fishes, molluscan shells, Philippine Island corals, and other foreign material.

The museum material includes a beautiful group of Woodland Caribou recently presented by James Ford Bell, the Roberts and Benner collection of skins, nests, and eggs of birds of Minnesota; the Oestlund collection of insects rich in Aphidae; the Guthrie collection of Collembola; the Menage collection of Philippine Island corals; the Survey collections, and a considerable amount of good material available for neither display nor study because the quarters are utterly inadequate.

Botany.—The material forming the museum in Botany includes the general herbarium numbering about 400,000 specimens and comprising the series of plants collected by the State Botanist; an alcoholic collection

of material for dissection; a collection of the woods of Minnesota; a limited series of Carboniferous and Cretaceous fossil plants, including the Lesquereaux collection from the Minnesota River localities. Two new herbaria are being developed with special reference to museum needs. One is a formation herbarium arranged to show the grouping and importance of the species which form the natural plant societies of the State. The other is designed to show the origin of new forms and species of plants, both in nature and under cultivation. A beginning has also been made in bringing together collections of the Botanical Survey, as well as from other sources, designed to illustrate the uses of plants in everyday life and in the industries.

Mining and Metallurgy.—A museum of mining and metallurgy is located in the School of Mines Building. Representative ores of all the most important metals, drawings, photographs of furnaces, sectional furnace models and samples of all the different furnace products are exhibited to the public and are used as illustrative material for regular classes. Various mine appliances, pieces of machinery, underground photographs, models of mine timbering with sectional maps of some of the large Minnesota properties, complete the collection. A collection begun will include ores from all the important mines on the Mesabi range. These samples with analysis show well the character of ore produced by the State.

Sociology and Anthropology.—Photographs and exhibits, showing the work in Charities and Corrections of the various state institutions; photographs and exhibits of leading national movements for better social conditions; wall-charts and maps which present graphically a large number of sociological facts, from various parts of the United States; a collection of plaster-cast crania and skulls, showing man's ancestors, fossil man from Western Europe, typical members of the various living races and sub-races, both normal and artificially deformed; a collection of face-masks in color, presenting well the Oceanic peoples; a series of busts in white, presenting facial and cranial characteristics of a considerable number of different peoples; natural cranial, skull, and skeletal materials from some dozen different continental and insular geographic areas; the Guthrie collection of ethnologic specimens from the Bulu tribe of Kamerun Province, Africa, presenting the material culture of a savage people in the Tropics; a collection of American Indian stone implements, weapons, etc.

Technology.—A cabinet of specimens illustrating the products and processes of Applied Chemistry is being collected by the Professors of Chemistry, as opportunity offers. The collection embraces fuel, ores, furnace products, textile materials, both raw and manufactured, dye-woods and other materials used in dyeing; specimens illustrating the bleaching and printing of cotton, linen, and woolen goods, earthenware, pottery, etc.

Classics.—Some material illustrating classical geography, topography, chronology, mythology, and art has been collected, consisting mainly of

plans and charts, casts, pictorial illustrations, facsimiles of manuscripts and inscriptions.

English.—A few facsimiles of manuscripts, plates that may serve the purpose of archaeological instruction, publication of texts, reprints of black-letter books and of original editions, photographs, and portraits have been gathered.

The College of Engineering.—The College of Engineering has equipment illustrating the historical development or evolution of many forms of machinery and apparatus in Mechanical and Electrical Engineering. In its shops and electrical laboratory, modern machinery and apparatus is used for actual operation in metal and wood working, and in electrical tests and demonstrations. The new Experimental Laboratory is a large beautiful building devoted to tests of engines, boilers, pumps, the flow of water, the strength of cements and concrete, and many other operations in experimentation and research.

Engineering Mathematics.—This department has recently added to its apparatus used for illustration in teaching, several types of slide-rules including those of Thatcher, Faber, Keuffel and Esser, Schureman's Computer, Boucher's Calculator, also Amsler's Polar Planimeter.

Mathematics.—The collection includes the Shroeder wooden and the Schilling gypsum, string and paper models for Solid Analytical Geometry, many of the Schilling models for illustrating the Theory of Surfaces, several of the Schilling mechanical devices for describing various loci, the Keuffel and Esser models for Solid Geometry, and large slated globes, suitably mounted, for use in Spherical Geometry and Spherical Trigonometry.

LIBRARIES

The University Library consists of

1. The general library.
2. The college libraries, including those of Engineering, Agriculture, Law, Medicine, Pharmacy, and Mines.
3. The departmental libraries, including those of Arts, Astronomy, Animal Biology, Botany, Chemistry, Civil, Mechanical, and Electrical Engineering, French, Geology, German, Greek, Latin, Mathematics, Military Science, Physics, Rhetoric, and Scandinavian.

The whole number of bound volumes owned by the University is about one hundred and fifty thousand; unbound books and pamphlets about twenty thousand. About nine hundred current periodicals are received.

The general library is open to students and the public from eight a. m. to ten p. m., except Sundays and legal holidays.

The departmental libraries are designed especially for the work of their respective departments and consist mainly of books of reference and current periodicals relating to technical subjects. The private col-

lections of the professors are usually available upon application when necessary for research.

Besides the University library the following libraries are easily accessible: The Minneapolis public library, containing over two hundred thousand bound volumes and over fourteen hundred of the leading newspapers, magazines, and periodicals of the world; the St. Paul public library with about one hundred and ten thousand volumes; the Minnesota Historical Society library of about eighty-five thousand volumes and the State library of about fifty-nine thousand volumes in the capitol in St. Paul; the Minnesota Academy of Natural Sciences library of twelve thousand titles.

ASSISTANTS, SCHOLARSHIPS, LOANS, AND PRIZES

ASSISTANTS AND SCHOLARS

It is the policy of the University to encourage graduate study and to provide for assistance in laboratories, reading of test and examination papers, supervision of note books, and similar services by the appointment of assistants and scholars in departments where such services are required. The general principles which now control the making of such appointments are: (1) the appointments are made by the Board of Regents, upon the nomination of the head of the department concerned and its ratification by the dean of the college; (2) appointments are for one year only, but may be renewed; (3) the appointees must be graduate students who are taking work along the line of their appointments; (4) they are not regularly placed in charge of classes, and when exceptions are made to meet emergencies the arrangement is regarded as a temporary one.

FELLOWSHIPS

The Shevlin Fellowships

Four fellowships, each being the income from \$10,000.00, were established in the Graduate School through the gift of \$40,000.00 by the late Thomas Shevlin, of Minneapolis. The donor designated the objects of these four fellowships as follows: Academic, Agriculture, Chemistry, and Medicine.

Academy of Medicine Fellowship

The Minnesota Academy of Medicine has made provision for a research fellowship in the College of Medicine and Surgery, which bears an annual stipend of \$250 to \$300. The appointment of the incumbent is placed in the hands of a committee of the Academy of Medicine, who will determine also the character and extent of the work and in what department it shall be undertaken.

Further information may be obtained from the Dean of the College of the Medicine and Surgery.

SCHOLARSHIPS

The Moses Marston Scholarship in English

Friends and pupils of the late Professor Moses Marston have given one thousand dollars as a memorial fund to him. The annual income of the fund is to be used to further English study. The scholarship is

awarded by the English Department as a recognition of special capacity for literary and linguistic studies.

The Albert Howard Scholarship Fund

Under the last will and testament of Mr. James T. Howard, of the town of St. Johnsbury, Vermont, \$4,166.81 was left to the University to establish a scholarship to be known as the Albert Howard Scholarship.

The Minneapolis Steel and Machinery Company Scholarship

Beginning with the college year 1912-13, the scholarship of \$500.00 created by the Minneapolis Steel and Machinery Company will be available for work by a graduate student in the laboratories of the College of Engineering. The subject upon which work will be carried on is to be determined by agreement between the Company and the College.

The College Woman's Club Scholarship

The College Woman's Club of Minneapolis has established a scholarship for the benefit of women students in this University. For the year 1912-13 this scholarship amounts to \$150. In awarding it the preference will be given to students in the junior and senior classes and to graduate students. Application for this scholarship may be made to the Dean of Women.

STUDENT LOAN FUNDS

The Gilfillan Trust Fund

The Hon. John B. Gilfillan has given to the University the sum of fifty thousand dollars, yielding an annual income of two thousand dollars, to be used by the Board of Regents to assist worthy students, needing such aid, to secure an education. The Regents are empowered to give this aid in the way of loans or gifts, according to the circumstances of the case. As a rule the fund is used as a loan fund, and a small rate of interest is charged. The details of the regulations which have been adopted by the Regents for the administration of the fund may be learned by addressing the President of the University.

The Elliot Scholarship Loan Fund

To fulfill the wishes of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the sum of \$5,000 was placed in the hands of the Board of Regents as a scholarship fund. The income from this fund is loaned students in the School of Mines on the following conditions: The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work, and promise of usefulness in his profession. When

money is available, it may be loaned to pay expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

The Puritan Colony Scholarship Loan

The Puritan Colony of the National Society of New England Women has established a loan fund for women students of the University. For the year 1912-13 this scholarship loan amounts to one hundred dollars. It is available for women students of New England birth or ancestry. In awarding it the preference will be given to young women in the junior and senior classes. Application for it may be made to the Dean of Women.

Students' Trust Fund

The class of 1902 left with the School of Agriculture a fund of \$100 "to assist by temporary loans at a reasonable rate of interest, deserving students needing such help, who are not below the B class in the School of Agriculture." This fund is in charge of a committee consisting of the Dean, the Principal, the Preceptress, and the President of the A class.

The Ludden Trust

The late Honorable John D. Ludden, of St. Paul, gave to the University of Minnesota \$10,000 to be held, invested, and reinvested by the University through its Board of Regents, and the income thereof to be collected, received, and applied by said Board of Regents to the financial assistance of students in the School of Agriculture.

This fund produces \$400 a year. Those wishing to avail themselves of its benefits should apply to the Dean of the Department of Agriculture, who will present the matter to the Board of Regents.

PRIZES

The John S. Pillsbury Prize

Three prizes of one hundred, fifty, and twenty-five dollars each, offered by the heirs of the late John S. Pillsbury, have been awarded for the best work in the Department of Rhetoric, as evidenced finally by an oration in public.

The Frank H. Peavey Prize

Mrs. Frank T. Heffelfinger has continued the prize of one hundred dollars, established by her father, the late Frank H. Peavey. This prize is awarded to the members of the team winning the annual freshman-sophomore debate.

The Maurice L. Rothschild and Company Prize

Maurice L. Rothschild and Company have provided three cash prizes of fifty, thirty, and twenty dollars each, which are annually awarded to those three students in the freshman and sophomore classes who write and deliver the best orations.

The '89 Memorial Prize in History

The class of 1889, at graduation, established a prize of twenty-five dollars each year, to be known as the '89 Memorial Prize, and to be given for the best thesis in history by a member of the graduating class. The award is made by a professor of history in some other institution.

The Frank O. Lowden Prize

The Hon. Frank O. Lowden, of Chicago, offers as prizes to be competed for by the Northern Oratorical League, the annual income on an endowment of three thousand dollars. A prize of one hundred dollars will be given to the orator winning the first place, fifty dollars to the orator winning second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

The Andrew Lanquist Prize

The Society for the Advancement of the Study of Swedish offers an annual prize of twenty-five dollars to be known as the Andrew Lanquist Prize, in honor of the donor. It is awarded to the student who, during the current year, has received the highest rank in the study of Swedish.

The William Jennings Bryan Prize

The Honorable William Jennings Bryan in 1898 gave the University the sum of two hundred and fifty dollars for the encouragement of studies in Political Science. The quadrennial income from this fund, amounting to fifty dollars, will be awarded every fourth year as a prize to the writer of the best essay upon a topic to be announced. The essay must be handed to one of the instructors in Political Science by May 1, 1913, and must not exceed ten thousand words. Three judges to be designated by the President of the University will award the prize.

The Alumni Weekly Gold Medal

This medal is provided by the *Minnesota Alumni Weekly* and is awarded annually by the Faculty Committee on Debate and Oratory, to that member of the graduating class who has, in the judgment of the Committee, made the best record in forensics during his college course. The medal is awarded only to a student who has shown himself broad-minded, unselfish, industrious, and willing to work courteously and enthu-

siastically with others so as to serve the highest interests of debate and oratory in the University. The recipient must be a type and a model, as nearly as the student body offers such a candidate each year, of what a man may make himself through diligent application to the duty next at hand.

The Rollin E. Cutts Prize in Surgery

Dr. Mary E. Smith Cutts, '91 Medical, has given to the University, as a memorial of her husband, the late Dr. Rollin E. Cutts, '91 Medical, the sum of \$500.00, the income from which is to be awarded in the form of a gold medal to that member of the senior class of the College of Medicine and Surgery who presents the best thesis showing original work upon a surgical subject.

The Dr. J. W. Bell Prize

Through the generosity of Dr. John W. Bell, Emeritus Professor of Clinical Medicine and Physical Diagnosis, an annual prize of \$100 is offered in the College of Medicine and Surgery, to the student showing the highest proficiency in physical diagnosis.

Information as to special conditions connected with this prize may be obtained from the Dean of the College of Medicine and Surgery.

The Mercer Prize

Mr. H. V. Mercer, of Minneapolis, offers three medals to be awarded annually, to the three winning debaters in a Law School debate, or series of debates, to be conducted under rules laid down by the Law Faculty.

The Briggs Prize in Foundry Practice

For the encouragement of students in foundry practice, Mr. O. P. Briggs, commissioner of the National Foundrymen's Association, Detroit, Mich., offers \$75 annually, in two prizes, which are to be accompanied by gold medals. The competition is open to sophomores in the College of Engineering, and the prizes will be awarded for the best essay relative to the above subject. No prize will be awarded if less than five essays are submitted in competition. Essays should contain about 3,000 words and must be submitted to the Professor of Rhetoric on or before May 1st.

The George C. Andrews Prize

Mr. George C. Andrews, M.E. '87, has offered an annual prize to the Senior Mechanical Engineers for the best essay on any subject connected with heating and ventilation. The prize in this contest will consist of \$50.00 in cash accompanied by suitable medal; a second prize will also be given which will consist of \$25.00 in cash accompanied by a medal. The winner of the first prize will be offered a position with the George C. Andrews Heating Company.

Pharmaceutical Association Prize

Nomination for membership in the American Pharmaceutical Association and the first year's dues are offered annually by Dean Wulling to the student in the College of Pharmacy earning the highest total average of all standings.

STUDENT ORGANIZATIONS AND PUBLICATIONS

RELIGIOUS ORGANIZATIONS

The Young Men's Christian Association has as its object the promotion of "growth in grace and Christian fellowship among its members and aggressive Christian work, by and for students." This Association occupies a commodious building on the campus and keeps it constantly open, with a general secretary in charge. All men in sympathy with the object of the Association are eligible to membership. This building is maintained as the social and religious headquarters of all young men in the University.

This Association provides an employment bureau whose services are free to students in all departments of the institution, as well as a committee to help students find comfortable rooms and boarding places. The Association also maintains an educational department in which students may make up their entrance conditions at a nominal charge for instruction. The general secretary will be pleased to correspond with any young man intending to come to the University. Any inquiry about board, room, employment, or general information will gladly be answered, and a hand-book will be sent to anyone wishing it. Address the General Secretary of the Young Men's Christian Association, University of Minnesota, Minneapolis, Minnesota.

The Young Women's Christian Association is the center of Christian life among the young women of the University. Its object is "to deepen spiritual thought in the University woman, to environ her with a semblance of home, to bring to her friendship, assistance, and sociability by stimulating student fellowship, to give her personal help when necessary thus developing in her the Christ ideal of culture in womanhood."

To this end frequent socials and informal teas are given throughout the year; each Wednesday noon a meeting is held in the Assembly Room of Shevlin Hall. It is the purpose of the association to make these meetings of practical help in the every-day lives of the University girls, by better interpreting the modern trend of religious thought in some of its phases. A number of courses are offered in both Bible and Mission study. The general secretary devotes all of her time to the association and will be pleased to correspond with any young woman who wishes information regarding the University.

All young women are invited to visit the Young Woman's Christian Association before registering. Women from the upper classes will be there during the opening days to give advice and assistance.

The Bishop Gilbert Society, for men, was organized about five years ago by the members of the Episcopal Church. The purpose of the society is to promote the religious welfare of the students generally, and to minister to those in particular who are communicants of the Episcopal Church. The members of the society operate "The University House of the Epis-

copal Church" which is the center of the society's work. The house is owned by a corporation composed of the Bishop of the Diocese of Minnesota, the Rector of Holy Trinity Church, and various other clergymen, and prominent laymen.

The Church Club was founded last year by the Episcopalians to be of service among the women of the University. The Club has maintained religious services and has endeavored to keep in touch with all Episcopal students. It has grown steadily in interest and members. Complete information concerning these two organizations may be obtained by addressing the Rector of Holy Trinity Church, Minneapolis.

The University Catholic Association (the U.C.A.) is an organization of students which has for its purpose the promotion of the welfare of the Catholic students of the University. The work of the Association is under the supervision of a Spiritual Director appointed by the Archbishop. The Association confines itself to uniting those who profess the Catholic faith by means of lectures and entertainments. Regular meetings are held every Sunday afternoon at 4 o'clock in the Y. M. C. A. Building on the Campus. These meetings are addressed by the Spiritual Director and by speakers from among the Catholic clergy and laity of the Twin Cities. All Catholic students and Faculty members are eligible to membership. Plans are under way for the erection of club rooms for the use of the Association.

The University Liberal Association is a non-sectarian religious organization meeting weekly for the purpose of cultivating liberal thought in religious matters, and social intercourse among the so-called liberally religious people upon the campus.

LITERARY, SCIENTIFIC, AND MUSICAL ORGANIZATIONS

Phi Beta Kappa.—A chapter of the honorary society of *Phi Beta Kappa* was established at the University in 1892. A small proportion of the graduates of the College of Science, Literature, and the Arts are elected to membership each year. Election is based upon high scholarship and character.

Sigma Xi.—A chapter of the honorary scientific society of *Sigma Xi* was established at the University in 1896. A small proportion of the graduates of the scientific and technical departments are elected to membership each year. Election is based upon research ability, high scholarship and character.

Tau Beta Pi.—A chapter of the honorary engineering society of *Tau Beta Pi* was established in the University in 1909. The membership of this fraternity is made up of engineering students, and the basis of eligibility is character and excellence in scholarship.

Literary Societies.—There are four men's literary societies at the University: Shakopean, Forum, Castalian, and Platform Club. They are mainly debating clubs. Every student is welcome to attend the literary sessions, but the business sessions are usually held behind closed

doors. Students desiring to join should make early application to some member of the society he prefers, as the membership is limited. The women's societies are Minerva, Theta Epsilon, Thalian, and Acanthus. Members to these are elected only by vote of the society.

The Debating Board has charge of home and inter-collegiate oratorical contests.

Philomathian Literary Society is an organization of the students of the College of Agriculture, its object being to train its members in the art of public speaking, debating, and parliamentary practice. The society meets once a week and presents a program including readings, recitations, debates, etc. The society is co-educational and its membership is limited to forty and includes only students in the College of Agriculture.

The Northern Oratorical League is composed of the oratorical associations of the University of Michigan, Northwestern University, the University of Wisconsin, Oberlin College, the State University of Iowa, the University of Illinois, and the University of Minnesota. Its purpose is to foster an interest in public speaking and to elevate the standard of oratory by holding annual contests. The contests are open only to undergraduates.

The Agricultural Club welcomes to its membership any male student in the College of Agriculture. Faculty men and others especially interested in agriculture may be elected to honorary membership.

