

THE UNIVERSITY OF MINNESOTA

BULLETIN

Vol. 14

JUNE 15, 1899.

No. 8

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MINNEAPOLIS, MINN.

The University Bulletins are published by authority of the Board of Regents, six times a year,—every six weeks during the University year. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them. In calling for bulletins, please state department of the University concerning which you desire information. Address

THE REGISTRAR,

The University of Minnesota,

Minneapolis, Minn.

THE UNIVERSITY OF MINNESOTA

CATALOGUE

FOR THE YEAR

1898-1899

AND

ANNOUNCEMENTS

FOR THE YEAR

1899-1900



BY THE UNIVERSITY

MINNEAPOLIS

1899

The University

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

THE GRADUATE DEPARTMENT.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

The School of Technical and Applied Chemistry.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS,

THE SCHOOL OF MINES.

THE COLLEGE OF AGRICULTURE.

The School of Agriculture.

The Dairy School.

THE COLLEGE OF LAW.

THE DEPARTMENT OF MEDICINE, composed of colleges as follows:

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

The Regents of the University have also entrusted to their charge

THE EXPERIMENT STATION;

THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

THE GRADUATE DEPARTMENT. In each of the colleges, except that of Medicine, there are advanced courses of study leading to second degrees. These courses are open to graduates of any reputable college upon presentation of diploma.

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS there are four four-year courses of study, the classical, scientific, literary and civic. The classical course offers for its leading studies the Greek and Latin languages; the scientific course, the natural and physical sciences; the literary course, the modern languages; the civic course, history and philosophy. The completion of the courses leads respectively to the degrees: bachelor of arts, bachelor of science, bachelor of literature, and bachelor of philosophy. The advanced degrees offered in this college are: master of arts, science, literature and philosophy, and doctor of philosophy.

The School of Technical and Applied Chemistry, leading to the degree of bachelor of science, is also organized as a part of this college.

A Summer School for Teachers. A four weeks' course of instruction is offered, in various University subjects, for those whose school duties prevent them from taking the regular University courses.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical and electrical engineering; leading to the degrees of civil, mechanical and electrical engineer. This college also offers graduate work leading to the degree master of science.

THE SCHOOL OF MINES offers a four years' course of study in mining and metallurgy; upon the completion of which the degrees engineer of mines, and metallurgical engineer are conferred.

THE COLLEGE OF AGRICULTURE offers a regular course in agriculture of four years of college work; the degree of bachelor of agriculture is conferred on completion of the course.

THE SCHOOL OF AGRICULTURE is open to both men and women, and is a training school for practical farm life and in domestic economy. The college of agriculture is open to graduates of this school.

A Dairy School offers practical instruction in dairying to those who have had some experience in conducting a dairy.

THE COLLEGE OF LAW offers a three years' course of instruction, leading to the degree of bachelor of laws. There is an evening class in this college leading to the same degree. This college offers graduate work leading to the degrees, master of laws, and doctor of civil laws.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY each offers a four years' course of study, of eight months each; upon completion of the prescribed course the degree of doctor of medicine is conferred.

THE COLLEGE OF DENTISTRY offers a three years' course of study of nine months each; upon completion of the prescribed course the degree of doctor of dental medicine is conferred.

THE COLLEGE OF PHARMACY offers a two or three years' course of study, leading to the degree of pharmaceutical chemist. This college also offers graduate work leading to the degrees, master of pharmacy, and doctor of pharmacy.

SPECIAL COURSES. In each of the colleges, students, of an advanced age and adequate preparation, are permitted to pursue, under the direction of the faculty, one or two distinct lines of study.

Catalogues of any department sent free to any address, upon application. The full catalogue will be sent only upon receipt of ten cents to cover postage. Address,

THE REGISTRAR,

University of Minnesota,
Minneapolis, Minn.

Organization.

The University was originally organized in 1851; it was re-organized in 1860, 1864 and 1868, and dates its actual beginning from the last named year.

The University is organized under the following act:

AN ACT to re-organize and provide for the Government and regulation of the University of Minnesota, and to establish an Agricultural College therein.

As amended by Chapter X of the General Laws of 1872:

AN ACT to amend Chapter I of the Session Laws of 1868, relating to the University of Minnesota.

SECTION 1. The object of the University of Minnesota, established by the Constitution at or near the Falls of St. Anthony, shall be to provide the means of acquiring a thorough knowledge of the various branches of literature, science and the arts, and such branches of learning as are related to agriculture and the mechanic arts, including military tactics and other scientific and classical studies.

SEC. 2. There shall be established in the University of Minnesota five or more colleges or departments, that is to say, a College of Science, Literature and the Arts, a College of Agriculture, including "military tactics," a College of the Mechanic Arts, a College or Department of Law, and also a College or Department of Medicine. The Department of Elementary Instruction may be dispensed with at such a rate and in such wise as may seem just and proper to the Board of Regents.

SEC. 3. The government of the University shall be vested in a board of ten Regents, of which the Governor of the State, the State Superintendent of Public Instruction, and the President of the University, shall be members *ex-officio*, and the remaining seven members thereof shall be appointed by the Governor, by and with the advice and consent of the Senate. Whenever a vacancy occurs therein, for any cause, the same shall be filled for the unexpired term in the same manner. Of the Regents thus appointed, two shall be commissioned and hold their offices for one year, and two for two years, and three for three years. Their successors shall be appointed in like manner, and shall hold their offices for the full term of three years from the first Wednesday of March succeeding their appointments, and until their successors are appointed and qualified. The President of the University shall have the same rights, powers and privileges as other members, *except the right of voting, and shall be, *ex-officio*, the Corresponding Secretary of the Board of Regents.

SEC. 4. The Regents of the University shall constitute a body corporate, under the name and style of "The University of Minnesota;" and by that name may sue and be sued, contract and be contracted with, make and use a common seal and alter the same at pleasure; a majority of the voting members shall constitute a quorum for the transaction of business, and a less number may adjourn from time to time.

SEC. 5. The Board of Regents shall elect from the members of the Board a President of the Board, [a] Recording Secretary and [a] Treasurer, who shall hold their respective offices during the pleasure of the Board. And the President and Treasurer each before entering upon the duties of his office, shall execute a bond in the penal sum of fifty thousand dollars, with at least two sufficient sureties, to the State of Minnesota, to be approved by the Governor, conditioned for the faithful and honest performance of the duties of his office according to law, which bonds, when so approved, shall be filed at the office of the Secretary of State.