The purpose of the club is to promote scientific agriculture by meetings and the public discussion of agricultural problems, especially those which are of immediate importance and upon which little has been published.

The Science Club is composed of the members of the Faculty of the Department of Agriculture and others connected with the institution. Meetings are held on the first Monday evening of each month. The purpose of the club is to bring those connected with the College and Station in closer touch with one another and with the many lines of work carried on in the several divisions.

The Home Economics Association is an association representing all of the students in the Home Economics course, with membership open to all women in the course. It is for the purpose of enlarging the opportunities both social and intellectual, and of furthering the interests of the women of the College of Agriculture both in the University and throughout the State.

The Home Economics Club is an organization of Agricultural College women having for its purpose the furthering of interest in Home Economics and the promotion of social activity among college students. Its membership is limited to thirty (30), the requirement for membership being the completion of at least one semester's work in economics pertaining to the home.

The Forestry Club was organized by the forestry students for the promotion of good fellowship and mutual interests. The specific object of the club is to keep the members up to date on forestry literature and current affairs in the lumber world.

American Chemical Society.—A local section of the American Chemical Society has been organized in Minnesota with headquarters at the University.

School of Chemistry Society.—The School of Chemistry Society is an organization of the students of the school, which meets once a month to consider topics of general interest. The society also procures lecturers to address the school.

The Engineers' Society meets once in two weeks to listen to addresses by prominent engineers and for the discussion of various engineering topics. *The Minnesota Engineer* is published quarterly by this society. It is devoted to the publication of articles upon engineering subjects by professors and students.

The School of Mines Society meets once a month to listen to addresses by students, alumni, and well-known mining and metallurgical engineers on various topics interesting to the professions. All students regularly registered in the School of Mines are eligible to membership. This society forms an important connecting link between the graduates in the field and the School of Mines.

The Minnesota Section of the American Institute of Electrical Engineers meets once a month alternately in St. Paul and Minneapolis. Students of the College of Engineering are welcome at these meetings.

The Northwestern Branch of the American Pharmaceutical Association meets six times a year at the College of Pharmacy or elsewhere in the Twin Cities. Pharmacy students are always welcome at these meetings and are eligible to membership in the Branch.

The Sem. Bot., organized in 1886 at the University of Nebraska, has established an allied convocation at the University of Minnesota. It is essentially a research society in Botany, composed of the botanical staff and of advanced students in the department. It meets alternately in convocation and in chapter to present the results of investigation, and for discussion.

Lambda Alpha Psi.—This society was founded for the purpose of encouraging the study of languages and their literatures. To this end it maintains a course of popular lectures on artistic, literary, and linguistic subjects, given at intervals throughout the college year, by various professors in the University and noted educators from abroad. A small number of students from the senior class in the College of Science, Literature, and the Arts, who have specialized in languages and literature, are elected each year to membership, such elections being based upon scholarship and high character.

The Masquers.—This society was organized in 1898 under the name of the University Dramatic Club. Two plays are given each year after careful training under an experienced dramatic coach. The active membership, limited to thirty, is composed of students who qualify by trials held soon after the beginning of each University year.

The Euterpean Club is a regularly organized body of singers, composed of forty of the women students of the University. The selection of voices

is made at the beginning of each school year. The club is under the direction of Professor Scott.

The Glee and Mandolin Clubs give a public concert each year at the University and make a tour of the State during the holidays.

The University Band is organized as a part of the military system of the University and is composed of about sixty musicians. It is under the efficient leadership of an instructor in music, and furnishes music for military and many other University affairs.

ATHLETIC ORGANIZATIONS

The Athletic Association is an organization having for its object the general physical well-being of the students and the encouragement of a proper spirit in favor of hearty, manly sports.

Board of Control for Athletics.—The athletic sports of the University are under the supervision of a Board of Control made up of eleven members of whom two are members of the Faculty, two are alumni, and seven are students. This board arranges the schedule of games, manages the finances, and exercises a general supervision over all matters connected with athletic contests. It has charge of the whole of the athletic grounds of the University, Northrop Field. This field, containing about six acres, lies immediately adjoining the armory. It contains a modern cinder track, tennis courts, baseball diamond, and football gridiron. The grand-stands have a seating capacity of about fifteen thousand. A large portion of this field was a gift to the University from the heirs of the late John S. Pillsbury, and the brick wall surrounding it is the gift of his son, Mr. A. F. Pillsbury. It is generally conceded to be one of the finest fields in the West.

PUBLICATIONS

The Minnesota Daily is published five times each week during the University year by an organization of University students.

The Junior Annual, called "The Gopher," is a book published annually by the junior class of the University.

The Minnesota Magazine is a monthly magazine devoted to the cultivation of literary taste and effort among the students of the University. It is managed by a board of editors chosen from the senior class.

The Minnesota Alumni Weekly is published each Monday during the University year, thirty-six numbers in all. It is published in the interests of the alumni and the University and is devoted to such news of the alumni and the University as will be of interest to the alumni.

The Minnesota Engineer of the Society of Engineers is published quarterly. It is devoted to the publication of articles upon engineering subjects by professors and students.

The Minnesota Forester is the official organ of the Minnesota State Forestry Association. It is edited by the Forestry Department of the

University and is devoted to the advancement of the forestry movement, with special emphasis on farm forestry.

The School of Mines Bulletin is published annually in April. It is devoted entirely to information concerning the alumni of the School of Mines. A complete record of each alumnus is published from the time of graduation to the time of publication of the Bulletin. The School of Mines Society issues this publication and sends it to every alumnus of the school.

The Minnesota Farm Review is a paper published and managed by the Alumni Association of the School of Agriculture. It is the official organ of the Alumni Association and the Farmers' Club. The *Review* is intended to be a medium through which former students may keep in touch with the Agricultural School and with one another. It also endeavors to bring the farmers of the State into closer touch with the School, the College, and the Experiment Station. To this end, the paper strives to present the latest progress in the experimental work of the various stations and to call attention to the most practical farm practices.

The Botanical Survey publishes *Minnesota Botanical Studies* and *Minnesota Plant Life*. The former is devoted to the results of investigations carried on in the Survey and in the Department of Botany. The latter is a series of popular booklets, treating of the plants of the State. In addition, the Survey publishes at intervals semi-popular scientific monographs, such as *Minnesota Plant Life*, *Minnesota Plant Diseases*, and *Minnesota Freshwater Algae*.

WOMEN STUDENTS

After June first, the Registrar will supply a list of boarding and rooming places recommended for women students. In September, as soon as registration begins, other addresses may be had by application to the Dean of Women, Shevlin Hall. The houses thus recommended make it their particular object to care for the women students of the University. Rooms in them are rented only to women, and parlors are provided in which callers may be received. Attention is called to the fact that only by special permission of the Dean of Women may a woman student occupy a room in a house in which young men are received as lodgers.

While the University has confidence in the houses on its list, it does not advise anyone to engage a room without seeing it. There should always be a definite understanding with the householder as to rates, time of payment, vacation charges, the period for which the room is engaged, and the privileges and rules of the house. Parents are urged to give as careful attention as possible to finding suitable and comfortable rooms for their daughters. In this, as in other matters affecting the well-being of the women students, the Dean of Women is glad to be of any service within her power.

Young women who wish to earn a part of their expenses may generally learn of opportunities by communicating with the Dean of Women. During the college year she holds office hours every week day in the

council room in Alice Shevlin Hall. At such times she welcomes any woman student who cares to come to her, whether for advice, information, or an informal talk.

Sanford Hall.—The University opened in November, 1910, a dormitory for the accommodation of a part of the women students. In honor of Maria L. Sanford, Emeritus Professor of Rhetoric, this dormitory is named Sanford Hall. It is situated on the corner of Eleventh and University Avenues, Southeast. It furnishes a home for ninety girls, about one-half of whom may be freshmen. The charge for room and board is \$225 for the University year. Applications should be sent to the Director of Sanford Hall, The University of Minnesota.

Shevlin Hall.—Through the generosity of the late Thomas H. Shevlin, the University now possesses in Alice Shevlin Hall a building admirably designed and equipped for the use of its women students. It is a two-story and basement structure, the material used being pressed brick with stone trimmings. It has a frontage of one hundred and fourteen feet on Pillsbury Avenue and a depth of fifty-five feet. The purpose of this building is to furnish suitable rest and study rooms for the women attending the University. A lunch room in which luncheon is furnished daily on the cafeteria plan and in which "spreads" and banquets are given, is one of the useful and attractive parts of the building.

The Student Government Association for Women.—This organization was formed for the purpose of aiding in the care and conduct of Alice Shevlin Hall. Every woman student in the University is regarded as a member. There are no dues. The Association makes rules for the guidance of those using Alice Shevlin Hall; it provides committees to enforce the rules; it gives permission for the holding of social functions in the building; and it controls the expenditure of any surplus in the receipts from the lunch room.

The Woman's League.—This organization is open to all women who are students in the University. It is governed by a council made up of student members from the four college classes. It makes its headquarters in the council room in Alice Shevlin Hall. The aim of the organization is to promote good fellowship and sociability among the women of the University. For this purpose it gives receptions and parties for girls at regular intervals throughout the year. It also endeavors to aid in any project which may be of benefit to the University, and particularly to the women students.

ADMISSION

Admission to the colleges or schools of the University which accept students direct from the High School is either by certificate or examination, or both. The candidate must offer fifteen units of high school work so chosen as to include those subjects required by the college or school which he desires to enter. No candidate will be admitted with less than fifteen units of the required grade, except to the College of Pharmacy and the School of Agriculture for which graduation from the High School is not required. The Enrollment Committee may, however, authorize substitutions in the list of required subjects to the extent of one unit in case the candidate did not have an opportunity to take all the required subjects, provided that no substitutions shall be made for the mathematics requirement in Engineering, Agricultural, and Mining courses.

No new student will be admitted to the work of the second semester unless he brings from another college a certificate of advanced standing showing his qualification to continue the second semester's work.

Under *Admission Groups* is shown the minimum number of units that will be accepted in any one subject by any college of the University. For a statement of the specific units required by the various colleges of the University and the maximum and minimum number of units accepted in any subject or group, see *Requirements of Individual Colleges*, pages 74-77.

ADMISSION GROUPS

The term *unit* means not less than five recitations of forty minutes each per week for a period of thirty-six weeks. In manual subjects and kindred courses, it means the equivalent of ten recitation periods per week for thirty-six weeks.

A major series is three or more units in one of the admission groups.

A minor series is two units in one of the groups.

To form a language series at least two units of the same language must be offered.

Group A: English

English, four or three units*

- (a) Principles of rhetoric
- (b) Practice in written expression in each of the years of the course, on an average of not less than one hour a week
- (c) Classics

*Three units will satisfy the English requirement in the College of Engineering, and, when the applicant presents four units in one foreign language, will suffice for the other colleges.

Group B: Languages

Latin—

- Grammar, one unit
- Caesar, four books, one unit
- Cicero, six orations, one unit
- Virgil, six books, one unit

Greek—

- Grammar, one unit
- Anabasis, four books, one unit

German—

- Grammar, one unit
- Literature, one, two, or three units

French—

- Grammar, one unit
- Literature, one, two, or three units

Spanish—

- Grammar, one unit
- Literature, one two, or three units

Scandinavian Languages—

- Grammar, one unit
- Literature, one, two, or three units

Group C: History and Social Sciences

History—

- Ancient, to Charlemagne, one unit
- Modern, from Charlemagne, one unit
- English, one-half unit
- Senior American, one-half unit
- American Government, one-half or one unit

Elementary Economics, one-half unit

Commercial Geography, one-half or one unit

History of Commerce, one-half or one unit

Economic History of England, one-half unit

Economic History of the United States, one-half unit

Group D: Mathematics

- Elementary Algebra, one unit
- Plane Geometry, one unit
- Higher Algebra, one-half unit

Solid Geometry, one-half unit

Trigonometry, one-half unit

Group E: Natural Sciences

- Physics, one unit
- Chemistry, one unit
- Botany, one-half or one unit
- Zoology, one-half or one unit

Physiology, one-half unit

Astronomy, one-half unit

Geology, one-half unit

Physiography, one-half unit

Group F: Vocational Subjects

Not to exceed four units may be offered from the following list of vocational subjects:

Business Subjects—

- Business Law, one-half unit
- Business Arithmetic, one-half unit

Advanced Bookkeeping, one unit
Stenography and Typewriting, two units

Elementary Bookkeeping, one unit

Manual Subjects—

- Freehand Drawing, two units
- Mechanical Drawing, two units
- Domestic Art and Science, four units

Shop Work, two units
Modeling and Wood Carving, one unit

Agriculture—

One to four units from schools receiving special state aid for Agriculture and also from other schools in which such course in Agriculture is approved by the State High School Board, as fast as the said schools are prepared to offer work in Agriculture.

REQUIREMENTS OF THE INDIVIDUAL COLLEGES

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

1. Four years of English, or three years of English accompanied by four years of one foreign language.
2. A major and a minor series, each chosen from one of the admission groups B, C, D, E. Either the major or the minor series must be in Mathematics.
3. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

1. English Three units
2. Mathematics Three units
3. Chemistry One unit
4. A minor series chosen from one of the groups B, C, and E. (The required Chemistry may be included in a science series.) To form a language series at least two units of the same language must be offered.
5. Enough additional work to make in all fifteen units of which not more than three may be in group F, with the provision that not more than one unit will be accepted in each of the following subjects: Freehand Drawing, Mechanical Drawing, and Shop Work; not more than two units in Agriculture, and not less than two units in Stenography and Typewriting if that subject be offered.

Students who have not either completed the required Mathematics with a grade of *Pass with Credit* during the three years immediately preceding matriculation, or completed a four years' course in Mathematics with like standing immediately preceding matriculation, and those who do not hold High School Board or College Entrance Examination Board certificates of proper date in the mathematical subjects required, must take entrance examinations in those subjects at the University. The certificate for either Higher Algebra or Solid Geometry must be dated within one year prior to admission to the University, and the other must be dated within two years of such time.

DEPARTMENT OF AGRICULTURE

College of Agriculture

Course in Agriculture

1. English, four units, or three units accompanied by four units of one foreign language.

2. Mathematics, major series, including Elementary and Higher Algebra, Plane and Solid Geometry.
3. Physics, one unit.
4. A minor series in one of the admission groups B, C, and E. (The required Physics may be included in a science series.)
5. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

Course in Home Economics

1. English, four units, or three units accompanied by four units of one foreign language.
2. Physics, one unit. (May be included in a natural science series.)
3. A major and a minor series, each chosen from one of the groups B, C, D, E. Either the major or the minor series must be in Mathematics.
4. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

College of Forestry

Same as for the Course in Agriculture under College of Agriculture. See page 74.

School of Agriculture (Three-Year Course)

Applicants must be 17 years of age, and must have completed eighth grade work or its equivalent. Male students must have six months' farm practice before entrance. For information concerning short courses, see Bulletin of the School of Agriculture.

THE LAW SCHOOL

Students desiring to enter the Law School must first complete two full years (not less than sixty* credits) of collegiate work in science, literature and arts at this or some other university or college of equal rank. See admission to the College of Science, Literature, and the Arts, page 74.

A special pre-legal course is offered by the Academic College covering those subjects which are particularly desirable as a preliminary for the study of Law.

The Law Faculty recommends that prospective law students devote the major part of their time while in High School to the study of the following subjects: English, Latin, History, Mathematics, French, and Science.

COLLEGE OF MEDICINE AND SURGERY

Applicants for admission to the College of Medicine and Surgery must present credentials showing the completion of a regular four-year high school course, including two units of Latin.

Students entering in September, 1912, or thereafter, must have received the bachelor's degree in arts or science from this University or

*Sixty-two credits until September, 1914.

some other university or college of equal rank, or must register in one of the combined courses offered by the College of Science, Literature, and the Arts and the College of Medicine and Surgery so as to receive the bachelor's degree before graduating in Medicine.

The following subjects are required of all candidates: Rhetoric, 6 credits; General Inorganic Chemistry, 6 credits; Physics, 8 credits; Zoology (preferred) or Botany, 6 credits; sufficient German or French to insure a reading knowledge. This language requirement will ordinarily involve one or two years of college work depending upon prior high school training. The head of the appropriate department shall determine the student's qualification in this matter. In addition at least one social science course must be completed.

COLLEGE OF DENTISTRY

1. English, four units, or three units accompanied by four units of one foreign language.
2. Chemistry, one unit.
3. A major and a minor series, each chosen from one of the admission groups B, C, D, E. (The required Chemistry may be included in a science series.) Either the major or the minor series must be in Mathematics.
4. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

Because of the limited capacity of the College of Dentistry, the number of freshmen admitted will be limited to eighty-five. The student who desires to enter this college in September, 1912, should fill out and send to the University a special application blank, which will be sent him as soon as his regular credential blank has been received by the Registrar. Both blanks should be in the Registrar's hands not later than August 1st.

The student's entire scholastic and industrial record will be taken into consideration in determining admission, and applicants will be notified promptly concerning the possibility of their matriculation.

COLLEGE OF PHARMACY

English	Two units
Elementary Algebra	One unit
Plane Geometry	One unit
Physics	One unit
Latin	Two units

SCHOOL OF MINES

A certificate of graduation from an accredited school will be accepted for admission to the School of Mines, subject to the specific requirements noted below.

Five-Year Courses

1. English, four units, or three units accompanied by four units of one foreign language.

2. Mathematics, two units, including Elementary Algebra and Plane Geometry.

3. Enough additional work to make in all fifteen units, of which not more than four may be in Group F.

Applicants for admission to the above courses need not take entrance examinations in Mathematics.

Four-Year Courses

1. English, four units, or three units accompanied by four units of one foreign language.

2. Mathematics, three units, including Elementary and Higher Algebra, Plane and Solid Geometry.

3. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

Entrance examinations in Elementary and Higher Algebra, Plane and Solid Geometry are required of all candidates for admission to these courses.

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

1. English, four units, or three units accompanied by four units of one foreign language.

2. A major or a minor series, each chosen from one of the admission groups B, C, D, E. One of the series must be in Mathematics.

3. Enough additional work to make in all fifteen units of which not more than four may be in Group F.

Students entering the Analytical Course or the five-year course in Applied Chemistry must present one-half unit of Higher Algebra.

COLLEGE OF EDUCATION

Applicants for admission to this College must present credentials showing:

1. The completion of a regular four-year high school course.

2. The completion of two full years of collegiate work (not less than sixty credits) in science, literature, and arts at this or some other college or university of equal rank.

Graduation from Advanced Graduate Normal Courses (two years beyond the high school) is considered equivalent to (1) and (2) above.

Graduates of a five-year Normal Course are allowed forty-two credits and are admitted to the College as unclassified students pending the completion of eighteen additional credits.

ADMISSION BY EXAMINATION

Entrance examinations are offered at the University during the opening week, September 10th to 13th. Candidates entering by this method must pass examinations in fifteen units so chosen as to satisfy the specific

requirements of the college to which entrance is desired. (See *Requirements of Individual Colleges*.) Certificates from the College Entrance Examination Board and from the High School Board are accepted (subject to time limit for Engineering Courses, see page 74) in lieu of examinations except in the Mathematics required for admission to the four-year courses in the School of Mines. For statement of examinations for students entering on certificate, see under *Admission by Certificate*, below.

ADMISSION BY CERTIFICATE

Graduates of the following courses, provided their preparation satisfies the specific requirements of the college they desire to enter, will be admitted to the freshman class, except where entrance examinations are required.

1. Any four-year course of a Minnesota State High School or other accredited school in the State.
2. A four-year course of schools in any other state accredited to the state university of that state.
3. The Advanced Latin and Advanced English course of the Minnesota State Normal Schools.

Admission by certificate to the Colleges of Science, Literature, and the Arts, Engineering, Agriculture, Chemistry, and Dentistry is governed by the following regulations. For regulations governing the admission to Colleges of Law, Medicine and Surgery, Mines, and Education, see under *Requirements of Individual Colleges*, pages 74-77.

1. The applicant for admission must present to the Registrar the principal's certificate containing his record on all the studies which were counted toward graduation. All records shall be entered on this certificate as *passed*, *passed with credit*, or *passed with honor*.*

To facilitate the operation of this rule, each accredited school is expected to keep its record of standings in these three grades or else show by a printed statement in the record book and in the catalogue of the school, how the marks in use are to be translated into these grades.

2. Candidates for admission on certificate must have an average record in the subjects counted for admission of *pass with credit*. For the purpose of this average a *pass* is offset by a *pass with honor*. Candidates are therefore admitted provided they have at least as many semester marks of *pass with honor* as they have semester marks of *pass*.

Certificates from the College Entrance Examination Board and from the State High School Board are accepted (subject to time limit for Engineering courses, see page 74) as satisfying the scholarship requirement.

Candidates entering on certificate shall not be examined for admission on subjects which are lacking or below the required grade, except on

*In per cent, these three grades are to be interpreted approximately as follows:

1. In schools having 65 as a passing mark, passed=65-75, passed with credit=75-90, passed with honor=90-100.
2. In schools having 75 as a passing mark, passed=75-80, passed with credit=80-90, passed with honor=90-100.

presentation to the Enrollment Committee of satisfactory evidence that they have done adequate special work in preparation for the examination. A certificate from the principal of the last school attended, or other person approved by the Enrollment Committee, shall constitute satisfactory evidence; and adequate special preparation shall consist of not less than thirty 60-minute hours under competent instruction on each semester subject presented for examination.

In case the records of any candidate from another state cannot be translated into the grades used in this state, the Enrollment Committee shall order examinations in English and also in three other subjects chosen from three different admission groups; in Engineering and four-year Mining courses, the examinations shall include the required Mathematics. The results of such examinations shall be final.

All examinations authorized by the Committee shall be held at the same time and according to the same schedule as the regular entrance examinations.

ADMISSION AS UNCLASSED STUDENTS

Only by permission of the proper officers and upon the presentation of satisfactory reasons for not taking the regular course will an applicant be admitted as an unclassified student. He must take the same examinations or present the same credentials as are required of those who enter the freshman class. (See classes 1 and 2.) Exceptions can be made only upon vote of the appropriate Faculty. A new application must be made each semester to the committee in charge. No student will be admitted as unclassified after the fourth week. No unclassified student shall be admitted to the School of Mines.

ADMISSION TO STUDY MUSIC

Students who enter the University for the express purpose of studying Music, must take the same examinations or present the same credits that are required by those who apply for admission to the freshman class. (See classes 1 and 2.) No student is admitted for the purpose of studying Music unless he presents a certificate from the Department of Music showing that he is qualified to pursue the courses offered.

ADMISSION TO ADVANCED STANDING

1. *From Other Colleges*

This college accepts records from all reputable colleges and universities for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this College. In bringing

records from other institutions, the certificate must be upon the official blank of the institution granting the certificate and should show:

- (a) The subject studied; if a language, the books read, etc.
- (b) The time spent upon each subject.
- (c) Ground covered in laboratory work in case of laboratory subjects.
- (d) The result. The exact grades should be stated, accompanied with an explanation of the marking basis employed.

Candidates wishing to gain credits for advanced standing by examination are allowed examinations without additional charge, providing they be taken within six weeks after matriculating.

2. *From Minnesota Normal Schools*

Graduates of the Advanced Graduate course of a Minnesota State Normal School are admitted to the College of Science, Literature, and the Arts (see Bulletin of College of Science, Literature, and the Arts) with advanced standing equivalent to one year's credit. Graduates of such advanced courses are admitted to the College of Education with an allowance of sixty credits toward graduation. (See Bulletin of the College of Education.)

Individual graduates of the Advanced Latin course (five-year) or of the Advanced English course (five-year) of a Minnesota State Normal School who, on the basis of maturity and ability, present certificates of special fitness from the President of the Normal School, will be admitted with advanced standing equivalent to one year's credit. Graduates of such courses are admitted to the College of Education with an allowance of forty-two credits toward graduation.

3. *Miscellaneous*

Credit in Shop Work and Drawing will be given in the College of Engineering for work in manual training, or for practical experience, provided the applicant gives evidence of proficiency in such work, and is qualified to pursue advanced work. The student must register for the regular work and at the same time make application to the department concerned for advanced credit.

LIST OF ACCREDITED SCHOOLS

Graduates of the following Minnesota state high schools will be admitted to the University of Minnesota without conditions, provided that their credentials satisfy the specific requirements of the college to which entrance is desired.

Ada	Alden	Appleton
Adrian	Alexandria	Argyle
Aitkin	Amboy	Arlington
Akeley	Annandale	Atwater
Albert Lea	Anoka	Austin

Bagley	Fosston	Mabel
Barnesville	Frazee	McIntosh
Belle Plaine	Fulda	Madelia
Bemidji	Gaylord	Madison
Benson	Gilbert	Mankato
Bird Island	Glencoe	Mantorville
Biwabik	Glenwood	Mapleton
Blooming Prairie	Graceville	Marshall
Blue Earth	Grand Meadow	Milaca
Brainerd	Grand Rapids	Minneapolis
Breckenridge	Granite Falls	Central
Browns Valley	Hallock	East
Buffalo	Halstad	North
Caledonia	Harmony	South
Cambridge	Hastings	West
Canby	Hawley	Minneota
Cannon Falls	Hector	Montevideo
Cass Lake	Henderson	Montgomery
Chaska	Herman	Monticello
Chatfield	Heron Lake	Moorhead
Chisholm	Hibbing	Mora
Clarkfield	Hinckley	Morris
Cloquet	Hopkins	Morton
Cokato	Houston	Mountain Lake
Coleraine	Howard Lake	New Prague
Cottonwood	Hutchinson	New Richland
Crookston	Jackson	New Ulm
Dawson	Janesville	North St. Paul
Delano	Jordan	Northfield
Detroit	Kasota	Olivia
Dodge Center	Kasson	Ortonville
Duluth	Kenyon	Osakis
Central	Kerkhoven	Owatonna
Industrial	Lake Benton	Park Rapids
Eagle Bend	Lake City	Paynesville
E. Grand Forks	Lake Crystal	Pelican Rapids
Elbow Lake	Lake Park	Perham
Elk River	Lakefield	Pine City
Elmore	Lamberton	Pine Island
Ely	Lanesboro	Pipestone
Eveleth	Le Roy	Plainview
Excelsior	Le Sueur	Preston
Fairfax	Le Sueur Center	Princeton
Fairmont	Litchfield	Red Lake Falls
Faribault	Little Falls	Red Wing
Farmington	Long Prairie	Redwood Falls
Fergus Falls	Luverne	Renville
Fertile	Lyle	Rochester

Royalton	Sherburn	Wadena
Rush City	Slayton	Warren
Rushford	Sleepy Eye	Waseca
St. Charles	South St. Paul	Waterville
St. Cloud	Springfield	Wayzata
St. James	Spring Grove	Welcome
St. Louis Park	Spring Valley	Wells
St. Paul	Staples	West Concord
Central	Stephen	Wheaton
Humboldt	Stewartville	White Bear
John A. Johnson	Stillwater	Willmar
Mechanic Arts	Thief River Falls	Windom
St. Peter	Tracy	Winnebago
Sandstone	Two Harbors	Winona
Sauk Center	Tyler	Winthrop
Sauk Rapids	Virginia	Worthington
Shakopee	Wabasha	Zumbrota

Graduates of the following private schools will be admitted to the freshman class under the same conditions governing admission of high school graduates, provided that the regular four-year course taken satisfies the specific requirements of the college to which entrance is desired and provided, also, that the student be recommended by the principal of the school for admission to the University.

St. Mary's Hall, Faribault	The Winona Seminary, Winona
St. Paul Academy, St. Paul	St. John's College, Collegeville
Shattuck Military Academy, Faribault	St. Thomas College, St. Paul
Stanley Hall, Minneapolis	Villa Maria, Frontenac
Windom Institute, Montevideo	Park Region Luther College, Fergus Falls
Concordia College, Moorhead	Minnesota College, Minneapolis
Pillsbury Academy, Owatonna	Bethel Academy, St. Paul
St. Joseph's Academy, St. Paul	Lutheran Ladies' Seminary, Red Wing
Graham Hall, Minneapolis	Cathedral High School for Girls, Duluth
Albert Lea College, Prep. Dept., Albert Lea	Blake School for Boys, Minneapolis
St. Paul's College, St. Paul Park	Bethlehem Academy, Faribault
The Loomis School, St. Paul	Cathedral High School for Boys, Duluth
The Backus School for Girls, St. Paul	Villa Sancta Scholastica, Duluth
The College of St. Catherine, St. Paul	Convent of St. Benedict, St. Joseph
St. Margaret's Academy, Minneapolis	

DESCRIPTION OF SUBJECTS ACCEPTED FOR ADMISSION

The following statements indicate in a general way the preparation which the University expects in the various subjects accepted for admission. The number of units in parentheses following each subject indicates the maximum credit accepted by any one college of the University and does not mean that all colleges will accept the maximum stated. See pages 74 to 77 for statements of the requirements of the individual colleges.

English (four units)

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. To satisfy this requirement a course of not less than four hours per week must be pursued during the time specified above. The headings under which instruction will naturally fall are:

- (a) The Principles of Rhetoric
- (b) Practice in Written Expression
- (c) English Classics

(a) The work in the principles of rhetoric should include the principles and technical terms of ordinary texts upon the subject, whether acquired by the direct study of such text or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.

(b) An average of not less than one hour each week in each of the years of the course should be devoted to practice in written expression, subject to the criticism, either oral or written, of the teacher. The instructor may choose such topics as local conditions may require or make most profitable; but whatever line of work is pursued, the student should be taught to use language correctly and forcibly and learn to express himself clearly and logically in writing.

(c) The preparation in English Literature should consist in the study of a limited number of English classics and in the reading of a larger number. The following lists of books, headed respectively *reading* and *study*, are quoted from the report of the National Conference on Uniform Entrance Requirements in English. They will be found suggestive to those preparing students for the University. In connection with both lists, the student should be trained in reading aloud and be encouraged to commit to memory some of the more notable passages both in verse and in prose. As an aid to literary application, he is further advised to acquaint himself with the most important facts in the lives of the authors whose works he reads and with their place in literary history.

a. *Reading*.—The aim of this course is to foster in the student the habit of intelligent reading and to develop a taste for good literature, by giving him a first-hand knowledge of some of its best specimens. He should read the books carefully, but his attention should not be so fixed upon details that he fails to appreciate the main purpose and charm of what he reads.

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from which at least ten units are to be selected, two from each group:

I. The *Old Testament*, comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther; the *Odyssey*, with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII; the *Iliad*, with the omission, if desired, of Books XI, XIII, XIV, XV, XVII, XXI; Virgil's *Aeneid*. The *Odyssey*, *Iliad*, and *Aeneid* should be read in English translations of recognized literary excellence.

For any unit of this group a unit from any other group may be substituted.

II. Shakespeare's *Merchant of Venice*; *A Midsummer Night's Dream*; *As You Like It*; *Twelfth Night*; *Henry the Fifth*; *Julius Caesar*.

III. Defoe's *Robinson Crusoe, Part I*; Goldsmith's *Vicar of Wakefield*; either Scott's *Ivanhoe* or Scott's *Quentin Durward*; Hawthorne's *House of Seven Gables*; either Dickens'

David Copperfield or *Dickens's Tale of Two Cities*; *Thackeray's Henry Esmond*; *Mrs. Gaskell's Cranford*; *George Eliot's Silas Marner*; *Stevenson's Treasure Island*.

IV. *Bunyan's Pilgrim's Progress, Part I*; *The Sir Roger de Coverley Papers* in the *Spectator*; *Franklin's Autobiography* (condensed); *Irving's Sketch Book*; *Macaulay's Essays on Lord Clive and Warren Hastings*; *Thackeray's English Humorists*; *Selections* from *Lincoln*, including at least the two Inaugurals, the *Speeches in Independence Hall* and at *Gettysburg*; the *Last Public Address*, and *Letter to Horace Greeley*, along with a brief memoir or estimate; *Parkman's Oregon Trail*; either *Thoreau's Walden* or *Huxley's Autobiography* and selections from *Lay Sermons*, including the addresses on *Improving Natural Knowledge*, *A Liberal Education*, and *A Piece of Chalk*; *Stevenson's Inland Voyage* and *Travels with a Donkey*.

V. *Palgrave's Golden Treasury (First Series), Books II and III*, with especial attention to *Dryden*, *Collins*, *Gray*, *Cowper*, and *Burns*; *Gray's Elegy in a Country Churchyard* and *Goldsmith's Deserted Village*; *Coleridge's Ancient Mariner* and *Lowell's Vision of Sir Launfal*; *Scott's Lady of the Lake*; *Byron's Childe Harold, Canto IV*, and *Prisoner of Chillon*; *Palgrave's Golden Treasury (First Series), Book IV*, with especial attention to *Wordsworth*, *Keats*, and *Shelley*; *Poe's Raven*, *Longfellow's Courtship of Miles Standish*, and *Whittier's Snow Bound*; *Macaulay's Lays of Ancient Rome* and *Arnold's Sohrab and Rostum*; *Tennyson's Gareth and Lynette, Lancelot and Elaine*, and *The Passing of Arthur*; *Browning's Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Herve Riel, Phidippides, My Last Duchess, Up at a Villa—Down in the City*.

b. *Study*.—This part of the requirement is intended as a natural and logical continuation of the student's earlier reading, with greater stress laid upon form and style, the exact meaning of words and phrases, and the understanding of allusions. For this close reading are provided a play, a group of poems, an oration, and an essay, as follows:

Shakespeare's Macbeth; *Milton's L'Allegro, Il Penseroso and Comus*; either *Burke's Speech on Conciliation with America* or both *Washington's Farewell Address* and *Webster's First Bunker Hill Oration*; either *Macaulay's Life of Johnson* or *Carlyle's Essay on Burns*.

Elementary Algebra (one unit).—Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, equations with one, two, and several unknown quantities followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, ratio, proportion and quadratic equations, with problems.

Higher Algebra, First part (one-half unit).—While this subject includes few topics not named under *Elementary Algebra*, a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below they are not prepared to pursue successfully at the University the *Second Part of Higher Algebra*.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries, simple equations with one, two and several unknown quantities, inequalities, ratio and proportion, arithmetical and geometrical progressions, quadratic equations and numerous problems requiring both simple and quadratic equations.

Plane Geometry (one unit).—Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

Solid Geometry (one-half unit).—Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

Latin Grammar (one unit).—This will include the subjects of orthography, etymology, and syntax. Proficiency is particularly desired in the following subjects: the analysis of the verb forms, the rules of syntax, and the principal parts of the irregular verbs.

Caesar (one unit).—First four Books or selections from the seven books equivalent to four; or three books, with thirty pages of *Cornelius Nepos*, or two books with sixty pages of *Cornelius Nepos*. The student is expected to be familiar with the life of *Caesar* and an account of his wars.

Cicero (one unit).—Any six orations from the following list: *Against Cataline*, *Poet Archias*, *Ligarius*, *Marcellus*, *Manilian Law* (to count as two orations), the fourteenth *Phillipic*. The student should also be familiar with the life of Cicero.

Virgil (one unit).—Six books of the *Aeneid*, or five of the *Aeneid* and one of the *Metamorphoses* of Ovid, or the *Eclagues*. The student should be familiar with the life of Virgil and an account of his times and writings. A correct rhythmical reading of the text is to be encouraged.

Greek Grammar (one unit).

Xenophon's Anabasis, four books (one credit).

German (four units).

First year the student should acquire:

(1) A correct pronunciation, training of the ear, eye, and organs of speech.
 (2) A vocabulary of a thousand words of every-day use; facility in combining these words into simple sentences. As a means to this, 100 to 150 pages of easy narrative prose and poetry should be read, from which questions and answers may be formed. To test the student's memory and knowledge of the word-order he should relate or write out the story anew in his own words.

(3) From two to three hundred German idioms.

(4) The essentials of German grammar, to be taught by means of oral and written exercises based upon the reading lessons.

Second year the pupil should:

(1) Read one hundred and fifty to two hundred pages of prose and poetry.

(2) Practice reading smoothly and with expression.

(3) Carefully translate selected passages of the text into idiomatic English. To translate easy sentences which the student already understands is a waste of time.

(4) Translate sentences from English into German, using words and idioms of the text read.

(5) Study typically German grammar, chief rules of orthography, etymology and syntax; illustrate these words, phrases, and sentences selected or composed by the student.

One or two additional years of work in literature will be accepted.

French (four units).—This work comprises the principles of French grammar, including acquaintance with the verb, regular and irregular, and ability to translate easy English sentences into French and simple French prose into English.

One or two additional years of work in literature will be accepted.

Spanish (four units).—The first year's work includes grammar and reader; second year, grammar reviewed, reading of some modern writer, composition and conversation.

One or two additional years of work in literature will be accepted.

Scandinavian Languages. Norwegian, Swedish, or Icelandic (four units).—The student should acquire the principles of grammar, ability to read and translate ordinary prose and easy poetry, also to translate from English, and a fair acquaintance with the history of the Scandinavian countries. Two additional years' work in literature will be accepted.

Ancient History (one unit).—This study should begin with from five to seven weeks upon the oriental peoples who have most influenced European development, and should be carried down to the establishment of Charlemagne's empire.

Modern History (one unit).—From Charlemagne to the present. It is desirable to give at least half of the year to the last period from 1789.

English History (one-half unit).—The Saxon period should be passed over rapidly. In the remainder of the work, besides the narrative, constitutional points should receive attention, and easily accessible documents, like Magna Charta, should receive careful study.

Senior American History (one-half unit).—No attempt should be made to cover the whole field in this time. Either the colonial history or the period from 1783 to 1832 offers quite enough material. In any case, considerable use should be made of collections of documents and sources.

American Government (one-half or one unit).—This should be a study of our government, national, state, and local, as it is organized and actually operated to-day. The instruction should aim to impart information essential to intelligent, active citizenship, such as the division of the government into departments, their organization and function; the methods of nominating, electing, and appointing men to office; of framing and amending constitutions, city charters, and statutes; of drawing grand and petit juries and the duty of

the citizen to serve on them; the distinction between common law, state law, and constitutional law, between equity, civil, and criminal cases.

Elementary Economics (one-half unit).—In the study of Economics it is desirable to avoid two extremes, abstract theory on the one hand, and controversial questions, such as the tariff, trusts, and trade unions, on the other hand. Emphasis should be placed on historical and descriptive matter, especially relating to the economic development of England and the United States. Some good elementary text-book should be mastered and a reasonable amount of collateral reading required.

History of Commerce (one-half or one unit).—This forms the natural introduction to the study of present economic conditions. It would be well to give special attention to the economic history of England and the United States. The work should be based on a text-book, supplemented by carefully directed map work and assigned readings. This should be preceded by a year course of medieval and modern European history.

Commercial Geography (one-half or one unit).—This describes and seeks to explain the commerce of to-day. The work should cover the ways in which commerce depends on nature and on man, the development of means of transportation and communication, and a detailed study of the several commercial regions of the world with reference to resources, industries, transportation facilities, and commerce. It should be based on a text-book supplemented by map work and assigned readings.