SEC. 6. The Board of Regents shall have the power, and it shall be their duty, to enact by-laws for the government of the University of Minnesota in all its departments; to elect a President of the University, and, in their discretion, a Vice-President, and the requisite number of professors, instructors, officers and employes, and to fix their salaries, [and] also the term of office of each, and to determine the moral and educational qualifications of applicants for admission, and in the appointment of professors, instructors and other officers, and assistants of the University, and in prescribing the studies and exercises thereof; and, in all the management and government thereof, no partiality or preference shall be shown to one sect or religious denomination over another; nor shall anything sectarian be taught therein. And the Board of Regents shall have the power to regulate the course of instruction, and (to) prescribe the books and authorities to be used, and also to confer such degrees and grant such diplomas as is usual, in their discretion. It shall be the duty of the Recording Secretary to record all the proceedings of the Board, and carefully preserve all its books and papers; and before entering upon the duties of his office he shall take and subscribe an oath to perform his duties honestly and faithfully as such officer. It shall be the duty of the

*By the later act the President has been given a vote.

Treasurer to keep an exact and faithful account of all moneys, bills receivable and evidence of indebtedness, and all securities of property received or paid out by him, and before entering upon his duties shall take and subscribe an oath that he will well and faithfully perform the duties of Treasurer thereof. It shall be the duty of the President to preside at the meetings of the Board; and in case of his inability to preside, the Board may appoint a President *pro tempore*.

SEC. 7. In addition to all the rights, immunities, franchises and endowments heretofore granted or conferred upon the University of Minnesota, for the endowment, support and maintenance thereof, there shall be and is hereby inviolably appropriated and placed at the disposal of the Board of Regents thereof, to be drawn from the State treasury upon the order of the President, drawn upon the State Auditor, countersigned by the Secretary of the Board and payable to the order of the Treasurer of the Board, all the interest and income of the fund to be derived from the sale of all lands granted and to be granted to the State of Minnesota by virtue of an act of Congress, entitled "An act donating lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," approved July 2d, 1867, and also all such gifts, grants and contributions to the endowment thereof as may be derived from any and all such sources.

SEC. 8. And in order to effect a settlement of all remaining indebtedness of the University, all the powers and authorities given by Chapter 18 of the laws of 1864, entitled "An act relating to the University of Minnesota," and Chapter 11 of the laws of 1866, entitled "An act to amend an act relating to the University of Minnesota, approved March 4, 1864," to the Regents therein mentioned, are hereby given to and conferred upon the Board of Regents of the University of Minnesota aforesaid, and the said acts are hereby continued and shall be in force until such outstanding indebtedness is fully liquidated.

SEC. 9. The first meeting of the first Board of Regents under the provisions of this act, shall be holden at the University building on the first Wednesday in March, 1868, at which meeting the officers of the Board shall be elected, and the annual meetings of the Board shall be holden on the second Tuesday in December in each and every year thereafter.

SEC. 10. Any person or persons contributing a sum of not less than fifteen thousand dollars shall have the privilege of endowing a professorship in the University, the name and object of which shall be designated by the Board of Regents.

SEC. 11. The said Board of Regents shall succeed to and have control of the books, records, building and all other property of the University; and the present Board of Regents shall be dissolved immediately upon the organization of the Board herein provided for; *Provided*, that all contracts made and at that time, binding upon the Board then dissolved, shall be assumed and discharged by their successors in office.

SEC. 12. It shall be the duty of the Board of Regents herein provided for, to make arrangements for securing suitable lands, pursuant to the act of Congress, above mentioned, in the vicinity of the University, for an experimental farm; and as soon thereafter as may be to make such improvements thereon as will render the same available for experimental purposes in connection with the course in the agricultural college, and for such purpose the Board of Regents is hereby authorized to expend a sum not exceeding the amount specified by the act of Congress aforesaid.

SEC. 13. On or before the second Tuesday in December in each and every year, the Board of Regents, through their President, shall make a report to the Governor, showing in detail the progress and condition of the University during the previous University year, the wants of the institution in all its various departments—the nature, costs and results of all improvements, experiments and investigations, the number of professors and students—the amounts of money received and disbursed—and such other matters, including industrial and economic statistics, as they deem important or useful. One copy of said report shall be transmitted to each of the other colleges endowed under the provisions of the said act of Congress, and one copy to the Secretary of the Interior.

SEC. 14. The President of the University shall be the President of the general faculty and of the special faculties of the several departments or colleges, and the executive head of the institution in all its departments. As such officer, he shall have authority, subject to the Board of Regents, to give general direction to the practical affairs and scientific investigations of the University, and in the recess of the Board of Regents to remove any employe or subordinate officer not a member of the faculty, and supply for the time being any vacancies thus created. He shall perform the customary duties of a corresponding secretary, and may be charged with the duties of one of the professorships. He shall make to the Superintendent of Public Instruction, on or before the second Tuesday in December in each and every year, a report, showing in detail the progress and condition of the University during the previous University year—the number of professors and students in the several departments—and such other matters relating to the proper educational work of the institution as he shall deem useful. It shall be the duty of the President of the University to make to the Board of Regents, on or before the second Tuesday in December in each and every year, a report showing in detail the progress and condition of the University during the previous University year—the nature and results of all important experiments and investigations, and such other matters, including economic and industrial facts and statistics as he shall deem useful.

SEC. 15. Chapter eighty of the laws of eighteen hundred and sixty, chapter eighty-seven of the laws of eighteen hundred and sixty-two, and so much and such parts of any and all acts and laws, whether general or special, as are inconsistent with the provisions of this act, are hereby repealed.

SEC. 16. This act shall take effect and be in force from and after its passage.

Approved February 18, 1868. Act to amend approved February 29, 1872.