Physics (one unit).—It is suggested that the year's work be confined to four of the seven subjects mentioned below.

(1) Mechanics of solids, (2) liquids and gases, (3) sound, (4) heat, (5) light, (6) and (7) electricity and magnetism (to count as two subjects, but not to be divided).

Chemistry (one unit).—The full year's work should include a study of both the non-metals and metals with laboratory experiments illustrating the common chemical laws and the commoner chemical reactions.

Botany (one or one-half unit).—The course in Botany should extend through the school year whenever it is at all possible, even if as much time cannot be given to it each week as when it occupies a single semester. The course should follow as closely as possible the nature and work of plants during the changing seasons of the year. The major portion of the work should be with living plants, naming the common plants of the neighborhood, both cultivated and native, and studying plant parts from the seed to maturity.

Zoology (one or one-half unit).—Animals should be studied as living units in their relation to one another and their environment. The aim of the teacher should be to foster a love for animate nature and to develop accuracy in observation and description.

Astronomy (one-half unit).—An elementary course in general astronomy as presented in any good modern text-book will satisfy this requirement.

Geology (one-half unit).—These subdivisions should receive special attention: physiographic geology, the building of the land and the evolution of its existing contours; geodynamics, the modifying of the earth by atmosphere, water, terrestrial heat, plants, and animals; and a brief survey of historical geology.

Physiography (one-half unit).—The following topics should be emphasized: meteorology, the leading facts relating to the atmosphere and its phenomena, including some acquaintance with the work of the United States weather bureau; land sculpture, as it treats of the origin, development, and decadence of land forms; and the influence of these processes on the physical environment of man.

VOCATIONAL SUBJECTS

Not more than four units are allowed in the following vocational subjects, including business subjects, manual subjects, domestic art and science, and agriculture.

Business Subjects

Business Law (one-half unit).—The object of this study is not to make "every man his own lawyer," but rather to enable him to keep out of legal complications. Text-book supplemented by study of a few typical cases, and practice in drawing up ordinary legal papers, such as bills, notes, checks, etc.

Business Arithmetic (one-half unit).—The object is, first of all, absolute accuracy and, secondly, speed in ordinary business complications. The topics to be emphasized are fundamental operations, common fractions having as denominator 2, 3, 4, 6 and 8,

a few common weights and measures, percentage and its applications, and useful short methods, especially interest and other calculation tables. The work should be based on a text-book, supplemented by numerous live exercises from current sources.

Elementary Bookkeeping (one unit).—A text-book should be employed with exercises so arranged that no two pupils will do exactly the same work, and no credit should be allowed unless the work is done neatly, accurately, and at a satisfactory rate of speed. It is suggested that double periods be provided, and all work be done in class under the eye of the instructor. The set used should include the journal, cash book, sales book, ledger, check book, bank pass book, and trial balance book.

Advanced Bookkeeping and Business Practice (one unit).—Thorough drill on standard business forms, such as bills, receipts, checks, notes, etc., also on the use and meaning of business symbols and abbreviations. The student should become acquainted with the bill book and invoice book, and loose leaf and voucher systems of bookkeeping. Each student should carry on a business of his own, first as individual, then as a partnership, and finally as a corporation. Credit on this course should mean that the student lacks only age and actual business experience to become a competent bookkeeper.

Stenography and Typewriting (two units).—This work is expected to occupy not less than two periods daily for two years. No credit should be given for either shorthand or typewriting if taken alone. Nothing but the touch method should be used in typewriting. The essentials are, first, accuracy and speed in taking dictation and transcribing notes; secondly, correct spelling, capitalization, punctuation, and paragraphing. The minimum speed at the end of the first year should be 75 words per minute in dictation and 25 words per minute on the machine; and at the end of the second year, 100 words per minute in dictation and 35 words per minute in transcribing notes. Thorough training should also be given in care of the machine, in modern methods of manifolding, and in filing papers.

Manual Subjects

Owing to the fact that drawing and shop work do not require outside preparation they should not be credited by the schools on the same basis as the academic subjects. Therefore half credits are allowed; that is, one full credit for two years of work one period daily, or for one year of work two periods daily, in each subject.

Freehand Drawing (two units).

Mechanical Drawing (two units).

Joinery (one-half unit).

Wood Turning and Cabinet Making (one-half unit).

Pattern Making and Forge Shop (one-half unit).

Machine Shop, Including Chipping, Filing, and Work on the Iron Lathe (one-half unit).

Drill Press and Iron Planer, Clay Modeling (one-half unit).

Wood Carving (one-half unit).

Domestic Art and Science

Domestic Art, including Carefully Graded Exercises in Sewing (two units).

Domestic Science, including Practical Cookery and Household Economy (two units).

Agriculture

Agriculture is accepted for from one to four credits from schools receiving special state aid for Agriculture, and also from other schools in which such course in Agriculture is approved by the State High School Board, as fast as the said schools are prepared to offer work in Agriculture.

DEGREES

The candidate for a degree must complete the requirements for graduation in his course. Any person may undergo, at suitable times, an examination in any subject, and if such person pass in all the studies and exercises of the course, he is entitled to the appropriate degree; provided, however, that at least one full year (the one immediately preceding the granting of the degree) must be spent at the University, before such degree shall be granted, and provided that examination, in every case, be held before a committee of the Faculty appointed for that purpose.

For detailed information concerning requirements, see the bulletin of the appropriate college and school.

The degrees Bachelor of Arts, Bachelor of Arts in Education, Bachelor of Science, Master of Science, Master of Arts, Doctor of Philosophy, Doctor of Science, Civil Engineer, Mechanical Engineer, Electrical Engineer, Architect, Engineer of Mines, Engineer of Mines in Geology, Metallurgical Engineer, Bachelor of Science in Engineering, Bachelor of Science in Architecture, Bachelor of Science in Chemistry, Bachelor of Science in Chemical Engineering, Bachelor of Laws, Doctor of Medicine, Doctor of Dental Surgery, and Bachelor of Pharmacy, are conferred after recommendation by the Deans of the respective colleges, by vote of the Regents.

THE UNIVERSITY STATE TEACHER'S CERTIFICATE

Graduates of the College of Science, Literature, and the Arts may receive the University State Teacher's Certificate under the following conditions:

First: They must have maintained a good average of scholarship throughout the four years of college study.

Second: They must have the recommendation of at least one department concerned with high school studies.

Third: They must have completed Philosophy 1a or 1b and Courses 1 and 2 or Course 3 in Education, with sufficient additional work in Education to make a total of fifteen credits, including those specified in Philosophy.

This certificate by State Law authorizes students to teach in the public schools of Minnesota for two years from date. After that time, upon satisfactory evidence of success, the certificate may be made permanent by the endorsement of the State Superintendent of Public Instruction and the President of the University.

EXPENSES

FEEES

Deposit Fee

At the beginning of each year, in addition to the first semester incidental fee, a deposit fee of five dollars (\$5.00) is required of every student to cover the following items:

Change of registration	\$2.50 per subject
Examination for removal of condition, at set time	1.00 per subject
Rental of post-office box, University post-office (required of all) . . . . .	.50 per year
Locker rental, locker key deposit	\$.50 to 1.00 per year
Case-book deposit (Law School), laboratory breakages, or damage to University property.	

Penalties for late registration or late payment of fees.

A penalty fee of one dollar (\$1.00) must be paid by all students who register or pay fees after the prescribed time. (See calendar, page 5.) After the day previous to that on which classes begin, the penalty for delay increases at the rate of twenty-five cents a day.

The unused balance of the deposit fee will be returned at the end of each year. If, at any time during the college year, the amount of charges against a student exceed the amount of the deposit, a second fee of five dollars (\$5.00) will be required.

Special Fees

The following special items may be included in the expenses of a student:

Special examination for removal of condition, at other than the set time	\$5.00
Examination on subject taken out of class	5.00
No fee for such examinations on first entering the University, if taken within the first six weeks	
Military uniform, men, about	15.00
Gymnasium suit, men and women	5.00

Incidental Fees

One-half of the annual incidental fee, which includes all laboratory charges, is payable at the beginning of each semester. Cards entitling the student to admission to classes will not be issued until the fees have been paid:

Science, Literature, and the Arts:

Annual incidental fee, resident	\$ 30.00
Annual incidental fee, non-resident	60.00
Music, Courses 4 and 5 (1½ hours per week), annually	64.00
Courses 4 and 5 (3 hours per week), annually	128.00

College of Engineering and the Mechanic Arts:

Annual incidental fee, resident and non-resident	\$ 50.00
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College of Agriculture:

Annual incidental fee, resident	\$ 30.00
Annual incidental fee, non-resident	60.00

College of Law:

Annual incidental fee	\$ 65.00
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College of Medicine and Surgery:

Annual incidental fee for students entering in and after September, 1910	\$150.00
Hospital fee (Jr. and Sr. years)	3.00

College of Dentistry:

Annual incidental fee	\$150.00
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College of Pharmacy:

Annual incidental fee, two-year course	\$ 82.50
Annual incidental fee, three-year course	55.00

School of Mines:

First Year Five-Year Courses

Annual incidental fee	\$ 55.00
Books (Estimated)	20.00
Note books and supplies (Estimated)	5.00

Freshman Year

Annual incidental fee	\$ 55.00
Books (Estimated)	25.00
Draughting instruments (Estimated)	15.00
Note books and supplies (Estimated)	5.00

Sophomore Year

Annual incidental fee	\$ 55.00
Field work (May 1st to July 1st) { Surveying }	100.00 to 150.00
{ Geological }	
Books (Estimated)	15.00
Note books and supplies (Estimated)	5.00

Junior Year

Annual incidental fee	\$ 55.00
Field work (May 1st to July 1st) { Metallurgy }	175.00 to 250.00
{ Mining }	
Books (Estimated)	30.00
Note books and supplies (Estimated)	5.00

Senior Year

Annual incidental fee	\$ 55.00
Books (Estimated)	30.00
Note books and supplies (Estimated)	5.00

School of Chemistry:

Annual incidental fee. \$ 55.00

College of Education:

Annual incidental fee, resident. \$30.00

Annual incidental fee, non-resident. 60.00

The Graduate School:

Annual incidental fee. \$ 30.00

Proportionate fees for less than full work

Special Incidental Fees

Students in Science, Literature, and the Arts and Education who are engaged in teaching nine hours or less, \$7.50 per semester. More than nine hours full tuition.

Wives of members of the Faculty and persons employed by the University, \$1.00 per credit hour.

A student in one college taking a course in another shall pay in addition the fees of that college pro rated in the proportion of credit hours taken to the full number of credit hours required.

LIVING EXPENSES

With the exception of Sanford Hall, which is open to a limited number of woman students, the University of Minnesota has no dormitory systems, and all students are thrown upon their own responsibility in obtaining boarding and rooming places. (For an account of Sanford Hall, see page 63.)

The expense of living at the University varies greatly according to individual habits and tastes. In general the scale of expenses is below rather than above that of similar institutions in the middle west and is considerably lower than that of most institutions situated in the eastern states.

Several years ago a number of young men and women, at the request of University Officials, kept careful account of their expenses for the University year. The result was that the expenses of the young men ranged from two hundred and seventeen to three hundred and ninety-seven dollars for the University year. The same students earned sums varying from two hundred and thirty-seven to two hundred and seventy-two dollars. The young women report expenses varying from one hundred and fifty to three hundred and fifty-five dollars. These figures do not include fees and, as the cost of living has increased decidedly, probably twenty-five per cent should be added to these figures to make them safe.

The students upon whose statements these figures are based were representative students; they were not extravagant nor did they deny themselves unduly to get along. While students at present can live within the figure given above, they would not, owing to the increased cost of living, be able to live as comfortably nor to have as many privileges as these students had.

Meals can be had at prices ranging from three dollars per week to as high as the student can afford to pay. In private families board ranges from three to five dollars.

Furnished rooms vary in price from eight to twenty dollars per month. Two students rooming together would of course reduce this expense. It is sometimes possible for a student, rooming alone, to secure a good room at an expense but little higher than when two room together; but such chances are the exception and not the rule. New students will find that they will be more likely to secure comfortable rooms and suitable board if they will consult the general secretary of either the Young Men's or Young Women's Christian Association immediately upon arrival at the University, or if they will correspond with these officers before coming to the University.

The student who learns some trade before coming to the University has a great advantage over the student who has to earn his money by ordinary manual labor. Students have earned their whole expenses while attending the University, and have made good records at the same time. Other students have done so much work that they have not been able to keep up their studies, and have thus missed the one thing for which they were attending the University.

If it is possible for the student to have part of his expenses paid, he should not attempt to earn his way entirely by his own exertions. It is a comparatively easy thing for a young man to earn half his living while attending the University and yet do good work in his classes. Students who want work seldom fail to find it. In coming to the University, the student should bring enough money with him so that he can live comfortably for a few weeks until he can find something to do.

Students who desire advice and assistance in securing a position to help pay their expenses should confer with the Secretary of the Y. M. C. A. at the University.

A pamphlet has been published containing five papers (one by a young woman) relating actual experiences of students who have made their way through the University. Students who contemplate making their own way through college will find here stated some very interesting and encouraging facts. A copy will be sent free to any address upon application.

DEGREES GRANTED IN 1911

Total 647

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

BACHELORS OF ARTS—199

Caroline Rae Ainsworth, Minneapolis
Edgar Marion Allen, Minneapolis
Marie Louise Anderson, Minneapolis
Benjamin Earl Arnold, Brainerd
Grace Ferguson Ayers, Minneapolis
Felix F. Bangs, Minneapolis
Arthur R. Barke, Fergus Falls
Jean Beryl Barr, St. John, N. B.
Julia B. Bell, Minneapolis
Charlotte Louise Bieber, Minneapolis
Helen Frances Billau, St. Paul
Mary Grace Birkenhauer, Minneapolis
Frederic Howes Blair, Minneapolis
Charlotte Carolynn Boller, St. Paul
Margaret Ethel Borden, Minneapolis
Richard Warner Borst, Minneapolis
Susan Edna Boyd, Calais, Maine
George Herbert Brande, Minneapolis
Jessie Ellen Brasie, Monticello
Ida L. Brooks, Aberdeen, S. D.
Doris Lillian Brown, Minneapolis
Sherman L. Brown, Amboy
Henry Van Anda Bruchholz, Minneapolis
Victor William Bruder, Minneapolis
Florence L. Buck, Minneapolis
Irene Helen Buckley, Minneapolis
Arthur C. Burkhard, Preston
Lyle Byrnes, Minneapolis
Rebecca Anna Campbell, Stirum, N. D.
Elisabeth Carey, Minneapolis
Elizabeth Casey, St. Paul
Edward Bradley Cosgrove, LeSueur
Anna Louise Cotnam, St. Paul
Florence Cotton, Minneapolis
Frances W. Cowan, Devils Lake, N. D.
Carolyn Curtis, Minneapolis
Harry William Dahleen, Maynard
Harold John Dane, St. Paul
Pearl Janet Davies, Afton
Josephine Dayton, Minneapolis
Louise de la Barre, Minneapolis
Rhoda Jane Dickinson, Minneapolis
Sabina Belle Donaghue, Minneapolis
John Nealis Donohue, St. Paul
Leah R. Drake, Detroit
Dana Wallace DuToit, Chaska
James Day Edgar, Minneapolis
Eda Carolyn Ehri, Minneapolis
Charles Jonas Eisler, Minneapolis
Ruth Erickson, Minneapolis
Ida C. Evans, Kasson
John Barthell Faegre, Minneapolis
Elizabeth Ruth Fagundus, Minneapolis
Augusta Amanda Peton, St. Paul
Florence A. Foley, Stillwater
Bernice Burns Foster, Duluth
Evelyn Foster, Minneapolis
Mary Foster, Duluth
Wilfred P. Freligh, Stillwater
Pansy Myra Gage, Minneapolis
Robert March Gaylord, Minneapolis
Bessie Louise Gilger, Minneapolis
Glenn W. Goldsmith, Hutchinson
A. Laird Goodman, Duluth
Fred William Graff, Cooperstown, N. D.
Mabel Grondahl, Red Wing
Ethel F. Hanke, Minneapolis
Alta Irene Hansen, Kenyon
Anna Marie Kjerstine Hansen, Minneapolis
Mary Catherine Haupt, St. Paul
Bernhardina Heffner, Minneapolis
Hazel L. Hibbard, Minneapolis
Merle Higley, Minneapolis
Drusilla Margaret Hodgson, Fergus Falls
Helen Elaine Holmen, Kenyon
Adolph Frederick Holmer, Virginia
Harry Hartwell Hopkins, Claremont, Cal.
Nina M. Horton, Minneapolis
Margaret Evah Houck, Summit, S. D.
Dorothy Rose Hudson, Minneapolis
Lillian Delphine Hughes, Mankato
Anne Hull, Minneapolis
Edith May Hyde, Blooming Prairie
Allina Linilla Johnson, Minneapolis
Odin James Johnson, Lyle
Alta Grace Kelley, Long Lake
Albert Gustave Klatt, Waconia
Lulu Viola Klossner, Winthrop
Marjorie Knappen, Minneapolis
Anne Paye Kramer, Minneapolis
Gudrun Krogh, Aberdeen, S. D.
Lorna Frances Lange, St. Paul
Albertine Larson, Halstad
Marion Randall Lawrence, Minneapolis
Ruth Sara Lee, Stillwater
Helen P. Leete, Sparta, Wis.
Amanda Viola Lenning, Duluth
Luella C. Lien, Granite Falls
Charlotte Lilienthal, Minneapolis

Agnes Molly Lingren, Minneapolis
Genevieve Love, Wayzata
Edith Mabelle Lucker, Minneapolis
Marie Caroline Lyle, Minneapolis
Clyde James McConkey, Brewster
Alice Rebecca McCray, Minneapolis
Helen C. McDermott, Rhinelander, Wis.
Charles Frederick MacGill, St. Paul
Lucile McGuire, Northfield
John Wallace McKenzie, Minneapolis
Wallace Macmurray, St. Paul
William James McNally, New Richmond,
Wis.

Ida Margaret Magnuson, Red Wing
Amy Magnusson, Duluth
Irma Ruth Martins, Minneapolis
Harold Charles Mason, New Richmond,
Wis.

Ethel R. Matson, Minneapolis
Adella May Melbourn, Minneapolis
Mildred Merriman, Vancouver, B. C.
Mary Richmond Miles, Fergus Falls
Marguerite Isabelle Millar, Minneapolis
Elizabeth Williams Miller, Minneapolis
Emma Fanny Minier, New Richmond,
Wis.