Board of Regents

The HON. JOHN S. PILLSBURY, MINNEAPOLIS,	-	-	-	-	-	<i>Regent for Life</i>
The HON. JOHN LIND, New Ulm, ^{St. Paul,} The Governor of the State.	-	-	-	-	-	<i>Ex-Officio</i>
CYRUS NORTHPROP, LL. D., MINNEAPOLIS, The President of the University.	-	-	-	-	-	<i>Ex-Officio</i>
The HON. JOHN H. LEWIS, B. A., HASTINGS, The State Superintendent of Public Instruction.	-	-	-	-	-	<i>Ex-Officio</i>
The HON. STEPHEN MAHONEY, B. A., MINNEAPOLIS,	-	-	-	-	-	1901
The HON. SIDNEY M. OWEN, MINNEAPOLIS,	-	-	-	-	-	1901
The HON. ALPHONSO BARTO, ST. CLOUD,	-	-	-	-	-	1902
The HON. THOMAS WILSON, ST. PAUL,	-	-	-	-	-	1902
The HON. WILLIAM M. LIGGETT, BENSON,	-	-	-	-	-	1903
The HON. A. E. RICE, WILLMAR,	-	-	-	-	-	1903
The HON. ELMER E. ADAMS, B. A., FERGUS FALLS,	-	-	-	-	-	1903
The HON. GREENLEAF CLARK, M. A., ST. PAUL,	-	-	-	-	-	1904
The REV. SAMUEL G. SMITH, D. D., ST. PAUL,	-	-	-	-	-	1904

OFFICERS.

The HON. JOHN S. PILLSBURY, *President.*

PRESIDENT CYRUS NORTHPROP, LL. D., *Corresponding Secretary.*

STEPHEN MAHONEY, B. A., *Recording Secretary.*

JOSEPH E. WARE, *Treasurer.*
(St. Anthony Falls Bank.)

Executive Officers

THE UNIVERSITY.

CYRUS NORTHRUP, LL. D., *President.*
E. BIRD JOHNSON, B. S., *Registrar.*
D. W. SPRAGUE, *Accountant.*

THE COLLEGES.

WILLIAM M. LIGGETT, *Dean of Department of Agriculture.*
WILLIAM S. PATTEE, LL. D., *Dean of the College of Law.*
PARKS RITCHIE, M. D., *Dean of the College of Medicine and Surgery.*
ALONZO P. WILLIAMSON, M. D., *Dean of the College of Homeopathic Medicine and Surgery.*
WILLIAM P. DICKINSON, D. D. S., *Secretary of the College of Dentistry.*
FREDERICK J. WULLING, PH. G., *Dean of the College of Pharmacy.*
HENRY WEBB BREWSTER, PH. D., *Principal of the School of Agriculture.*

LIBRARY AND MUSEUMS.

WILLIAM WATTS FOLWELL, LL. D., *Librarian.*
LETTIE M. CRAFTS, B. L., *Assistant Librarian.*
INA FIRKINS, B. L., *Library Assistant.*
ANNA L. GUTHRIE, B. A., *Library Assistant.*
FLORENCE A. BREWSTER, *Librarian of School of Agriculture.*
EDITH BOWEN, *Librarian of Department of Medicine.*
RANSOM J. POWELL, *Librarian of the College of Law.*
NEWTON H. WINCHELL, M. A., *Curator of the Geological Museum.*
CHRISTOPHER W. HALL, M. A., *Assistant Curator.*
HENRY F. NACHTRIEB, B. S., *Curator of the Zoological Museum.*

ALLEN W. GUILD, *Superintendent of Buildings.*

CALENDAR FOR 1899-1900.

1899.

1900.

JULY.

S.	M.	T.	W.	T.	F.	S.
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

AUGUST.

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..

SEPTEMBER.

..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
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OCTOBER.

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1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31

NOVEMBER.

..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30
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DECEMBER.

..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31

JANUARY.

S.	M.	T.	W.	T.	F.	S.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31
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FEBRUARY.

..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28
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MARCH.

..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
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APRIL.

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1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30

MAY.

..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..

JUNE.

..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
..

University Calendar, 1899-1900

FIRST TERM.

SEPTEMBER	5	T	Entrance examinations and registration.	
	6	W	" " " "	
	7	T	" " " "	
	8	F	" " " "	
	9	S	" " " "	I W
	11	M	Examinations end and registration continued	
	12	T	Registration completed and classes called at 10:45.	
	15	F	(First College classes organized, 1869.	
	16	S	.....	2 W
	23	S	.....	3 W
	30	S	.....	4 W
OCTOBER	7	S	.....	5 W
	14	S	.....	6 W
	21	S	.....	7 W
	28	S	.....	8 W
NOVEMBER	4	S	.....	9 W
	11	S	.....	10 W
	13	M	Examinations for conditioned students.	
	18	S	.....	11 W
	20	M	Examinations for conditioned students.	
	25	S	Term examinations, I and II hour work.....	12 W
	27	M	" " III and IV hour work.	
	28	T	" " V and VI hour work.	
	29	W	" " VII and VIII hour work.	
	30	T	THANKSGIVING DAY.	
DECEMBER	2	S	.....	13 W

SECOND TERM.

DECEMBER	4	M	Registration for second term completed.	
	5	T	Classes called for regular work	
	9	S	.....	I W
	12	T	Annual Meeting of the Board of Regents.	
	16	S	.....	2 W
	23	S	Holiday Recess begins (no classes).....	3 W
	25	M	CHRISTMAS DAY.	

JANUARY	1	M	NEW YEAR'S DAY.	
	9	T	Work resumed in all departments.	
	13	S	.....	4 W
	20	S	.....	5 W
	28	S	.....	6 W
FEBRUARY	3	S	.....	7 W
	5	M	Examinations for conditioned students.	
	10	S	.....	8 W
	12	M	LINCOLN'S BIRTHDAY.	
	17	S	.....	9 W
	18	S	University Charter, 1868. General Sibley died, 1891.	
	19	M	Examinations for conditioned students.	
	22	T	WASHINGTON'S BIRTHDAY—Holiday.	
	24	S	.....	10 W
MARCH	3	S	.....	11 W
	7	W	Term Examinations, I and II hour work.	
	8	T	" " III and IV hour work.	
	9	F	" " V and VI hour work.	
	10	S	" " VII and VIII hour work.	12 W

THIRD TERM.

MARCH	12	M	Registration for third term completed.	
	13	T	Classes called for regular work.	
	17	S	.....	1 W
	24	S	.....	2 W
	31	S	.....	3 W
APRIL	7	S	.....	4 W
	14	S	.....	5 W
	21	S	.....	6 W
	28	S	.....	7 W
MAY	5	S	.....	8 W
	12	S	.....	9 W
	19	S	.....	10 W
	22	T	Senior Examinations begin.	
	26	S	.....	11 W
	29	T	Term Examinations, I and II hour work.	
	30	W	MEMORIAL DAY—Holiday.	
	31	T	Term Examinations, III and IV hour work.	
JUNE	1	F	" " V and VI hour work.	
	2	S	" " VII and VIII hour work.....	12 W

COMMENCEMENT WEEK.

SUNDAY	JUNE 3	BACCALAUREATE SERVICE, - - - - 3:00 P. M.
		ALUMNI PRAYER MEETING, - - - - 10:00 A. M.
MONDAY	JUNE 4	SENIOR CLASS EXERCISES—Announcement by the class.
TUESDAY	JUNE 5	SENIOR PROMENADE—Announcement by class, 8:00 P. M.
WEDNESDAY	JUNE 6	ALUMNI DAY—Meeting of Alumni, - - - 7:30 P. M.
		ADDRESS BEFORE COLLEGE OF LAW, - - - 3:00 P. M.
THURSDAY	JUNE 7	COMMENCEMENT DAY—The Twenty-eighth Annual Com-
		mencement.
		Graduating Exercises, - - - - 9:00 A. M.
		Alumni Banquet and President's Reception, 2:00 P. M.
FRIDAY	JUNE 8	SUMMER VACATION BEGINS, - - - - 13 W
		The year 1900-1901 will begin September 4, 1900.

PROGRAM OF EXAMINATIONS, SEPTEMBER, 1899.

The number placed after the subjects, when given, indicates the room in which the examinations will be held.

DAY.	HOUR.	Subjects for admission to the freshman class.	For students conditioned in the work of first term freshman and sophomore year.
TUESDAY,	8:00-10:30	†English Classics.....13	
September,	10:45- 1:15	*English Composition..1	
5	2:30- 5:00	*Elementary Algebra...22	
WEDNESDAY,	8:00-10:30	*Higher Algebra .....22	{*Fresh. and Soph. Mathematics.22 §Sophomore Physics..... 9 §Soph. and Fresh. Chemistry. .20
September,	10:45- 1:15	{ History, Gr. and R... } { English History..... } 17 { Medieval History.... }	{*Fresh. and Soph. Latin..... 4 †Fresh. and Soph. English.....13
6	2:30- 5:00	*Plane Geometry.....22	
THURSDAY,	8:00-10:30	*Solid Geometry.....22	{*Soph. and Fresh. French.....29 {*Soph. and Fresh. German.....21
September,	10:45- 1:15	§Chemistry.....20	*Fresh. and Soph. Greek.....20
7	2:30- 5:00	§Physics..... 9	
FRIDAY,	8:30-10:30	{ †Psychology..... } 35 { Zoology..... } 35	†Soph. and Fresh. Botany..... 29 †Soph. and Fresh. Zoology..... 35
September,	10:45- 1:15	{ †Botany..... } 29 { *Greek..... } 20	†Sophomore History.....17
	2:30- 5:00	*Latin Grammar.....	
SATURDAY,	8:00-10:30	*Cæsar..... 4	
September,	10:45- 1:15	*Cicero..... 4	
9	2:30- 5:00	{ *Vergil..... } 4 { †English..... } 13	
MONDAY,	8:00-10:30	{ *French..... } 29 { *German..... } 21	
September,			
11			

Students conditioned in work of the *first term*, not mentioned in the above schedule, will arrange with the professors concerned to take their examinations some time during the week.

* Main Building; † Library Building; ‡ Pillsbury Hall; §Chemical and Physical Laboratory Building.

Faculty and Instructors.

CYRUS NORTHROP, LL. D., President	519 Tenth Avenue S. E.
WILLIAM W. FOLWELL, LL. D., Professor of Political Science; Lecturer on International Law; Librarian.	1029 Fifth Street S. E.
JABEZ BROOKS, D. D., Senior Professor of the Greek Language and Literature.	1708 Laurel Avenue
NEWTON H. WINCHELL, M. A., Professor of Geology and Mineralogy; in charge of the Geological Survey; Curator of the Geological Museum.	129 State Street S. E.
CHARLES N. HEWITT, M. D., LL. D., Professor of Sanitary Science.	Red Wing
JOHN G. MOORE, B. A., Professor of the German Language and Literature.	2810 University Avenue S. E.
CHRISTOPHER W. HALL, M. A., Professor of Geology and Mineralogy; Assistant Curator of the Museum.	803 University Avenue S. E.
JOHN C. HUTCHINSON, B. A., Professor of Greek Language and Literature.	3806 Blaisdell Avenue
JOHN S. CLARK, B. A., Professor of the Latin Language and Literature.	729 Tenth Avenue S. E.
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Guaranty Loan Law Library	9,000 volumes
N. Y. Life Insurance Law Library	8,000 volumes
Minnesota Academy of Natural Sciences (pamphlets and volumes)	7,000 titles

ST. PAUL.

State Historical Library	56,000 volumes
State Library	20,000 volumes
Public Library	32,000 volumes
Total	252,000 volumes

The general library of the University contains about fifty thousand bound volumes, besides many thousand volumes of pamphlets, magazines and reports. About one hundred and twenty periodicals are received regularly by the library, not inclusive of technical magazines and newspapers.

The library is open to students and the public from 8 a. m to 9:30 p. m. every day of the University year, except Sundays and legal holidays.

Beside the general library of the University, there are several special libraries, consisting mainly of books of reference and current periodicals relating to technical subjects in connection with several of the departments in engineering, botany, animal biology, law and medicine.

The law library contains the English and American reports most frequently cited, digests, dictionaries, and a full and excellent selection of standard text books. Further facilities are afforded the College of Law by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its extensive and ample library, located in Temple Court. It contains all the American reports, state and national, and also the English text books and reports so necessary for the student in his study of fundamental principles of jurisprudence. The State library,

containing everything which a student would have occasion to consult, located in the Capitol, St. Paul, and is within easy reach of the students.

The Nelson Law Library of 1,500 volumes donated to the University by the Hon. R. R. Nelson, of St. Paul, on his retirement from the Federal Bench, contains many rare English reports and treatises.