Helen Isabelle Muir, St. Paul
Karl G. Nuemeier, Stillwater
Myrtle Florence Olsen, Minneapolis
Constance Olsgard, Minot, N. D.
Mary Oredalen, Kenyon
Gena Sophia Bertina Ostby, Minneapolis
Ellen Overlock, Minneapolis
Benjamin W. Palmer, St. Paul
Carl Herbert Parks, Montevideo
Belle France Parsons, Minneapolis
Helen Holmes Patterson, Minneapolis
Erich G. Pershon, Young America
Gustav S. Petterson, Battle Lake
Louana Phelps, Duluth
Fidelia Anten Pine, St. Paul
Anna Elizabeth Pope, Minneapolis
Russell Blaine Rathbun, Minneapolis
Laura F. Remund, Waseca
Caroline Drew Roberts, Minneapolis
Grace Elizabeth Robinson, Minneapolis
Rhea Benedict Robinson, Minneapolis
Clinton Willis Roenisch, Minneapolis
Dorothy A. Root, Minneapolis
Elizabeth Mary Rosche, Minneapolis
Henry B. Rothrick, Minneapolis

Edna Ruble, Minneapolis
Elise Rushfeldt, Hawley
Edith V. Sage, Minneapolis
Helen Atherton Sanborn, Minneapolis
Sara Elizabeth Sawyer, Minneapolis
Carrie D. Schabacker, Menomonie, Wis.
Alice Nellie Schollert, Minneapolis
Alma O. Schulz, Minneapolis
Clifford Griffith Schultz, Minneapolis
Jonas Arnold Sende, Minneapolis
Hermione Shearer, Minneapolis
Jane Lotta Shedd, Pasedena, Cal.
Paul Fyler Shepard, Minneapolis
Clara Shepley, Minneapolis
Byron Lloyd Sheppard, Hutchinson
Eva Rose Sherwin, Monticello
Frances Elizabeth Shrader, Springfield
Leighton Robert Simons, Virginia
Myra Jean Sinclair, Minneapolis
Alice Louise Smith, Minneapolis
Ralph G. Smith, Groton, S. D.
Vera Claire Smith, Minneapolis
Raymond L. Starrett, Minneapolis
Dorothy Colburn Stevens, Minneapolis
Glenn Stennett Stiles, Minneapolis
Hazel Louise Wheeler Storr, St. Paul
Louise Amy Strong, Minneapolis
Mary Dorothy Swain, Elysian
Eather L. Swenson, Minneapolis
Blanche Irene Tension, Monticello
May Aldyth Thompson, Minneapolis
Mary Florence Tornstrom, Stillwater
Emily Hartwell Tupper, Minneapolis
Florence Aurora Turnquist, Minneapolis
Selma Henriette Viker, Halsted
Alfred Theodor Vollum, Hayward
Elizabeth Roy Ware, Minneapolis
Frederick Webster Ware, Minneapolis
Charlotte Waugh, St. Paul
Roscoe Clayton Webb, Tracy
Anna Wentz, Red Wing
Alice May Wessberg, Fergus Falls
Huldah Lucile Winsted, Minneapolis
Florence Winterer, Valley City, N. D.
Hazel Eloise Withee, St. Paul
Winifred Swift Wood, Jamestown, N. D.
Lillian Loretta Woolsey, Minneapolis
Anne Gertrude York, Minneapolis
Georgia Marion York, Minneapolis
Blanche M. Young, Minneapolis
Georgia Ruth Navarre Zeches, St. Charles

Frank Zoubek, Excelsior

BACHELORS OF SCIENCE—27

George Irving Badeaux, Brainerd
Hazel Bonness, Minneapolis
Olaf Edward Bratrud, St. Paul
Walter Douglas Brodie, St. Paul
Thayer Clinton Davis, Akeley

Richard I. Dorge, Minneapolis
Will Francis Finley, Minneapolis
Joseph Moffett Hall, Minneapolis
John Abner Handy, Minneapolis
Archibald Wilcox Howe, St. Paul

Alexander Josewitch, Minneapolis	Lee Wesley Pollock, Rochester
William John Kucera, Hutchinson	Earle Douglass Quinnell, St. Paul
Ernest Sidney Mariette, Minneapolis	Charles Morton Robilliard, Faribault
Frederick Paul Moersch, St. Paul	Charles Rydell, North Branch
Martin Nordland, Minneapolis	Amalie S. Sjolas, Hoffman
Silas Arthur Nesse, Mabel	Charles F. Snell, Detroit
Walter G. Nuesse, Springfield	Mary Margaret Warwick, Goodhue
Thomas Albert Peppard, Minneapolis	Henry W. Woltmann, St. Paul
	Raymond Wright Whittier, Minneapolis

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

CIVIL ENGINEERS—23

Arthur Frederick Ainslie, Rochester	Ingwald Kvitrud, Minneapolis
Herbert P. Arnesen, Benson	George Alfred Maney, Minneapolis
Francis C. Boerner, Duluth	Reuben Andrew Mark, St. Paul
William P. Cottingham, Helena, Mont.	George Carl Mattison, Minneapolis
Ernest B. Croft, Minneapolis	Clyde Methven, Minneapolis
A. E. Elfstrum, Willmar	Ervin J. Miller, Minneapolis
Edward Henry Enger, Minneapolis	Martin J. Orbeck, Minneapolis
David Pinkus Fieldman, Duluth	Lewis Mitchell Roth, Minneapolis
Ralph Meyerhoff Hodnett, St. Paul	Sigvel John Siverson, Minneapolis
Michael J. Hoffmann, St. Paul	Sydney H. Smith, Minneapolis
Carl Arthur Johnson, Minneapolis	M. Roy Swedberg, Luverne
	Arthur Carl Walby, Minneapolis

MECHANICAL ENGINEERS—10

Marvin Culver Barnum, Minneapolis	Oscar Arthur Olstad, Minneapolis
Ira. L. Bishop, Mapleton	Robert C. Oram, Willmar
Julian Perkins Farnam, Minneapolis	Leo E. Owens, Minneapolis
Walter F. Kasper, Owatonna	Jack Stickney Sneve, St. Paul
Martin S. Larson, Red Wing	Joseph Cushman Woodman, Minneapolis

ELECTRICAL ENGINEERS—29

Roy H. Ashworth, Minneapolis	Ira Clark McCoy, Rochester
George Williams Blossom, Minneapolis	Raymond Eugene McQuillin, Britton, S. D.
Robert Penn Burrows, St. Paul	Oscar S. Markuson, Fertile
Allan Coffman Butterworth, Minneapolis	Albert H. Mittag, Elizabeth
Arthur Garner Chapman, Minneapolis	George H. Morse, Lincoln, Neb.
Charles Sidney Demarest, Minneapolis	Walter Harry Nebel, Braham
Leon R. Drinkall, Spring Valley	Raymond J. O'Brien, St. Paul
Lynn A. Emerson, Elmore	Joseph Hill Pengilly, Osseo
Peter William Forsberg, Minneapolis	Louis F. Riegel, Rochester
Harry B. Frederickson, Minneapolis	D. Dayton Shepard, El Reno, Okla.
Maurice James Hansen, Hopkins	Joseph Henry Soulek, Montgomery
Henry Clay James, St. Paul	Will V. Stinson, Minneapolis
John E. Johnson, Minneapolis	William A. Walker, Moorhead
Watkin W. Jones, Windom	Glenn William Wilson, Dover
Dartt Hendrickson Lyford, St. Paul	

*BACHELORS OF SCIENCE—2

Paul E. Klopsteg, Fairmont	Ralph Mueller Hoffman, Minneapolis
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*This degree is granted in these special cases for the completion of the course in Science and Technology no longer offered.

THE COLLEGE OF AGRICULTURE

BACHELORS OF SCIENCE—*In Agriculture*—11

Francis Alexander Cornia, Plato	Forrest Herbert Sargent, Red Wing
Leroy Vernon Crandall, Red Wing	Mark Joseph Thompson, Winsted
Charles Alfred Matthews, Ortonville	Arne G. Tolaas, St. Paul
Knute A. Norsen, Posston	Leroy Uptagraff, Spirit Lake, Iowa
Richard M. Poe, St. Paul	Edward W. Vancura, Lakefield
	Frank William White, Excelsior

BACHELORS OF SCIENCE—*In Forestry*—17

David A. Arrivee, St. Paul	Adolph G. Hauge, Albert Lea
Frank Wilson Beard, Minneapolis	Julius Valentine Hofmann, Janesville
Clarence Winthrop Bowen, Jr., Minneapolis	William Henry Kenety, Fulda
James Roy Brownlie, Davenport, Iowa	Dean W. Martin, Minneapolis
Hugh Bryan Campbell, Stillwater	Arthur Frederick Oppel, Fulda
Walter L. Eisenach, Ely	William Underwood, Hutchinson
James Rozel Gillis, Superior, Wis.	Henry Goessler Weber, Minneapolis
Carl Lewis Hamilton, Dubuque, Iowa	Donald T. Williams, Minneapolis
	J. Paul Young, Eugene, Oregon

BACHELORS OF SCIENCE—*In Home Economics*—9

Clara L. Aust, Minneapolis	Mabel Edna Regan, St. Paul
Ethel Evans Chase, St. Paul	Maude Bessie Rice, Windom
Madge Leona Glotfelter, Minneapolis	Minnie Anna Schrepel, Le Sueur
Leola Marie Howard, St. Paul	Florence Sophia Strong, St. Paul
Charlotte Armene Raymond, Summit, S. D.	

THE COLLEGE OF LAW

DOCTOR OF CIVIL LAW—1

Hugh Victor Mercer, LL. M., Minneapolis

MASTERS OF LAWS—10

Arthur T. Adams, Minneapolis	Edward John Lee, St. Paul
Josiah Eschel Brill, Minneapolis	Everett Judson Mohl, St. Paul
Benjamin F. Groat, Minneapolis	John Edward Sundberg, Kennedy
Julius Waldemar Held, St. Louis Park	Reuben G. Thoreen, Stillwater
Harry Alexander Irwin, Belle Plaine	Cecil Elisha Warner, Ashville, Ohio

BACHELORS OF LAWS—105

George J. Andrews, Paynesville	Edward Babb Cutter, Anoka
Alfred E. Bollum, Minneapolis	Darlington, Davenport, Ph. B., Minneapolis
Arthur De Forest Bornemann, Hallock	
Carleton E. Bradley, Minneapolis	Charles Louis De Reu, Marshall
Leon Lester Bulen, Minneapolis	Karl Andrea Dibble, Minneapolis
John Ralph Bullard, Waseca	Augustus Sylvester Dowdall, Minneapolis
George Alfred Carleton, Minneapolis	Myron Lynn Ellis, Kasson
Alexander R. Chesnut, Minneapolis	Harold Newton Falk, Minneapolis
Sherman Child, Minneapolis	Albert Daniel Flor, New Ulm
John Robert Coan, Minneapolis	William E. Flynn, Caledonia
Arthur Thomas Conley, Bristol, S. D.	Edward Leo Fogarty, Buffalo
John Roland Connelly, Savage	Earle Johnson Frisbee, Le Roy

- George M. Gilbert, Duluth
 Walter Gonska, Duluth
 Frank Peter Goodman, Sheldon, N. D.
 Gordon Grimes, Minneapolis
 Herbert L. Halliday, Minneapolis
 Gustav Halvorson, Wanamingo
 Paul Morrison Hatfield, Sioux City, Ia.
 Albert Weiser Heidel, Minneapolis
 Edwin Albert Hendricks, Minneapolis
 Maurice A. Hessian, Le Sueur
 Edwin Arnold Hobbs, Canton, Ill.
 Gustave S. Holm, Minneapolis
 Harold J. Hull, Minneapolis
 Maurice Jenness, B.A., Minneapolis
 Buford Paul Johnson, Minneapolis
 Charles Francis Kelly, Schuyler Lake,
 N. Y.
 Arthur Raymond Knox, Fulda
 Robert Knutson, Albert Lea
 Ferdinand Aloysius Kranz, Minneapolis
 Evert R. Lanterman, B.A., Mandan,
 N. D.
 Jay A. Larkin, B.A., St. Paul
 Orrin Henry Larrabee, Minneapolis
 Walter Freeman Larrabee, Minneapolis
 L. Leonard Larson, St. Paul
 Harold C. Lindgren, Adrian
 Verner V. Lindgren, Adrian
 Ernest W. Lonquist, Minneapolis
 George M. McCanna, McCanna, N. D.
 Willis Gorman McCrady, Minneapolis
 Robert Hugh McCune, B.A., Benson
 Francis Louis McDonald, Minneapolis
 Millard Halpin McDonald, Minneapolis
 James Knox McDowall, Minneapolis
 John Alexander McHardy, Minneapolis
 John Francis McGovern, Minneapolis
 Albert Edward McMahan, St. Cloud
 William H. Markham, Independence,
 Wis.
 Fayette Elam Marsh, Stillwater
 Ebin Luther Melin, Minneapolis
 John Richard Naeseth, Zumbrota
 Harold Soren Nelson, Owatonna
- A. J. A. Ness, Hector
 John B. Ochu, Minneapolis
 Hervey Augustus Paddock, Oak Park
 Ira Edward Palmer, B.S., Cedar Rapids,
 Iowa
 Alonzo E. Parker, Guthrie Center, Ia.
 James Ewing Patterson, Minneapolis
 Spurgeon E. Paul, Wheaton
 Orley H. Peabody, Minneapolis
 Curtis H. Pomeroy, Moorhead
 Herbert M. Porter, Minneapolis
 Arba Joseph Powers, LL.B., Granite Falls
 Harry Ravicz, Minneapolis
 Christian Adolph Reineke, Morrystown
 Walter Richardson, St. Paul
 Benjamin M. Rigler, Minneapolis
 Mabel Ophelia Sands, Minneapolis
 Roy Le Verne Sanford, Minneapolis
 George A. Schain, Browns Valley
 William Edward Schreyer, Minneapolis
 Lawrence Severson, Forest City, Iowa
 David Calvin Sivright, Hutchinson
 George B. Sjoselius, Duluth
 Serenus B. Skahen, Princeton
 Vance E. Skahen, Minneapolis
 Albert O. Sletvold, Elizabeth
 Edmund C. Spaulding, Mapleton
 Joseph H. Starkey, Mapleton
 Ole Swanjord, Balaton
 Iver Benjamin Swanson, Minneapolis
 Harold R. Taylor, Chaska
 Carl Willard Thoen, Grove City
 Walter J. Trogner, Minneapolis
 Stanley Maybury Vance, Winona
 Olaf S. Vesta, Northfield, Wis.
 Frank Perry Vroman, Minneapolis
 Abbott McConnell Washburn, B.A., Du-
 luth
 Marshall Z. Way, Minneapolis
 Harold Arthur Welch, Minneapolis
 Waldemar Franklin Wendlandt, Man-
 chester, Wis.
 Frank J. Williams, Minneapolis
 Clyde Raymond Yates, Minneapolis

THE COLLEGE OF MEDICINE AND SURGERY

DOCTORS OF MEDICINE—19

- Francis W. Anderson, Dickinson, N. D.
 Moses Barron, St. Paul
 Robert Russell Craig, Willow Range,
 Man.
 Karl Dedolph, St. Paul
 Philip Randall Fulton, Hudson, Wis.
 George Arthur Geist, B.S., St. Paul
 William Howard Hengstler, Willmar
 Paul Harold Kelly, Ph.C., St. Paul
 Walter John Kremer, Cold Springs
- Chandler C. Larkin, Minneapolis
 Archibald Leitch, St. Paul
 Whiting B. Mitchell, Chehalis, Wash.
 Charles A. Olson, St. Paul
 James Wenceslas Papez, Minneapolis
 Erhard A. Rumreich, Pisek, N. D.
 Magnus B. Ruud, B.A., Fosston
 Albert E. Spear, Ph.B., Ft. Worth, Tex.
 Dale D. Turnacliif, Waseca
 Thomas Ziskin, Minneapolis

CERTIFICATES OF COMPLETED COURSE—6

The following students have completed one year of work at Hamline University and three years at the University of Minnesota. They are granted the degree of Doctor of Medicine from the former and certificates of completed work from the latter university.

William John Dailey, St. Paul	Antoine A. Laurent, Minneapolis
Charles Joseph Goodheart, Graceville	Nicholas William Schumacher, Minneapolis
Louis Henry Hedenstrom, St. Paul	Arthur M. Wooster, Minneapolis

THE COLLEGE OF DENTISTRY

DOCTORS OF DENTAL SURGERY—49

Wallace Adolph Altermatt, Springfield	Archie E. Luhman, Dover
Otto H. Brede, Minneapolis	Harry H. Lyman, Minneapolis
Bert Le Roy Cole, St. Paul	William McDougall, Royalton
Oscar Cooperman, Minneapolis	Theodore W. Maves, St. Peter
Edward G. De Mots, Minneapolis	Richard S. Maybury, Minneapolis
Albert J. Deslaurier, St. Paul	William E. Monroe, Hutchinson
Maurice de Trey, Lausanne, Switzerland	William Arthur Moore, Chatfield
Edward J. Dvorak, Glencoe	Raymond R. Moorhouse, Minneapolis
Henry William Ernst, St. Paul	Arent H. Olson, Preston
Guy Buchanan Fairchild, Grand Forks, N. D.	Warren W. Oram, Willmar
Carl O. Flagstad, Minneapolis	Johan Ferdinand Peterson, Bemidji
Oscar Eilert Fossum, St. James	Walter Raymond Porter, Minneapolis
Victor Edmond Gauthier, Virginia	Harvey Wesley Rieke, Gibbon
Henry S. Greene, Luverne	William A. Roll, Clontarf
Paul Hagen, Crookston	Maurice C. Rosen, Minneapolis
Henry Joseph Hall, Rochester	Charles Eugene Rudolph, Annandale
Frank Joseph Hartl, New Rockford, N. D.	Truman Leander Stickney, Minneapolis
William John Hartung, St. James	James Alfred Thomas, Spencer, Iowa
William James Haycock, Tracy	Lloyd Mungo Thorburn, Marshall
James L. Henderson, St. Paul	Jesse S. Van Guilder, Cannon Falls
Clements J. Johnson, Winthrop	Richard Vig, Fosston
John Patrick Kelly, Minneapolis	Martin J. Walhus, Spring Grove
Nelson Vivian LaDue, Walker	Robert E. Williams, Park Rapids
Arthur O. Lindquist, Minneapolis	George Emil Wolf, St. Paul
	Sam Ziegler, Stillwater

THE COLLEGE OF PHARMACY

BACHELORS OF PHARMACY—23

Edward M. Adams, Wayzata	Richard Burton Meland, Pelican Rapids
Ben G. Anderson, Wheaton	Susan S. Millard, Breckenridge
Benedict Samuel Ash, Delano	Rex G. Nelson, New Richland
Alberta J. Austin, Milbank, S. D.	Alice Prentice Newsom, Menomonie, Wis.
Roy J. Boardman, Rochester	Albert Wilhelm Peterson, Litchfield
Samuel John Broude, Minneapolis	Marie Estelle Prevost, Big Timber, Mont.
Oscar H. Erickson, Canby	Ross J. Reynolds, Graceville
Frank Ambrose Gifford, Madison Lake	Adolph F. Rood, Minneapolis
Manley Hewitt Haynes, Minneapolis	Louis Spiegel, Minneapolis
Wilfred Raowl Laliberte, Crookston	Frank August Steiner, Mankato
Edward M. Marsh, Pine Island	James Louis Titus, Bera, Ky.
	Frank J. Weber, Le Sueur Center

THE SCHOOL OF MINES

ENGINEERS OF MINES—26

Theodore Schwan Abbot, St. Paul	A. Stanley Hill, Minneapolis
Joseph H. Anderson, Minneapolis	John J. Hurley, Pine City
Walter Carl Anderson, Hopkins	William Frederick Jahn, Winona
Paul Thorndyke Bailey, Minneapolis	Neil Stetson Kingsley, Minneapolis
Emory P. Baker, Minneapolis	Milton Seigfred Lindholm, Ortonville
Charles S. Beck, Lewiston	Ervin W. McCullough, St. Paul
Anshelm Cyrus Borgeson, Minneapolis	Harold Joseph Rahilly, Minneapolis
Robert J. Burgess, Minneapolis	*Samuel Gilbert Swartz, St. Paul
Charles Stevens Crouse, Minneapolis	John Richard Tettie, Minneapolis
George Morgan Drake, Madelia	Edwin Harold Walker, Minneapolis
Victor Emanuel Ekloff, Kokato	Charles W. Walters, Minneapolis
Jay R. Elliot, Minneapolis	Arthur John Wehr, White Bear
Victor Leroy Fixen, Minneapolis	Lloyd Robert Whitson, Fergus Falls