The Medical library contains a large and well assorted collection of books, sets of journals, bound and unbound pamphlets, relating to all branches of medicine. All of the leading medical journals are on file in the reading room. The various laboratories have also reference libraries devoted to their special lines of work.

The library has been greatly enriched by the bequest of the late Dean, Perry H. Millard, M. D., who bequeathed his entire private medical library to the department. This collection consists of several hundred volumes and pamphlets, including many rare and old medical works, sets of journals, especially rich in surgical works.

To all these library facilities may be added the Minneapolis Public Library, which is within easy reach of the University and is opened freely to the students of the University. The library contains over fifty-five thousand bound volumes; over fourteen hundred of the leading newspapers, magazines and periodicals of the world.

In the same building may be found the Museum of the Minnesota Academy of Natural Sciences, the art school of the Minneapolis Society of Fine Arts, and the art gallery, containing many masterpieces of painting, and a large number of casts from antique sculpture.

MUSEUMS.

The museums of the University contain materials obtained from various sources arranged with special reference to its use for illustration. Among the more notable collections are the following;

(a) *In Geology and Mineralogy*: The Kunz collection of minerals, purchased of George F. Kunz; several suites of crystalline rocks secured from various sources; the Ward collection of casts contributed in part by citizens of Minneapolis; collections of the 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 4,500 entries and more than 30,000 specimens; a series of 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.

(b) *In Zoology*: All the material collected by the State Zoologist; 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, corals and other foreign material.

The ornithological room contains the excellent Thomas S. Roberts and Franklin Benner collection of skins, nests and eggs of Minnesota birds. Other groups of animals are more or less numerous represented, and are receiving annual additions from the Zoological Survey.

(c) *In Botany*: The general herbarium, numbering about 175,000 specimens, and comprising the series of plants collected by the State Botanist; an alcoholic collection of material for dissection; a collection of woods of Minnesota; a limited series of carboniferous and cretaceous fossil plants, including the Lesquereaux collection from the Minnesota River localities.

(d) *The Museum of Technology*: A cabinet of specimens illustrating the products and processes of applied chemistry is being collected by the professor 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 woollen goods, earthenware, pottery, etc.

(e) *The Classical Museum*. Some material illustrating classical geography, topography, chronology, mythology, archæology and art has been collected, consisting mainly of plans and charts, casts, pictorial illustrations, fac-similes of manuscripts and inscriptions.

(f) *In English*. A few fac-similes of manuscripts, plates that may serve for the purpose of archæological instruction, publications of texts, reprints of blackletter books and of original editions, photographs and portraits have been gathered.

(g) *Civil Engineering*. The department is collecting samples of road material, typical of the various localities of the State; leading materials used in street paving, such as granite, trap rock, brick, and asphalt. A set of standard sections of steel and wrought iron is provided for illustration in the study of structural design.

(h) *Mechanical Engineering*: The collection consists of models of mechanical motions especially relating to the work in kinematics; sectioned apparatus, such as injectors, water meters and steam separators; various collections of drop forgings in iron, steel, and copper; miscellaneous samples of commercial work representing the product of special machines; groups of standard nuts, bolts and screws; samples of belting, ropes, steel and iron cables, rawhide gears, and other material especially useful for illustrative purposes.

(i) *Electrical Engineering Museum*: This museum contains a growing collection of samples furnished by various manufacturers and dealers for demonstrating the merits of different products and for illustrating modern practice; an excellent collection showing the development of electrical instruments, lightning arresters, switches, primary and secondary batteries, early forms of dynamos and motors, lighting apparatus and various industrial applications of electricity; also a collection of samples from repair shops and elsewhere, illustrating the effects of wear, accidents and abuse.

ASTRONOMICAL OBSERVATORY.

The students astronomical observatory contains a ten and one-half inch combined, visual, photographic and spectroscopic refracting telescope, constructed by Warner Swasey and Brashear; a photographic measuring machine by Repsold; a spectrometer by Brashear; a three-inch transit circle and chronograph by Fauth; a Howard Astronomical clock.

GYMNASIUM.

The gymnasium is located in the Armory and is well equipped with a variety of gymnastic appliances. 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. All young men are required to be examined by the medical director upon entering the University, and during their course as often as their physical condition may require. 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. Work in the gymnasium is required of all men in the freshman class, through the year, and the gymnasium is open at all times to all young men in 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.

General Information

THE UNIVERSITY YEAR.

The University year covers a period of thirty-eight weeks, beginning on the Tuesday before the first Thursday in September, and is divided into three terms. The first term has thirteen, the second twelve, and the third thirteen weeks. Commencement day comes on the first Thursday in June.

STUDENTS' SOCIETIES.

RELIGIOUS.

THE STUDENTS' CHRISTIAN ASSOCIATION was organized by the students and faculty of the University in 1869; its object being, as stated in the constitution, to promote growth in Christian character, and to engage in such religious work as may be deemed expedient and necessary.

The association owns a commodious building. The association is meant to be the rallying point of all the Christians in college. All persons in sympathy with the object of the association are eligible to membership.

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." The association rents the S. C. A. building and keeps it open, with a general secretary in charge, at all times. This building is meant to be the social and religious headquarters of all young men in the University.

The association maintains an employment bureau, whose services are free to students in all departments of the institution. In making application for assistance in this line, applicants should state—

1. The kind of work in which they have had experience.
2. The kind they would accept.
3. The amount of time they can give to it.
4. The proportion of the expenses which they must earn.
5. The college and class they expect to enter.

The association has a committee to help students to find comfortable rooms and boarding places. Students will be more apt to secure rooms as they desire them if they send word before coming to the University, telling the price they wish to pay.

The association maintains an educational department where students can make up their entrance conditions without any charge for instruction.

A Student's Hand Book, containing items of information, especially valuable to new students, is issued at the beginning of the college year. A copy will be sent free to any address after August 1st. Apply to the general secretary.

Address all inquiries to the General Secretary of the Y. M. C. A. of the University of Minnesota, Minneapolis, Minn.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION is the center of Christian life among the young women of the University, and its object is the development of Christian character in its members and the prosecution of active Christian work among the young women of the University. The association has a room in the library building, which they have furnished, and which is always open to members and their friends during the noon hour. Regular weekly prayer meetings are held; also Sunday afternoon meetings. One-third of the members belong to Bible classes which meet each week for one hour. Any young woman wishing information in regard to the University is invited to correspond with the president of the association.

LITERARY, SCIENTIFIC AND PHILOSOPHICAL.

Literary Societies—These societies do excellent work; they are mainly debating clubs. Every one is cordially invited to attend the literary sessions, but the business sessions are usually held with closed doors. Any one wishing to join should make early application to some member of the society he prefers, as the membership is limited.

Federated Literary Societies—A federation including the Delta Sigma, Shakopean, Law Literary, Forum, Castalian, Kent, Minerva and Hermean literary societies. Organized for the promotion of general literary and rhetorical work, and for management and support of the interstate and intersociety debates.

Delta Sigma—Membership limit, 35; gentlemen: *Shakopean*—Membership limit, 35; gentlemen: *Forum*—Membership limit, 30; gentlemen: *Minerva*—Membership limit, 30; ladies: *Law Literary*—Unlimited; law students: *Castalian*—Membership limit, 35; gentlemen: *Kent*—Membership limit, 30; law students: *Hermean*—Membership limit, 30; gentlemen.

The Philological Society—The object of the philological society is to promote philological investigation and study.

Societas Latina is a society in the department of Latin, having for its special aim the securing of greater proficiency in reading and writing Latin.

The Politico-Historical Union is a society organized among the graduate students of the University for the purpose of political and historical research and discussion.

The Graduate Club is a club organized for the purpose of fostering a greater interest in graduate work, for mutual help, and for the discussion of topics under investigation.

The Dramatic Club is organized for the study and practice of dramatic art.

The Engineer's Club meets once a week to listen to addresses by prominent engineers and for the discussion of various engineering topics.

The Geological Club is an organization of students interested in geological science, for the purpose of furthering their knowledge of that science.

The Scandinavian Literary Club is an organization whose purpose it is to promote interest in the study of Scandinavian literatures.

The Political Economy Club is organized for the purpose of promoting political science investigations and discussions.

The Oratorical Association has charge of home and inter-collegiate oratorical contests

The Economic Club meets twice a week for debate in economic and political subjects.

The Pedagogical Society is organized for the purpose of the investigation and discussion of pedagogical problems.

ATHLETICS.

The Athletic Association is an organization having for its object the general physical culture of the students, and the encouragement of a proper spirit in favor of hearty, manly sports.

SCHOLARSHIPS.

It is the policy of the University to establish scholarships in the different departments where extra help is needed for instruction, under regulations somewhat as follows:

1. The appointments are made by the executive committee of the Board of Regents, upon the recommendation of the department in which the appointment is desired, after approval by the general faculty.
2. Recipients of scholarships may be either graduate or under graduate students.
3. The scholarships are not intended as gifts or benefactions from the State to the recipients, but as provisions under which services may be rendered the University.
4. It is understood that these services are of a nature which shall assist the holder of a scholarship to attain to a mastery of some line of work in the department to which he is appointed.

PRIZES.

THE PILLSBURY PRIZES.

Three prizes of \$30, \$25 and \$20, offered by the Hon. J. S. Pillsbury, are awarded every year for the best work in the rhetorical department, as evidenced finally by an oration in public.

THE '89 MEMORIAL PRIZE IN HISTORY.

The class of 1889, at graduation, established a prize of \$25 each year, to be known as the *'89 Memorial Prize*, and to be given for the best thesis in history—the thesis to be based upon original research. The award is made by a professor of history in some other institution.

THE MOSES MARSTON SCHOLARSHIP IN ENGLISH.

Some of the friends and pupils of the late Professor Moses Marston, Ph. D., have given and pledged one thousand dollars as a memorial fund. The annual income of the fund is to be used to help some student in the long English course. The award of the income is made on the basis of pecuniary need and of deserving scholarship.

PRIZES IN ENGLISH.

The Hon. John B. Gilfillan offers \$75, in three prizes, for the best specimens of English prose.

PAIGE LAW PRIZE.

Professor James Paige of the College of Law offers an annual prize of forty prizes for the best thesis presented by any member of the graduating class.

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." This scholarship is assigned by the executive committee, upon the recommendation of the general faculty.

THE GILLETTE-HERZOG PRIZES.

The Gillette-Herzog Manufacturing Company offer for competition, by the students of the college of engineering and the mechanic arts, two annual prizes, viz:

A first cash prize of fifty dollars, accompanied by a gold medal.

A second cash prize of thirty dollars, accompanied by a gold medal.

The subjects admitted to competition are:

1. Civil engineering.
2. Mechanical engineering.
3. Electrical engineering.

THE SCHURMEIER PRIZE.

Hon. T. L. Schurmeier, of St. Paul, offers through the department of Political Science, a prize of twenty dollars for the best essay presented by an undergraduate student on the subject of "Government by Injunction." The essay must consist of three thousand words and should be handed to the professor of political science on or before May 1. Judges may reject any or all essays at their pleasure.

THE WILLIAM JENNINGS BRYAN PRIZE.

This distinguished citizen has given to the university the sum of \$250.00 for the encouragement of studies in political science. The annual income will be given as a prize to the writer of the best essay on government.

Twelve dollars will be available at the close of the year 1898-9 and will be paid to the author of the best essay on "Party Allegiance in Municipal Elections." The essays submitted must contain not less than 2000 nor more than 3000 words and must be handed to the professor of political science on or before May 1, 1899. The usual devices for securing impersonality must be adopted. The judges will be appointed by the president of the university.

PUBLICATIONS.

THE ARIEL.

The Ariel association is an association formed by the students of the University. A board of editors is elected annually, who publish a weekly paper called the "Ariel."

THE JUNIOR ANNUAL.

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 YEAR BOOK OF THE SOCIETY OF ENGINEERS.

The book is published yearly by the society of engineering students. It is devoted to the publication of articles upon engineering subjects by professors and students in the college of engineering and the mechanic arts.

EXPENSES.

In past years several students have kept careful account of their expenses for the University year. The following is a detailed report of the result.