THE SCHOOL OF CHEMISTRY

BACHELORS OF SCIENCE—*In Chemistry*—10

William F. Cantwell, St. Paul	Francis Maury Leavenworth, Minneapolis
Henry A. Halvorson, Minneapolis	P. Raymond McMiller, Minneapolis
John Glynn Hartnett, Graceville	Arthur Orlando Olson, Montevideo
Hugh Jerome Hennessy, Minneapolis	Earl Pettijohn, B.A., St. Paul
Einer Johnson, B.A., Minneapolis	Ernest Albert Stoppel, Rochester

BACHELORS OF SCIENCE—*In Chemical Engineering*—3

Russell E. Baker, Minneapolis	John Bernice Bolton, Minneapolis
	Roy Samuel Callaway, Minneapolis

THE COLLEGE OF EDUCATION

BACHELORS OF ARTS—*In Education*—34

Joseph Elmer Anderson, Amboy	Ruth Elizabeth Hermann, Minneapolis
Fred A. Andert, Morris	Dora Jensen, Minneapolis
Kate J. Bartholf, Minneapolis	Hermine Rosalie König, Minneapolis
Frances Elvira Blake, St. Paul	Nettie C. Moulton, Dawson
Minnie Brattland, Ada	Wesley E. Peik, Jordan
Georgia L. Burgett, Faribault	Ruth Esther Peterson, Ortonville
Harold Kendall Chance, Gheen	Ilse Gertrud Probst, St. Paul
Jennie Clark, St. Paul	Alla Burtis Ransom, Minneapolis
Alice Louise Corbett, St. Paul	Frances Helen Relf, St. Paul
Helen Lois Currier, Minneapolis	Bess Lois Shannon, Minneapolis
Ida Frances Davison, Granada	Mary Ethel Spencer, Hankinson, N. D.
Vivienne Rose Doherty, St. Paul	Theodor Herman Steffen, New Ulm
Grace Fern Doremus, Duluth	Vera E. Strickler, New Ulm
Marie Erd, Duluth	Earl Sweet, Blue Earth
Blanche Bernice Grand-Maitre, Chipewa Falls, Wis.	Elsie L. Switzer, Minneapolis
Pearl Catherine Hansen, Duluth	Paul Vander Eike, Minneapolis
	Clementine Regina Whaley, St. Paul
	Robert James White, Amboy

*Deceased

THE GRADUATE SCHOOL

MASTERS OF ARTS—26

Nanda M. Berger, B.A. '09, Minnesota	St. Paul
Major, Mathematics; Minors, Mechanics, Spanish	
Thesis, Geometric Constructions with the Compass	
William Bethke, B.A. '10, Minnesota	Franklin
Major, Political Science; Minors, Economics, Philosophy	
Thesis, The Grand Jury System	
Frederick McRae Byers, Ph.B. '87, Northwestern	Minneapolis
Major, Latin; Minors, English, Latin	
Thesis, Reign and Character of Tiberius	
George Archibald Clark, B.L. '91, Minnesota	Stanford University, Cal.
Major, Animal Biology; Minor, Latin	
Thesis, The Fur Seal of the Pribilof Islands	
May Gibson, B.A. '05, Minnesota	Minneapolis
Major, Latin; Minors, Greek, Philosophy	
Thesis, A Study of Seneca's Moral and Religious Doctrines	
Ellen Mary Giltinan, B.A. '10, Minnesota	Minneapolis
Major, German; Minors, English, Philology	
Thesis, Joan of Arc in Poetry	
Henry Peter Goertz, Ph.B. '10, Hamline	Mountain Lake
Major, Economics; Minor, Political Science	
Thesis, The Twin City Rapid Transit Company	
Frederick Butler Harrington, B.A. '07, Oberlin	Morgan
Major, Education; Minor, Psychology	
Thesis, Some Considerations in Connection with a Modern Course of Study	
Erwin Stearns Hatch, B.A. '03, Steinman College, Ill.	St. Louis Park
Major, Education; Minor, Psychology	
Thesis, A present Demand of Our Educational System	
Mabel Estella Hibbard, B.L. '06, California	Minneapolis
Major, Political Science; Minor, Economics	
Thesis, A Study in Corrupt Practices Legislation	
Albert P. Hovey, B.A. '09, Minnesota	Minneapolis
Major, Economics; Minors, English; Philosophy	
Thesis, Co-operation between Growers of Perishable Produce in the South	
Etheleen Frances Kemp, B.A. '10, Minnesota	Minneapolis
Major, History; Minors, English, Political Science	
Thesis, The Committee of Safety, 1642-44	
Walter Otis Lippitt, B.S. '03, Carleton	Excelsior
Major, Economics; Minor, Political Science	
Thesis, Industrial Education in Our Public Schools	
Freeman E. Lurton, B.S. '94, M.S. '97, Carleton	Anoka
Major, Education; Minor, Psychology	
Thesis, Repeating and Retardation in the Schools of Minnesota	
Ethel Noyes McCauley, B.A. '07, Minnesota	McCauleyville
Major, English; Minors, Latin, German	
Thesis, The Literary Development of Robert Louis Stevenson	
Anna E. Maguire, B.A. '03, Nebraska	Mitchell, S. D.
Major, Psychology; Minors, English, Psychology	
Thesis, The Binet Tests as Applied to Pupils in the Eighth Grade	
Florence Lauretta Mathes, B.A. '10, Minnesota	St. Paul
Major, English; Minors, Philosophy, Sociology	
Thesis, The Ibsenism of George Bernard Shaw	
Peter Nehleen, B.A. '10, Gustavus Adolphus	Minneapolis
Major, Swedish; Minors, Greek, Philology	
Thesis, Influences of Greek Literature on Johan Ludvig Runeberg, the National Poet of Finland	

- Richard Ager Newhall, B.A. '10, Minnesota
Major, History; Minors, Greek, Philosophy
Thesis, The Conspiracy of Cataline: A Political Episode
Minneapolis
- Olga Sybil Pinkus, B. A. '10, Minnesota
Major, English; Minors, Philosophy, Sociology
Thesis, An Interpretation of the Mystic, Symbolic, and Poetic Dramas of Ibsen's
Last Period
St. Paul
- Richard Joseph Purcell, B.A. '10, Minnesota
Major, History; Minors, Political Science, French
Thesis, The Council of the Protectorate, 1653-9
Minneapolis
- Eugene A. Rateaver, B.A. '08, St. Olaf
Major, Political Science; Minors, Economics, Sociology
Thesis, The French Administrative Policy in Madagascar
St. Anthony Park
- Edith Kuhlmeier Rowley, B.A. '10, Minnesota
Major, German; Minors, Physical Geography, Philology
Thesis, The Faust Legend as a Poetical Expression of the Age
Minneapolis
- Adolph Frederick Sandquist, B.A. '10, Gustavus Adolphus
Major, Swedish; Minors, English, German
Thesis, Gustaf af Geijerstam: A Study in Pessimistic Realism
Copas
- Pauline S. Schmidt, B.A. '08, Minnesota
Major, German; Minors, Education, Philology
Thesis, The Grail Legend as Treated by Wolfram von Eschenbach, Wagner,
Tennyson, and Lowell
Minneapolis
- Benjamin Franklin Zuehl, B.D. '06, B.A. '07, Western Union College
Major, Psychology; Minor, Sociology
Thesis, The Association-Reaction Method Applied to Religious and Moral Terms
St. Paul

MASTERS OF SCIENCE—7

- Franz A. Aust, B.A. '08, Minnesota
Major, Physics; Minors, Electrical Engineering, Mathematics
Thesis, The Electrical Discharge from a Pointed Conductor to a Hemispherical
Surface in Gases at Different Pressures
Minneapolis
- Grace Mary Bell, B.A. '09, Minnesota
Major, Chemistry; Minors, Chemistry, Botany
Thesis, The Alkali Salts of Tribromguaiaacol
St. Paul
- Florence Mayfred Briggs, B.A. '09, Minnesota
Major, Psychology; Minors, Psychology, Education
Thesis, A Study in Method of Correcting Stuttering and Stammering
St. Paul
- Farrington Daniels, B.S. in Chem. '10, Minnesota
Major, Physical Chemistry; Minors, Physics, Botanical Microchemistry
Thesis, An Apparatus for the Determination of Vapor Pressures by the Dynamic
Method
Minneapolis
- Ben-Hur Kepner, B.A. '10, Minnesota
Major, Organic Chemistry; Minors, Physical Chemistry, Agricultural Chemistry
Thesis, A Chemical Study of Wheat
Appleton
- Andrew P. Peterson, B.S. in Chem. '10, Minnesota
Major, Chemistry; Minors, Electric Power, Physics
Thesis, A Chemical Study of Lignite
Lamberton
- Frederick William Poppe, B.A. '10, Lawrence
Major, Organic Research; Minor, Physical Chemistry, Advanced Mineralogy
Thesis, The Action of Iodine on Pinene and the Resins Formed by the Action of
Iodine on Pinene
Appleton, Wis.

DOCTOR OF PHILOSOPHY—1

- Louis Williams McKeehan, B.S. in Eng. '08, M.S. '09, Minnesota
Major, Physics; Minors, Mathematics, Astronomy
Thesis, The Terminal Velocity of Fall of Small Spheres in Air at Reduced
Pressures
Minneapolis

HONORS, CERTIFICATES, PRIZES

Degrees with Distinction

IN ANATOMY

George W. Snyder

IN ENGLISH

Jean Beryl Barr
Charlotte Lilienthal

Wallace Macmurray
Clementine R. Whaley

IN FRENCH

Anna Louise Cotnam

Evelyn Foster
May Aldyth Thompson

IN GEOLOGY

Paul Vander Eike, Minneapolis

IN GERMAN

Arthur C. Burkhard

Vivienne R. Doherty
Mary Florence Tornstrom

IN HISTORY

Sabina Belle Donaghue
Merle Higley

Helen I. Muir
Frances H. Relf

IN LATIN

Elisabeth Carey

IN MATHEMATICS

Doris Lilian Brown

Hazel Eloise Withee

IN SOCIOLOGY AND ANTHROPOLOGY

Gustav S. Petterson

Edith V. Sage

Certificates of Proficiency in Music

Grace Donohue
Mary Edwards
Corinne Elken
Lillian Hanson

Magdalene Holter
Gertrude Murphy
Catherine Payne
Marguerite Scott
Pearl Sutherland

The '89 Memorial Prize in History

Awarded to Frances H. Relf

The Albert Howard Scholarship

Awarded to Etheleen Kemp, B.A.

The Shevlin Fellowship—Academic

Awarded to William Bethke, B.A.

*Honor Graduates of the Military Department to be Reported to the Secretary
of War and the Adjutant General of Minnesota*

CADET MAJORS

Robert Penn Burrows

William F. Cantwell
Richard Ager Newhall

CADET CAPTAINS

Edward Babb Cutter
Charles Jonas Eisler
Adolph Frederick Holmer
Francis Maury Leavenworth

Clyde James McConkey
Ernest Sidney Mariette
Earle Douglass Quinnell
Rhea Benedict Robinson

CADET FIRST LIEUTENANT

James Arnold Sende

SUMMARY OF STUDENTS

1911-12

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

	Men	Women	Total	
Senior Class.....	95	165	260	
Junior Class.....	121	197	318	
Sophomore Class.....	193	294	487	
Freshman Class.....	305	308	613	
Unclassed Students.....	28	52	80	
	742	1016	1758	1758

COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

	Men	Women	Total	
Post-Senior Class—				
Civil.....	5	..	5	
Electrical.....	7	..	7	
Mechanical.....	5	..	5	
	17	..	17	17
Senior Class—				
Civil.....	26	..	26	
Electrical.....	19	..	19	
Mechanical.....	11	..	11	
	56	..	56	56
Junior Class—				
Civil.....	22	..	22	
Electrical.....	31	..	31	
Mechanical.....	13	..	13	
	66	..	66	66
Sophomore Class—				
Civil.....	38	..	38	
Electrical.....	40	..	40	
Mechanical.....	18	..	18	
	96	..	96	96
Freshman Class—				
Civil.....	48	..	48	
Electrical.....	40	..	40	
Mechanical.....	33	..	33	
	121	..	121	121
Irregular.....	21	..	21	21

THE DEPARTMENT OF AGRICULTURE

	Men	Women	Total	
College of Agriculture—				
Graduate Students.....	14	2	16	
Special Students.....	6	6	12	
Normal Students.....	..	65	65	
	20	73	93	93

Agricultural Course:	Men	Women	Total	
Senior Class.....	8	..	8	
Junior Class.....	21	..	21	
Sophomore Class.....	41	..	41	
Freshman Class.....	51	..	51	
	<hr/>	<hr/>	<hr/>	<hr/>
	121	..	121	121
 Forestry Course:				
Senior Class.....	14	..	14	
Junior Class.....	8	..	8	
Sophomore Class.....	23	..	23	
Freshman Class.....	19	..	19	
	<hr/>	<hr/>	<hr/>	<hr/>
	64	..	64	64
 Home Economics Course:				
Senior Class.....	..	14	14	
Junior Class.....	..	10	10	
Sophomore Class.....	..	32	32	
Freshman Class.....	..	83	83	
	<hr/>	<hr/>	<hr/>	<hr/>
	..	139	139	139
 The School of Agriculture—				
Intermediate Year.....	18	7	25	
A Class.....	106	42	148	
B Class.....	227	98	325	
C Class.....	247	135	382	
	<hr/>	<hr/>	<hr/>	<hr/>
	598	282	880	880
 Dairy School.....	96	..	96	
Farmers' Short Course.....	122	5	127	
Junior Short Course.....	203	107	310	
Traction Engineering Course.....	38	..	38	
Teachers' Training School.....	51	838	889	
College Summer School.....	25	45	70	
	<hr/>	<hr/>	<hr/>	<hr/>
	535	995	1530	1530
 School of Agriculture at Crookston.....	122	37	159	
School of Agriculture at Morris.....	67	24	91	
	<hr/>	<hr/>	<hr/>	<hr/>
	189	61	250	250

THE LAW SCHOOL

Regular Law

	Men	Women	Total	
Third-Year Day.....	46	..	46	
Second-Year Day.....	66	2	68	
First-Year Day.....	22	1	23	
First-Year Day (Academic Seniors).....	8	..	8	
Fourth-Year Night.....	24	1	25	
Third-Year Night.....	15	1	16	
Second-Year Night.....	16	1	17	
First-Year Night.....	6	..	6	
	<hr/>	<hr/>	<hr/>	<hr/>
	203	6	209	209

Special Law

	Men	Women	Total	
Third-Year Day.....	7	..	7	
Second-Year Day.....	24	..	24	
First-Year Day.....	44	..	44	
Fourth-Year Night.....	5	..	5	
Third-Year Night.....	7	..	7	
Second-Year.....	7	..	7	
First-Year Night.....	22	..	22	
	<hr/> 116	<hr/> ..	<hr/> 116	<hr/> 116

COLLEGE OF MEDICINE AND SURGERY

	Men	Women	Total	
Graduate Students.....	3	..	3	
Sixth-Year Class.....	35	1	36	
Fifth-Year Class.....	42	4	46	
Fourth-Year Class.....	38	2	40	
*Third-Year Class.....	60	2	62	
	<hr/> 178	<hr/> 9	<hr/> 187	<hr/> 187
The School for Nurses—				
Third-Year.....	..	8	8	
Second-Year.....	..	10	10	
Preliminary Course.....	..	4	4	
	<hr/> ..	<hr/> 22	<hr/> 22	<hr/> 22

COLLEGE OF DENTISTRY

	Men	Women	Total	
Third-Year Class.....	58	..	58	
Second-Year Class.....	66	..	66	
First-Year Class.....	102	3	105	
Unclassed.....	18	..	18	
	<hr/> 244	<hr/> 3	<hr/> 247	<hr/> 247

COLLEGE OF PHARMACY

	Men	Women	Total	
Senior Class.....	26	1	27	
Junior Class.....	43	..	43	
Unclassed Students.....	6	1	7	
	<hr/> 75	<hr/> 2	<hr/> 77	<hr/> 77

SCHOOL OF MINES

	Men	Women	Total	
Seniors.....	24	..	24	
Juniors.....	17	..	17	
Sophomores.....	14	..	14	
Freshmen.....	22	..	22	
First-Year Class.....	21	..	21	
	<hr/> 98	<hr/> ..	<hr/> 98	<hr/> 98

*Second and First-Year students are listed in the College of Science, Literature, and the Arts.

SUMMARY OF STUDENTS

107

SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

	Men	Women	Total	
Seniors.....	18	..	18	
Juniors.....	17	1	18	
Sophomores.....	7	..	7	
Freshmen.....	16	1	17	
First-Year.....	14	1	15	
Unclassed Students.....	6	..	6	
	78	3	81	81

SCHOOL OF EDUCATION

	Men	Women	Total	
Graduate Students.....	8	5	13	
Seniors.....	2	38	40	
Juniors.....	2	33	35	
Unclassed Students.....	2	13	15	
	14	89	103	103

GRADUATE SCHOOL

	Men	Women	Total	
Graduate Students.....	101	58	159	159

THE UNIVERSITY SUMMER SESSION

	Men	Women	Total	
Registration (Less Duplicates).....	96	145	241	241

SUMMARY OF TOTALS

	Men	Women	Total	
College of Science, Literature, and the Arts.....	742	1016	1758	
College of Engineering and the Mechanic Arts....	377	..	377	
Department of Agriculture.....	1527	1550	3077	
Law School.....	319	6	325	
College of Medicine and Surgery (including the School for Nurses).....	178	31	209	
College of Dentistry.....	244	3	247	
College of Pharmacy.....	75	2	77	
School of Mines.....	98	..	98	
School of Analytical and Applied Chemistry.....	78	3	81	
School of Education.....	14	89	103	
Graduate School.....	101	58	159	
Summer Session.....	96	145	241	
	3849	2903	6752	6752
Less Duplicates.....	84	26	110	110
	3765	2877	6642	6642
Evening Courses (Economics Extension).....	263	13	276	
Correspondence Courses (Education).....	15	17	32	
Correspondence Courses (Economics).....	4	1	5	
	282	31	313	313

Total Registration..... 6955

SUMMARY OF TOTALS (CONTINUED)

	Men	Women	Total
Students of Collegiate Grade.....	2468	1584	4052
Students of Non-Collegiate Grade.....	1297	1293	2590

The University of Minnesota

DEPARTMENT OF AGRICULTURE

WEST CENTRAL SCHOOL AND STATION MORRIS, MINNESOTA

1912-1913



BULLETIN OF THE UNIVERSITY OF MINNESOTA

VOL. XV, NO. 17. SEPTEMBER 1912

Entered at the Post Office
in Minneapolis as second-class matter
MINNEAPOLIS, MINN.