STUDENT ONE was supported by his parents; the following is a statement of his expenses:

Board, 35 weeks (this leaves out of account a vacation of three weeks spent at home).....	\$122.50
Room, nine months.....	49.50
Text books.....	22.75
Street car fare.....	4.85
Railroad fare, six trips home.....	7.44
Clothing.....	62.50
Laundry.....	21.35
Sundries.....	22.65

Total for the year..... \$313.54

STUDENT TWO earned everything that he spent during the year. He began school in the fall with fifty dollars in the bank; at the end of the year

he had ten dollars in the bank. He earned his money by work as printer. The following is a statement of his expenses:

Board and room.....	\$160.00
Laundry.....	15.00
Medical attendance.....	20.00
Clothing.....	50.00
Books.....	30.00
Incidentals (this includes street car fare, railroad fare, etc.).....	30.00
Total for the year.....	\$305.00

STUDENT THREE worked for his table board, his parents paying most of his other expenses. The following is a statement of his expenses:

Board, 38 weeks.....	\$142.50
Room.....	34.68
Laundry.....	10.49
Books.....	18.39
Railroad fare and express.....	8.53
Street car fare.....	8.45
Clothing.....	26.29
Sundries.....	19.50
Total for the year.....	\$268.83
Received from parents.....	96.33
Earned for himself.....	\$172.50

STUDENT FOUR, a member of the senior class, paid expenses as follows:

Board, room, laundry and fraternity dues (39 weeks).....	\$208.75
Clothing.....	74.25
Class dues.....	8.25
Books.....	29.10
Stamps.....	3.41
Church donations and amusements.....	24.00
Railroad fare.....	16.25
Street car fare.....	4.95
Incidentals.....	27.23
Total.....	\$397.09

Of this amount he earned all but \$125 by working in an office. This statement includes all expenses incident to graduation and commencement week.

These students are fairly representative; they were neither extravagant nor did they deny themselves unduly to get along. Board could have been obtained in clubs at from fifty to seventy-five cents per week cheaper than any of them paid.

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 a 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 stu-

dent should bring enough money with him so that he can live comfortably for a few weeks until he can find something to do.

The following statement, while it can hardly be considered an average one, shows what students have done and what they can do. The young man has just completed his junior year with a record for scholarship decidedly above the average:

Class and society dues.....	\$6.00	
Room rent (9 months).....	36.25	
Board (39 weeks).....	85.05	
Laundry.....	9.95	
Books and stationery.....	13.95	
Street car fare.....	3.80	
Clothing.....	20.80	
Benevolence.....	17.35	
Miscellaneous.....	24.35	
Total expenses.....		\$217.50
Saved during summer.....	\$35.00	
Salary—janitor of church.....	225.00	
Other work.....	12.75	
		\$272.75
Expenses.....		217.50
Balance, over expenses.....		\$55.25

EXPENSES OF YOUNG WOMEN.

The following is the record of one of two sisters who kept house during their sophomore year:

Rent.....	\$ 40.75
Board, light, laundry.....	52.42
Fuel.....	7.25
Railroad fare and cartage.....	27.80
Street car fare.....	5.85
Stationery.....	3.97
Amusements and presents.....	10.56
Personals and clothing.....	72.51
Incidentals.....	18.94
Total expenses.....	\$240.05

The following is the record of a young lady who boarded in a private family:

Board.....	\$138.00
Room for nine months (four with room mate).....	58.00
Railroad fare.....	30.22
Street car fare.....	6.00
Text books.....	16.12
Clothing (besides that brought from home) and laundry.....	67.59
Fraternity and class dues, Christian association and other religious organization.....	20.19
Sundries.....	19.48
Total for the year.....	\$355.60

The following is a statement of expenses of a young lady during her freshman year in the medical department:

Board and room (32 weeks).....	\$128.00
Books and instruments.....	30.05
Railroad fare.....	21.00
University fee.....	100.00
Clothing and incidentals.....	72.65
Laundry.....	7.50
Total.....	\$359.20

The following is the record for a young lady during her freshman year in the college of science, literature and the arts.

Board, room, fuel and light.....	\$ 75.21
Clothing, besides that brought from home.....	32.63
Railroad fare, street car fare and cartage.....	9.32
Stationery.....	2.16
Books and fees.....	23.26
Y. W. C. A., fraternity and amusements.....	7.50
Laundry work done at home.....	\$150.08

The Young Men's Christian Association of the University last year offered two prizes of \$10 and \$5 for the best two papers relating the actual experiences of students in making their way through the University. The papers received relate the actual experiences of men who have made their way at the University. Several papers have been published in the hope that they might prove helpful to others who contemplate making their way through the University. The men who wrote these papers are all good students. They do not lead their classes in mere scholarship, as evidenced by the highest term average, but every one is recognized by his class-mates as being among the strong men of the class, and as leaders in University public life.

Students who contemplate making their way through college will find here stated the stern and unpleasant side as well as the brighter side of such a life. A copy of these papers will be sent free to any address upon application.

THE
GRADUATE DEPARTMENT

The Graduate Department

This department affords an extension of the work of the college of science, literature and arts, the college of engineering, and the mechanic arts, the school of mines and the college law. It meets the threefold purpose of extending general culture, for which master's degrees are offered; of encouraging the mastery a specialty, for which the degree of doctor of philosophy is given; of providing for those who desire a more thorough acquaintance with particular subjects than is offered in undergraduate work, but are not candidates for degrees.

REGISTRATION.

Those who wish to take any of these courses must present their application to the registrar, and register for whatever work they may wish to pursue. All students doing work in this department are required to pay a fee of ten dollars. Those doing laboratory work must pay the usual laboratory dues in addition to the regular fee.

THE MASTER'S DEGREE.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

I. The degree of master in science, literature and arts will be conferred on a bachelor of this or any other reputable college or university who, not sooner than one year after graduation, if in residence at this University, and not sooner than two years after graduation, if not in residence, shall pass an examination on certain prescribed lines of study, and present a satisfactory thesis.

II. A candidate for a degree is required to present his application on the proper blank, stating the particular degree desired, the several subjects selected in which to be examined, and the title of thesis. Graduates of other colleges or universities must present their diplomas or other credentials on filing their applications. After the approval of the application by the faculty of the college, no changes or departures will be permitted.

Applicants for graduate work shall be referred, with the necessary credentials, to the committee on graduate studies and degrees, who shall examine said applicant and report accordingly to the general faculty. Provided always, that the committee on graduate studies and degrees may pre-

scribe for the candidate such preliminary studies as they may deem necessary for entrance on his work. The registrar shall notify professors of the lines selected by the applicant in their department. Professors shall report to the general faculty early in the third term of each year, the names and work of the graduate students actively at work in their departments.