THE UNIVERSITY

THE UNIVERSITY OF MINNESOTA comprises the following named schools, colleges, and departments:

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

THE COLLEGE OF AGRICULTURE

THE COLLEGE OF FORESTRY, including—

FOREST EXPERIMENT STATIONS AT ITASCA AND CLOQUET

THE SCHOOL OF AGRICULTURE, including—

THE DAIRY SCHOOL

THE SHORT COURSE FOR FARMERS

TEACHERS' SUMMER TRAINING SCHOOL

THE SCHOOL OF TRACTION ENGINEERING

THE SCHOOL OF AGRICULTURE, CROOKSTON

THE SCHOOL OF AGRICULTURE, MORRIS

THE EXPERIMENT STATIONS, including—

THE MAIN STATION AT ST. ANTHONY PARK

THE SUB-STATION AT CROOKSTON

THE SUB-STATION AT GRAND RAPIDS

THE SUB-STATION AT DULUTH

TH SUB-STATION AT WASECA

THE SUB-STATION AT ZUMBRA HEIGHTS

AGRICULTURAL EXTENSION

BUREAU OF RESEARCH IN AGRICULTURAL ECONOMICS

THE LAW SCHOOL

THE COLLEGE OF MEDICINE AND SURGERY, including—

THE SCHOOL FOR NURSES

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES, including—

MINNESOTA SCHOOL OF MINES EXPERIMENT STATION

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

THE GEOLOGICAL AND NATURAL HISTORY SURVEY

THE BOARD OF REGENTS

The Hon. JOHN LIND, Minneapolis, President of the Board	- -	1914
GEORGE EDGAR VINCENT, Ph.D., LL.D., Minneapolis	- -	<i>Ex-Officio</i>
The President of the University		
The Hon. ADOLPH O. EBERHART, Mankato	- - - -	<i>Ex-Officio</i>
The Governor of the State		
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The State Superintendent of Public Instruction		
The Hon. W. J. MAYO, Rochester	- - - -	1913
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Secretary of the Board

THE AGRICULTURAL COMMITTEE

The Hon. A. E. RICE, Chairman
The Hon. C. G. SCHULZ
The Hon. CHARLES A. SMITH
The Hon. MILTON M. WILLIAMS
President GEORGE E. VINCENT

THE WEST CENTRAL SCHOOL AND STATION

GEORGE EDGAR VINCENT, Ph.D., LL.D., President, University of Minnesota

ALBERT F. WOODS, M.A., Dean and Director, Department of Agriculture
EDGAR C. HIGBIE, M.A., Superintendent, West Central School and Station

FACULTY

DEPARTMENT OF ENGLISH

English: IRMA HATHORN, B.A.

Literature: DOROTHY R. HUDSON, B.A.

Librarian: ELIZABETH MOTT

DEPARTMENT OF ANIMAL HUSBANDRY

Beef Husbandry:

Dairy Husbandry: R. H. GIBBERSON, B.Agr.

Poultry: S. IRWIN SNORTUM

Swine: E. A. MOLDENHAUER

DEPARTMENT OF AGRONOMY

Farm Grains and Farm Management: PAUL E. MILLER, B.S.

Agricultural Botany:

Soils:

Farm Accounts: S. IRWIN SNORTUM

DEPARTMENT OF AGRICULTURAL ENGINEERING

Farm Mechanics: ARTHUR WOODMAN, B.S.

Carpentry: O. O. BYE

DEPARTMENT OF HOME ECONOMICS

Household Art: IRMA HATHORN, B.A.

Domestic Art: SUSAN WILDER, B.S.

Domestic Science: MARGARET JONES, B.S.

DEPARTMENT OF MUSIC

Piano: INA BRYNILDSEN

Chorus: ELIZABETH MOTT

OFFICERS OF ADMINISTRATION

S. IRWIN SNORTUM, Accountant

ERNEST MOLDENHAUER, Farm Foreman

O. O. BYE, Superintendent of Buildings

GEORGIANA L. SHARROTT, Matron

MARTHA M. BEECHER, Office Clerk

SCHOOL CALENDAR

1912-13

October	1	Tuesday	First term opens; Registration
October	2	Wednesday	Organization of Classes
October	28	Monday	Field Day
November	28	Thursday	Thanksgiving Day
December	21	Saturday	First term closes
January	2	Thursday	Second term opens; Registration
January	3	Friday	Organization of Classes
February	22	Saturday	Washington's Birthday
March	18	Tuesday	Inter-Society Debate
March	19	Wednesday	Class Play
March	21	Friday	Commencement Day
March	24	Monday	Opening of Junior Short Course
March	29	Saturday	Closing of Junior Short Course

GENERAL INFORMATION

PURPOSE

The West Central School of Agriculture is an institution established primarily for the training of young men and women for the profession of farming. The courses are planned and the subjects are taught with the purpose of making the students masters of this work. The courses are sufficiently extended to give, not only a fairly complete technical equipment in the business of production, but a working basis in the economic and sociologic aspects of farm life. It is felt that the farmer of the future must have a broad grasp of his profession in its relationships with other callings, as well as a realization of the possibilities of its social development.

LOCATION

The School is admirably situated to serve about seventeen counties of the west central part of the State. The Great Northern Railway through connections with the Chicago, Milwaukee, and St. Paul Railroad gives good service to the southeast, south, southwest, west, and northwest. The Northern Pacific Railway through connections with the Soo Line and other roads gives very satisfactory service to the portion of the State lying north and northeast of Morris.

The School itself adjoins the city of Morris and is situated upon a natural rise of ground overlooking the Pomme de Terre Valley. When the present plans are carried into effect, the campus will be a very beautiful place indeed with its fifteen or twenty buildings and pleasant drives.

TIME OF OPENING

The School of Agriculture will open Tuesday, October 1st, and close for the fall term Saturday, December 21st. The winter term will open Thursday, January 2d, and close Saturday, March 21st. This gives six months of school work at a time when the students can best be spared from home.

Special Information

Old or new students planning to attend the School of Agriculture should write at once to the Registrar asking him to reserve a room. The first term will open Tuesday, October 1st, and classes will be organized the following day. It is hoped to have everything in readiness this year so there will be no delay in getting the work started.

Each dormitory room is furnished with two single beds, dresser, table, chairs, curtains, sheets, bed spreads, pillows and pillow cases.

Each student should bring with him quilts or blankets for one single bed, napkins and napkin rings, towels, comb, brush, and other toilet articles.

Preference as to room-mates should be stated early and will be considered so far as possible.

All trains will be met by special committees and conveyances Tuesday, October 1st. If possible, be on hand the first day.

HOLIDAYS

Lincoln's and Washington's birthdays are legal holidays and will be appropriately observed. On Thanksgiving Day no classes will be held, but school will continue as usual on Friday and Saturday following.

DORMITORIES

Two new dormitories, one for young men and one for young women, will be ready for occupancy in October. Each will be in charge of one of the members of the Faculty. These buildings are modern, three-story structures, splendidly equipped and heated by the Central Heating Plant. They will accommodate about one hundred and fifty students.

HOME LIFE ON THE CAMPUS

The life of the students while attending the School of Agriculture is subject to supervision. Everything is done to promote a healthful, moral atmosphere. The use of tobacco and spirituous liquors of all kinds is strictly forbidden. Anyone not in accord with these restrictions and not willing to lend a hand toward strong, moral growth should not come to the School of Agriculture.

EXPENSES

The expenses at the institution are made as moderate as feasible. They include the following items:

Incidental fee (yearly).....	\$5.00
Board, light, heat, and flat laundry (weekly).....	3.50
Laboratory fees for woodwork, blacksmithing, sewing, cooking, chemistry, corn studies, or dairying per term	\$1.00 to 3.00
Text-book rental per term.....	1.00
Deposit (yearly).....	5.00
Hospital fee.....	1.00
Piano lessons per term.....	10.00
Piano rental per term.....	2.00

Text-books may be purchased or rented as the student desires. The \$5.00 deposit is required as a protection against breakages; book

losses, etc. Unless deductions are made, it will be returned in full at the end of the year. Each month's board is paid in advance. The buildings are lighted by electric lights and warmed by steam. No deduction in charges is made for any absence of less than five days.

A fee of \$1.00 per term is collected from each resident student and is used as a hospital fund. This fund will be administered under direction of the hospital committee which shall consist of the matron, the preceptress, and four others elected from the student body. A general statement of regulations so far as such regulations can be determined will be posted at the beginning of the year.

Students will buy their own stationery, drawing material, etc.

STUDENTS' DEBATING SOCIETIES

Students are urged to unite with one of the literary societies of the school for both pleasure and profit. They afford a training in conducting meetings, parliamentary law, and public speaking, obtainable in no other way.

An Inter-Society Debate cup for the promotion of interest in civic and political questions has been offered by the Superintendent. This will become the property of the society winning it three successive times. The Vincent Literary Society now holds the cup, having won it the first time the spring of 1912.

LIBRARY

The library is well equipped to supply the needs of the students. A large number of books have been selected to meet the requirements of the various departments. These, with the government and station reports, are all classified and available for use by instructors and students.

The librarian is always ready to give whatever assistance she can in directing students in the selection of the books they may need in the pursuit of their work.

LECTURE COURSE

During the school year a lecture and entertainment course, consisting of four or five numbers, is given at a cost of one dollar for the series. These entertainments are strictly high grade and furnish a pleasant relaxation from regular school work.

DEPARTMENT OF MUSIC

The organization of the Department of Music will be completed this year and the work put upon a definite credit basis. Instruction will be given in both singing and instrumental lines. The chorus work will

be in charge of Miss Mott. She will conduct glee clubs and chapel music and direct the various other singing activities. Piano instruction will be given by Miss Brynildsen. Two half hours per week will be required for credit, and a fee of \$10.00 per term for the lessons and \$2.00 per term for piano rental will be charged. Special rooms will be set aside for the piano instruction and practice, making it possible to do good, thorough work. Miss Brynildsen has had extended preparation for her work and teaching experience, completing the Teachers' Normal Piano Course at the Minneapolis School of Music, Oratory, and Dramatic Art in 1910.

SUMMER SESSION FOR TEACHERS

The first annual summer session for rural school teachers was held at the West Central School for six weeks, beginning June 17th. Credit courses were offered in a number of the subjects and Teachers' Courses in Agriculture, Manual Training, and Home Economics were a part of the work. This work will be continued from year to year and ultimately expanded to give a very complete training for rural and consolidated school teachers.

SUMMER DRESSMAKING COURSE

During the 1912 Summer Session a Dressmaking Course was conducted. About twenty young ladies were enrolled. It is planned to make this a permanent feature in future years, giving students complete courses in commercial dressmaking.

ADMISSION

The West Central Minnesota School of Agriculture is an institution established for the training of farmers and farmers' wives. At present the rural schools are unable to do much advanced work. It is hoped that they will improve their courses through consolidation and association and ultimately make it possible for the School of Agriculture to set higher standards of admission, but, until such is the case, the School must accept any mature young man or woman even though he or she might find it hard to pass entrance tests. Students above sixteen years of age will be welcomed even though they may not be able to show graduation from the usual eighth grade work. Whenever possible, prospective students should present county or high school certificates in the common branches. These will admit to the regular work without conditions.

REQUIREMENTS FOR GRADUATION

First—The completion of the prescribed course of study, with an honorable standing in department.

Second—An essay of not less than one thousand words, upon a topic connected with Agriculture or Home Economics, typewritten on paper of approved size for binding and filing in the library.

Third—For young men, a practical experience in field work at the Station Farm or elsewhere, as shall appear in reports received from responsible sources.

It is essential that the student should do some work of a practical nature during the vacations following the first and second school years respectively. Students will be given credit for this work just the same as for other school work. Blanks giving an outline of the work in detail and blanks for certification are furnished to all students.

It is expected that all the boys in the School will devote their vacations to actual farm work, or to some form of agricultural work, and the girls to some line or lines of work such as making bread for the family, canning fruits or vegetables, and other home-making pursuits.

EXPERIMENT STATION

Three hundred acres of land are laid out for experimental and demonstration purposes. At present three main lines are followed:

1. *Crop Rotation and Farm Management.*—One hundred acres are divided into five-year rotation with a dairy herd in connection. This is to demonstrate what seems to be the ideal for the newer agriculture, namely, smaller farms intensively handled with live stock to help maintain soil fertility.

2. *Better Seed Selection.*—Pure seeds are being grown with a hope that the Station may lead in an effort toward the general improvement of the quality of farm seeds.

3. *Nitrogen Gathering Crops.*—Clovers, alfalfas, and other leguminous crops are receiving attention in order to restore the nitrogen content of the soil, to improve the physical texture of the land, and to give a source of excellent stock food.

COURSES OF STUDY

FOR YOUNG MEN

First Year

- 1 English
- 2 Industrial Geography
- 3 Accounts; Physiology
- 4 Botany and Corn Studies
- 5 Farm Crops
- 6 Carpentry and Blacksmithing

Second Year

- 1 English
- 2 Industrial History
- 3 Vegetable Gardening and Fruit
- 4 Animal Husbandry
- 5 Dairying and Farm Structures
- 6 Physics

Third Year

- 1 English
- 2 Chemistry
- 3 Government and Legal Forms
- 4 Accounts and Farm Management
- 5 Poultry and Horse Husbandry
- 6 Soils

Advanced Years

Fourth Year

- 1 English Literature
- 2 Algebra
- 3 Chemistry and Physics
- 4 Landscape Gardening and Forestry
- 5 Economics

Fifth Year

- 1 English Literature
- 2 Rural Sociology
- 3 Geometry
- 4 Farm Management
- 5 Elective

FOR YOUNG WOMEN

First Year

- 1 English
- 2 Industrial Geography
- 3 Home Accounts and Physiology
- 4 Agricultural Botany or Music
- 5 Laundering and Sanitation
- 6 Sewing and Cooking

Second Year

- 1 English
- 2 Industrial History
- 3 Vegetable and Fruit Gardening or Music
- 4 Dairying and Bacteriology
- 5 House Planning and Decoration and Home Nursing
- 6 Sewing and Cooking

Third Year

- 1 English
- 2 Food Chemistry
- 3 Government and Legal Forms
- 4 Household Physics or Music
- 5 Poultry and Home Management
- 6 Sewing and Cooking

Advanced Course

Fourth Year

- 1 English Literature
- 2 Algebra
- 3 Economics
- 4 Textiles and Millinery
- 5 Landscape Gardening and Forestry or Music

Fifth Year

- 1 English Literature
- 2 Geometry
- 3 Rural Sociology
- 4 Dressmaking
- 5 Elective

STUDENTS

Students in attendance at the West Central School of Agriculture, Morris, Minnesota,
1911-1912—91

Aanerud, Agnes, Donnelly	Judd, Earl, Morris
Anderson, Harry, Donnelly	Kleven, Bertha, Starbuck
Anderson, Walter, Murdock	Kleven, Gilbert S., Starbuck
Andert, Lena, Morris	Kleven, William O., Starbuck
Andert, Paul, Morris	Knight, Frank, Morris
Bennett, Chester H., Lowry	Koll, Victor, Morris
Boe, Oscar J., Alberta	Larson, Einar, Starbuck
Bolstad, Selfred H., Dawson	Larson, Elmer, Murdock
Brandt, Alice, Morris	Larson, Reuben, Murdock
Brandt, Elmer P., Morris	Leuty, George W., Morris
Brandt, Lawrence, Donnelly	Lewis, Ida G., Morris
Brevig, Joseph, Starbuck	Lien, Alma, Starbuck
Brevig, Ole, Starbuck	Mallery, Stanley, Albert Lea
Carlson, Hilda, Morris	McIver, George, Lowry
Crosette, William E., Chokio	Mecklinburg, Emil, Hancock
Dunken, Otto, Chokio	Nordeen, Ernest, Spicer
Durkee, Albert B., Hancock	Nygaard, Petra M., Starbuck
Eck, Emelia A., Morris	Nysteum, Joyce, Morris
Engebretson, Christian M., Starbuck	O'Brien, John T., Morris
Estenson, Alice, Hancock	Olson, Ida, Morris
Everett, Ervin, Donnelly	Opheim, Clifford, Cyrus
Eystad, Charles, Alberta	Otteson, Elmer, Starbuck
Farwell, Olive, Alberta	Page, Howard, Hancock
Farwell, Walter, Alberta	Page, Mayme, Hancock
Field, Frank, New London	Peterson, Bueford, Murdock
Forney, Paul, Hornick, Iowa	Quitney, Gerhart, Lowry
Gausman, Amy, Morris	Ranum, Arthur, Starbuck
Gausman, Edward A., Morris	Reisrud, Agnes M., Starbuck
Gausman, Emil, Morris	Schliep, Peter, Holloway
Gillette, John D., Beardsley	Scott, Eugene W., Hancock
Gordon, Mrs. Olga, Lisbon, N. D.	Sharrot, Herald E., Morris
Grandjean, Charles H., Hancock	Sherman, Lewis, Beardsley
Halloway, Fred B., Holloway	Simonson, Judith, Starbuck
Hanse, Melvin L., Morris	Sovey, Joseph, Artichoke Lake
Hauck, Reuben, Madison	Steen, Anna, Clinton
Haug, Clemens, Duluth	Strand, Francis A., Benson
Hogan, John E., Morris	Subak, Herman, Chokio
Hortell, Gordon B., Clinton	Svenning, Olga, Glenwood
Hubbard, Mildred L., Hancock	Tessem, Cora, Starbuck
Isherwood, Earl, Morris	Thompson, Albert, Starbuck
Jallo, Ole, Alberta	Thompson, Selma, Starbuck
Jenk, Dedrick P., Beardaley	Vinji, Pearl, Morris
Johnson, Harry A., Hancock	Wendt, William, Donnelly
Jongeward, William, Morris	Wetmore, Henry, Morris
Jongeward, Hubert F., Morris	Will, Martha, Morris
	Zahl, Henry F., Morris

JUNIOR SHORT COURSE, 1912—32

Anderson, Carl, Hancock	Asmus, Olga, Chokio
Anderson, Clara, Alberta	Bengston, Beda, Benson
Anderson, Oliver, Benson	Brandt, Editth, Morris

Cornell, Fred, Benson
 DeCamp, Clifford, Chokio
 Erdahl, Albert, Chokio
 Eystad, Cora, Alberta
 Eystad, George, Alberta
 Eystad, John, Alberta
 Eystad, Joseph, Alberta
 Eystad, William, Alberta
 Horn, Irma, Chokio
 Horn, Loretta, Chokio
 Hubbard, Albert, Hancock
 Hubbard, Grace, Hancock
 Kaweng, John, Tintah

Loehr, William, Chokio
 Metzger, Margaret, Chokio
 Mickelson, Alfred, Benson
 Oldhaver, Esther, Chokio
 Peterson, Evylen, Wolverton
 Rolan, Carl, Clinton
 Rolan, Elmer, Clinton
 Staples, Marie, Wolverton
 Strand, Oscar, Benson
 Thronson, Howard, Morris
 Thronson, Lawrence, Morris
 Tucker, Lucy, Tintah
 Tucker, Mary, Tintah

SUMMER SCHOOL STUDENTS, 1912—105

Anderson, Emma, Donnelly
 Anderson, Mabel H., Farwell
 Bengtson, Huldah O., Barrett
 Berg, Hannah, Morris
 Berg, Sena, Morris
 Brennan, Margaret, Graceville
 Britt, Ethel E., Chokio
 Brom, Olga, Morris
 Bruns, Marie F., Morris
 Buckley, Alice, Alberta
 Buckley, Mae, Alberta
 Buroker, Edith, Benson
 Cairney, Julia, Morris
 Casey, Susan, Morris
 Clemans, Glada B., Hancock
 Clemans, Vanissa B., Hancock
 Connole, Helen, Conrad, Montana
 Cook, Evelyn M., Norcross
 Coyne, Hilda, Barry
 Danzeisen, Jessie, Herman
 Deely, Catherine, Morris
 Dewane, Mary, Morris
 Erickson, Effie, Hancock
 Erickson, Ethel M., Hancock
 Erickson, Selma G., Milan
 Estep, Mabel, Herman
 Farley, Margaret, Chokio
 Fehling, Mabel, Louisberg
 Fenton, Minnie, Hancock
 Flynn, Rebecca M., Morris
 Gagen, Evangeline, Morris
 Gagen, Jannette, Morris
 Gallagher, Lauretta, Danvers
 Galvin, Stella, Morris
 Gaughan, Anna, Morris
 Geenty, Anna, Graceville
 Giddings, Ines, Graceville
 Giddings, Silence, Graceville
 Haack, Bertha M., Morris
 Haack, Rosa, Morris
 Hagen, Marie, Morris
 Haldorson, Alma, Hancock
 Heuer, Addie, Chokio

Heuer, Clara, Chokio
 Hilleren, Susan, Benson
 Isherwood, Adeline, Morris
 Isherwood, Earl, Morris
 Johnson, Annie E., Donnelly
 Johnson, Clara, Appleton
 Johnson, Ella A., Hancock
 Johnson, Mabel C., Milan
 Johnson, Signe, White Rock, S. D.
 Judiah, Adeline, Danvers
 Just, Elizabeth, Morris
 Keefe, Alice R., Graceville
 Kiernan, Thomas F., Watkins
 Klein, Julia Robert, Hancock
 Klein, Rose Topsy, Hancock
 Klevan, Gena, Starbuck
 Lerass, Mollie, Herman
 Lindquist, Phyllis, Diamond, S. D.
 Lynch, Margaret, DeGraff
 McAloon, Nellie, Barry
 McNally, Alice, Chokio
 Maloney, Grace, Morris
 Maughan, Louise, Morris
 Mich, Clara, Donnelly
 Modahl, Alice, Alexandria
 Moran, Gertrude, Graceville
 Moran, Mary R., Graceville
 Moran, Rose, Graceville
 Nelson, Esther, Hancock
 Nelson, Mabel, Clontarf
 Nelson, Nina, Morris
 Norton, Marie C., Hancock
 Nygard, Constance, Starbuck
 Olen, Marie J., Benson
 Olen, Othelia, Benson
 Olson, Ida, Chokio
 Ormond, Edna M., Artichoke Lake
 Ostgulen, Oscar B., Glenwood
 Page, Mayme, Hancock
 Palmer, Ruth D., La Crosse
 Peterson, Albert L., Artichoke Lake
 Peterson, Gena, Appleton
 Peterson, Laura, Collis

Peterson, Mary T., Litchfield
 Peterson, Olga M. V., Murdock
 Rasmussen, Regina, Kensington
 Rotramel, Mae, Morris
 Sauter, Barbara, Morris
 Sauter, Bathilda, Morris
 Slawson, Inez, Morris
 Sommerfeld, Lena, Sleepy Eye
 Stende, Anton, Maynard

Stenger, Margaret M., Morris
 Stoneberg, Lawrence, Chokio
 Strandberg, Edith E., Morris
 Sullivan, Ella, Barry
 Sutherland, Margaret, Hancock
 Taffe, Mary R., Barry
 Trainor, Teresa, Graceville
 Varnum, Melissa Cap, Hancock
 Westberg, Florence A., Norcross

Woods, Laura, Morris

SPECIAL DRESSMAKING STUDENTS AT SUMMER SCHOOL, 1912—19

Berg, Ella, Morris
 Blackwelder, Cleda, Johnson
 Buckley, Alice, Alberta
 Erickson, Ethel, Hancock
 Gagen, Jannette, Morris
 Galvin, Stella, Morris
 Hagen, Marie, Morris
 Jongeward, Jannette, Morris
 Landis, Stella, Morris

Lee, Selma, Morris
 Lyon, Mayme, Morris
 McCarthy, Mayme, Morris
 McNally, Alice, Chokio
 Mahoney, Margaret, Morris
 Nelson, Esther P., Morris
 Nygard, Constance, Starbuck
 Olson, Mary, Chokio
 Ortman, Florence, Morris

Trainor, Teresa, Graceville

The University of Minnesota

BULLETIN

DAIRY SCHOOL

Offering lectures and practice work in Creamery buttermaking, Factory
cheesemaking, Ice-cream making, and kindred subjects

At

UNIVERSITY FARM, SAINT PAUL

November 11, to December 7, 1912



DAIRY HALL

Vol. XV.

September, 1912

No. 18.

Entered at the Post Office in Minneapolis as second class matter.
MINNEAPOLIS, MINN.

THE BOARD OF REGENTS

The Hon. JOHN LIND, Minneapolis, President of the Board	-	-	-	-	1914
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The Hon ADOLPH O. EBERHART, Mankato The Governor of the State.	-	-	-	-	<i>Ex-Officio</i>
The Hon. C. G. SCHULZ, St. Paul The State Superintendent of Public Instruction.	-	-	-	-	<i>Ex-Officio</i>
The Hon. W. J. MAYO, Rochester	-	-	-	-	1913
The Hon. MILTON M. WILLIAMS, Little Falls	-	-	-	-	1913
The Hon. HENRY B. HOVLAND, Duluth	-	-	-	-	1914
The Hon. A. E. RICE, Willmar	-	-	-	-	1915
The Hon. CHARLES L. SOMMERS, St. Paul	-	-	-	-	1915
The Hon. B. F. NELSON, Minneapolis	-	-	-	-	1916
The Hon. PIERCE BUTLER, St. Paul	-	-	-	-	1916
The Hon. CHARLES A. SMITH, Minneapolis	-	-	-	-	1916

FACULTY DAIRY SCHOOL, 1912

George Edgar Vincent, Ph. D., LL. D.....	President of the University
A. F. Woods, A. M., Dean.....	Department of Agriculture
T. L. Haecker, Professor.....	In Charge Dairy School; Feeding
James Sorensen.....	Creamery Management, Chief Instructor
R. M. Washburn, M. S. A.....	Associate Professor, Dairy Stock Judging
E. O. Hanson.....	Milk and Cream Testing
H. L. Russell, Ph. D.....	Dairy Bacteriology
M. H. Reynolds, M. D., D. V. M.....	Diseases of the Dairy Cow
C. P. Bull, B. Agr.....	Forage Crops, Pasture
Ralph Hoagland, B. Agr.....	Dairy Chemistry
A. W. Parkins.....	Cheese Making
A. M. Bull.....	Farm Structures
J. L. Mowry.....	Engineering, Pipe-fitting
S. G. Gustafson.....	Butter-making
Elov Ericsson.....	Cultures
E. O. Storvick.....	Starters
J. E. Lindberg.....	Dairy Mathematics
O. E. Bloomquist.....	Assistant in Creamery
J. L. Pomeroy.....	Assistant in Starters

DAIRY SCHOOL

The next session of the Dairy School will convene Nov. 11, 1912, and will continue for five weeks, the first four being used for butter and cheese making, while the last week will be given over almost wholly to ice cream making, both by lectures and practice work.

The Purpose of the school is to offer an opportunity to young men to become more thoroughly trained in the science and the art of making the largest quantity of butter and cheese of the highest possible quality and to encourage them to greater community usefulness.

The Demand for men well trained in creamery management is greater than the supply. Several factories in the state have had difficulty during the past year in securing good men even at liberal salaries. Creamery butter making, and factory cheese making, offer good open-



BUTTER SCORING TROPHY.

Won by Minnesota Buttermakers at the International Dairy Show, 1911.

ings to young men who will apply themselves faithfully, for there is now an actual shortage of first-class men in these lines.

The Expense of the first four weeks is a registration fee of \$15.00; board at \$3.50 to \$4.00 per week, and the purchase of two white suits and caps, which cost about \$2.00. The students usually purchase a few books, though this is not required. The registration fee of the Ice Cream Course will be \$5.00.

Location.

The Dairy School is located at the School of Agriculture and Experiment Station, on the University Farm, situated between St. Paul

and Minneapolis. To reach the school take the Como-Harriet or the Como-Hopkins car, and get off at Carter Avenue. The school is about a ten minute walk from the car. It is in the country, yet within thirty minute car ride of either city.

Equipment.

The work rooms are provided with machines with which the most modern and exacting demands can be met, even though the rapid growth and evolution of the dairy industry has often required that sound, even almost new equipment be cast aside to make room for the most modern and efficient type of tools and machines.

Requirements for Admission.

No entrance examination is required, but an experience equal to at least one season in creamery or cheese factory is required.

Experience has shown conclusively that those who have had experience before coming to the school are the ones who get most out of the course.

Dairy Certificates.

The Regents of the University will grant Dairy School certificates to students who have taken the course and passed a satisfactory examination, and in addition have demonstrated that they have acquired special skill in the art of butter or cheese making, and are thoroughly qualified to take charge of creamery or cheese factory.

The Instructors.

All lecturers and workroom instructors are practical men chosen because of their special fitness to give accurate and sound advice in the particular line of work in which they teach. Most of the instructors are veteran creamerymen, and come to the school fresh from their labor in the factory to the work of teaching. For more than 20 years, the Minnesota Dairy School has led in practical teaching and it is felt that the success which this school has met during this time has been largely due to the fact that the instructors have been workers in and not merely students of dairying. No pains will be spared to continue to secure these men of actual experience, for they know what it is that the student needs and wants to know.

Nature of the Instruction.

The work expected of the student is divided into two general classes:

Lectures are given, about 60 altogether, covering all phases of agriculture which pertain in any way to dairying in Minnesota.

Practical Work in shop, churn room, cheese room, and testing laboratories is performed by all students under the supervision of competent instructors.

Lectures.

The lectures given deal mainly with the following topics: The care of milk and cream on the farm, receiving and separating milk, receiving and grading cream at the factory, keeping composite samples, testing milk and cream, general creamery practice and problems, cul-



CHURN ROOM.

tures and starter-making, judging and scoring butter and cheese, market requirements and the principles of co-operative dairying; breeds of dairy cattle and their feeding and management, pastures and forage crops, preservation of fodders, animal hygiene and common diseases of the cows, arrangement and construction of barns, and milking.

Practical Work.

Butter Making is naturally a leading feature. In this room milk is received, separated and ripened; cream is received, graded, pasteurized and ripened; the cream is churned, and the butter washed, salted and packed with special care to preserve high quality, to avoid mottles

and marblings, and to put all finished packages into the neatest and most salable form possible. The butter is judged daily, that the makers may know what grade of work they are doing.

Careful record is always kept of the consistency and fat of cream and the moisture and salt contents of the finished butter.

Over-runs are calculated and all losses determined.

Cheese Making, though less important in the state than butter making, is yet highly worthy of study and encouragement in certain places. The work in the cheese room is carried on as in any well-conducted factory.

The milk is received, carefully tested for acid, fat, and dirt, and then made into American cheese. Every step in the entire process is explained by the skilled cheese maker who has charge. Quality of product and ease of doing the work as well as the production of ample yield, are carefully studied. The students soon acquire sufficient skill to enable them to lead in the day's work and thereby mature their judgment. The four weeks of such combined working and studying equip the worker even more than would several years of effort by himself.

Making Ice Cream is a new enterprise for Minnesota butter makers, but one offering, in many places, a bright future to the careful and diligent. At present about 40 creameries of this state are making ice cream and others are studying the matter. Inquiries are numerous from creamerymen who wish to know more of the new work.

To prepare the young men in the future to meet all reasonable requirements, an ice cream department has just been established and equipped with all needed machinery—freezers, ice crushers, holding tank, mixing vat, etc.—and will be run for a week following the regular four weeks in butter and cheese making. It will be taught by a butter and ice cream-maker, and from the standpoint of the local creamery, rather than from that of a city enterprise.

Milk Testing is one of the few things that can be taught in school better than in the factory.

Milk, as well as cream, is now purchased on the fat basis, and it is imperative that factory operators know, not only how to make the tests, but also be able to figure correctly the results obtained. The test room is provided with both steam and hand testers: Lactometers for the detection of adulteration, the latest salt test, and moisture test. To be able to test for salt and for moisture in the butter, as well as fat and acid in the cream, is now demanded of most butter-makers, and here opportunity is given to learn how.

Pure Cultures and Starters are given close attention, for it is now well known that very much, in fact most, of the flavor of butter is due to the kind and extent of growth of the bacteria which are always to be found in milk or are made to grow in the cream. Each student is

provided with pure cultures, as well as jars and dippers for handling starters. Large starter cans of different make are used daily—thus the student has splendid opportunity to study the results obtained by different methods of handling. A room is set apart for this particular class of work and ample provision is made to aid the student in learning.

The Engine Room is an important place in a creamery, consequently careful instruction is given in the construction, care, and handling of boilers, engines, pumps, injectors, feed water heaters, and other appliances.

Setting machinery, pipe fitting, soldering, lining up shafting,



CLASS WORK IN THE STARTER ROOM.

lacing belts, and other similarly necessary work are studied by means of machinery placed in the hands of the students. Both steam and gas engines are studied.

In all departments questions are encouraged and so cheerfully answered, that there is scarcely any problem pertaining to practical creamery management that is not discussed for the benefit of the students.

Factory Bookkeeping and Dairy Arithmetic are essentials to success in the business management of a plant.

All the essential features of creamery accounting, from the taking in of the milk or cream to the payment of the patrons from the net receipts, are thoroughly considered. The students do the actual figuring for one month's business of a creamery, in books provided. In addition all sorts of dairy and creamery problems are solved.

DAIRY SCHOOL, 1911

Aalid, Thos A.....	Emmons, Minn.
Ackerson, Martin	Bowlus, Minn.
Anderson, Sever	Forest City, Ia.
Anderson, Andrew J.....	Otisco, Minn.
Anderson, Peter L.....	Holt, Minn.
Anderson, Jos. F.....	Garfield, Minn.
Anderson, S. Selmer.....	New Richmond, Minn.
Anderson, Henry	Milaca, Minn.
Arlt, William	Glencoe, Minn.
Barhang, Otto G.....	Milaca, Minn.
Bartness, Arthur.....	Hartland, R. R. 2, Minn.
Berg, Harvey G.....	1501 E. 22d St., Minneapolis, Minn.
Bjorge, Alvin O.....	Beldenville, Wis.
Blake, Peter F.....	Pierz, Minn.
Bliss, J. A.....	McGregor, Ia.
Bohks, Henry J.....	St. Charles, Minn.
Bulkeley, F. L.....	Greene, Ia.
Carlson, Carl W.....	Rock Creek, Minn.
Carlson, Jens Peter.....	Ellendale, Minn.
Christenson, Alfred.....	Albert Lea, Minn.
Clark, B.....	Clear Lake, Wis.
Cliffgard, Arnie	Sisseton, S. D.
Crum, Howard T.....	McKenzie, N. D.
Erickson, Roy Harry.....	St. Peter, Minn.
Evans, Thomas.....	R. R. 1, New London, Minn.
Forsberg, Delphin A.....	Farwell, Minn.
Giles, C. J.....	Holland, Minn.
Grellong, Louis J.....	Erhard, Minn.
Goltz, Adam	Gilman, Minn.
Gross, Stephan J.....	Pierz, Minn.
Hair, Leon Bert.....	Byron, Minn.
Hansen, Johnnie.....	R. R. 2, Box 84, Albert Lea, Minn.
Hanson, Clarence	Berner, Minn.
Hanson, Helmer P.....	Hartland, Minn.
Herrell, Dudley.....	Augusta, Wis.
Hultstrand, Oscar B.....	Parker's Prairie, Minn.
Imsdahl, Harold	Brooten, Minn.
Irey, Geo. F.....	Erhard, Minn.
Janning, Herman	Pierz, Minn.
Jensen, Hans J.....	Nelson, Minn.
Johnsen, John	Evan, Minn.
Johnson, Clarence.....	New Richland, Minn.
Johnson, Clarence L.....	Clayton, Wis.
Jones, William L.....	203 W. 5th St., St. Paul, Minn.
Knutson, Abraham	Santiago, Minn.
Kristoffersen, H.....	Brandon, Minn.
Kuhnley, C. H.....	322 Central Ave., Mpls., Minn.

Landon, Albert G.	Dover, Minn.
Lehmberg, Fred, Jr.	Hutchinson, Minn.
Lerfeld, Ole M.	Clarissa, Minn.
Leiter, John	(Present address Holdingford, Minn.) Pierz, Minn.
Linander, H.	Richardson, Wis.
Livingston, Russel A.	St. Peter, Minn.
Luebke, J. C.	Waconia, Minn.
Lundborg, John	Brooks, Minn.
Lundgren, Harry	Gibbon, Minn.
Markus, Frank.	Wahpeton, N. D.
Martinson, Oscar.	R. R. 2, Burtrum, Minn.
Meyers, M.	R. R. 8, Owatonna, Minn.
Mieseler, George.	Cologne, Minn.
Mischke, Aug.	Theilman, Minn.
Moe, Edw.	Barret, Minn.
Molmen, Ole	Wadena, Minn.
Nagel, Wm. Phillip.	New Ulm, Minn.
Nelson, Carl A.	Wood Lake, Minn.
Nelson, John G.	R. R. 1, Box 2, Olivia, Minn.
Norberg, Andrew	Cokato, Minn.
Olson, Arthur R.	Cokato, Minn.
Olson, Chas. Richard.	Ellendale, Minn.
Olson, Julius E.	Rice Lake, Wis.
Oman, C.	Atwater, Minn.
Oman, Emil G.	Little Falls, Minn.
Peterson, Edwin	Hallock, Minn.
Peterson, Geo. W.	Box 86, Chisago City, Minn.
Peterson, Oscar C.	St. Hilaire, Minn.
Peterson, Otto H.	Chisago City, Minn.
Prange, H.	Wells, Minn.
Reinke, Frank.	New Salem, N. D.
Roberts, Jesse T.	Annandale, Minn.
Rose, Oliver	Princeton, Minn.
Rusley, Sever	Lake Mills, Ia.
Schlosser, Frank C. V.	Box 142, Osakis, Minn.
Schultz, Fred	Bertha, Minn.
Sham, Samuel S.	Princeton, Minn.
Skoglund, Gust	Eagle Bend, Minn.
Stamnes, Oscar	Newfolden, Minn.
Stenberg, Hilmer L.	2717 Penn Ave. N., Mpls., Minn.
Stratton, Geo.	Good Thunder, Minn.
Swanberg, Andrew J.	Grantsburg, Wis.
Vigen, John	Marietta, Minn.
Wass, G.	Lancaster, Minn.
Weis, D. C.	Pine Island, Minn.
Wennberg, O. A.	Clearbrook, Minn.
Wenzel, Wm. C.	Eitzen, Minn.
Willie, Frank.	Battle Lake, Minn.
Wittnebel, R.	Garfield, Minn.
Zierke, Chas. Otto.	Glencoe, Minn.

GRANTED DAIRY CERTIFICATES

November, 1911

Dannheim, A. H.	Good Thunder
Dummer, O. F.	Odessa
Hagberg, Geo.	Cokato
Hagen, S. H.	Jackson
Hansen, Joe	Sebeka
Jacobs, Lewis M.	Buckman
Johnson, Elmer	Floodwood
Johnson, Frank A.	North Branch
Johnson, Peter O.	Lowry
Knudson, Gust	Armstrong
Kristensen, Peter	R. R. 1, Luck, Wis.
Larson, Hilmer.	Pine River
Miller, Edw. E.	Pine Island
Nielson, Martin A.	Porter
Oman, Emil G.	Little Falls
Pace, Frank A.	Newfolden
Peterson, Theo.	Maple Plain
Poppler, John, Jr.	Audubon
Ramstad, E. S.	Waubon
Rentz, A. C.	Brownsdale
Röhe, Fred M.	Osseo
Schons, M. A.	Courtland
Schuelke, W. F.	Clearwater
Stiles, Richard K.	Woodland
Wieland, Aug. W.	New Ulm