The professors in charge of the subjects pursued by the candidate for the master's degree, shall be the examining committee of said candidate, of which the professor in charge of the major subject selected, shall be the chairman, and shall make its report to the committee on graduate studies and degrees.

III. Tables of studies offered to candidates:

- A. Classical philology:
 1. Greek.
 2. Latin.
 3. Sanskrit.
 4. Semitic languages.
- B. Modern philology.
 1. English.
 2. French, (Spanish and Italian).
 3. German.
 4. Scandinavian languages.
- C. Biological sciences:
 1. Botany.
 2. Zoölogy.
 3. Paleontology.
- D. Physical sciences:
 1. Geology—lithological.
 2. Chemistry.
 3. Physics.
 4. Mineralogy.
- E. Mathematical sciences:
 1. Mathematics.
 2. Astronomy.
- F. Philosophical sciences:
 1. History.
 2. Economics.
 3. Political science.
 4. Philosophy.
 5. Pedagogy.
 6. Social science.
 7. Archæology.

IV. THE AMOUNT OF WORK done by the candidate shall be equivalent to that done by the senior class, viz: three terms of four subjects each term, with thesis in addition.

NOTE: It will be observed that this is equivalent to 12 terms of work on one subject. Hence, estimates of the time to be occupied will be stated in *twelfths* of a year.

V. METHOD OF SELECTING WORK:

1. The candidate shall select work in three distinct departments.
2. One of the subjects he shall indicate as a major, the other two as minors.
3. The candidate shall devote not less than six-twelfths of his work to the major, and not less than one-twelfth to each minor.
4. The thesis shall be on some theme connected with the major subject.

The following special regulations are to be observed with reference to the different degrees:

- a.* For the degree of Master of Arts at least one of the three subjects selected shall be from division A in the table in paragraph III.
- b.* For the degree of Master of Science at least one of the three subjects selected shall be from divisions C, D, E, F, in the same table.
- c.* For the degree of Master of Literature at least one of the three subjects shall be selected from division B in the same table.

VI. The proficiency of candidates shall be determined by examination only.

VII. All examinations shall be held at the University, at such time and in such manner as may be directed by the faculty. Provided, however, that the committee to examine each candidate shall consist of not less than three professors, and provided that the examinations must be completed by the second Thursday preceding commencement.

THE COLLEGE OF ENGINEERING, AND THE MECHANIC
ARTS AND THE SCHOOL OF MINES.

All regulations governing candidates for the Master's degree shall apply to the candidates for second degrees in the college of engineering and the mechanic arts and the school of mines, particularly as to the amount of work done, the method of selecting work, degree of proficiency expected and the time and manner of conducting the examination.

These courses are a continuation of the lines of undergraduate work in that department which has conferred upon the student his first degree. Upon the completion of a full year of work and by passing a satisfactory examination, with a technical thesis, the student is entitled to a second degree.

COLLEGE OF LAW.

For the benefit of those students who wish to pursue their legal studies further than they are able to do in the undergraduate course, graduate courses are offered.

See statement under department of law.

The object of this course is to afford opportunity to gain a broader view of jurisprudence and also to gain a greater familiarity with the particular practice of Minnesota.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws.

DEGREE OF DOCTOR OF PHILOSOPHY.

The degree of Doctor of Philosophy will be conferred on bachelors of this or any other reputable college or university within not less than three years after graduation therefrom, under the following conditions:

I. The candidate shall elect work in three distinct departments—a major subject in one department, and two minor subjects in other departments, and it shall be permissible for the committee on graduate studies and degrees to prescribe for the candidate such preliminary studies as they may deem necessary for entering upon the work. Within the major subject the candidate shall choose a special field.

The work included in a minor shall be equivalent to at least one year's work in one subject.

II. The candidate shall evince on his final examination an exhaustive knowledge of the special field selected, and shall show such acquaintance with the other studies of the major subject, and with the minor subjects as the faculty may require.

III. A committee, consisting of the heads of departments in which the candidate's subjects fall, shall have the direction of his work, subject to the approval of the faculty. The chairman of the committee shall be the professor in charge of the candidate's major subject.

IV. The candidate shall present a thesis on some subject connected with his special field of work, which thesis shall be the result of original investigation by the candidate, and shall be a contribution to knowledge.

V. Candidates for this degree shall ordinarily be required to devote three full years of graduate study to preparation for the final examination, but if the study be not the candidate's sole occupation during that period, then the time of preparation shall be extended as the faculty may deem proper.

VI. Candidates shall be in actual residence at the University and shall pursue their studies therein at least two years; they may, however, offer in lieu of one of these two years an equivalent term of resident graduate work in some other institution, it being always required that they be in residence at the University the year next preceding the final examination. Candidates shall be regarded as in residence only when they carry on their work, in all essential respects, at the University itself.

VII. At the beginning of the year next preceding his final examination, the candidate shall pass a preliminary examination on the work for his degree that he has done up to that time.

VIII. A fair copy of the thesis shall be placed in the hands of a committee of the faculty on or before the first day of April next preceding the final examination. No candidate shall be admitted to the final examination unless his thesis shall be approved by the committee. If the degree thereafter be conferred, at least one hundred printed copies of the thesis shall be deposited with the president of the University on or before the first day of January following.

IX. The final examination for this degree shall be held on or about the third Tuesday in May, as the president of the University may decide.

X. Both the preliminary and final examination for the degree of doctor of philosophy shall be held in the presence of the general faculty, and shall be conducted as the faculty may direct. A quorum for the examination shall be five.

XI. In addition to passing the final examination, the candidate shall make a public defense of his thesis at such time and place as the general faculty may determine.

Candidates for the degree of doctor of philosophy shall have a reading knowledge of German and French.

THE COLLEGE OF

SCIENCE

LITERATURE AND

THE ARTS

The College of Science, Literature and the Arts.

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
WILLIAM W. FOLWELL, LL. D., *Professor of Political Science.*
JABEZ BROOKS, D. D., *Senior Professor of Greek.*
CHARLES N. HEWITT, M. D., *Professor of Sanitary Science.*
JOHN G. MOORE, B. A., *Professor of German.*
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy.*
JOHN C. HUTCHINSON, B. A., *Professor of Greek.*
JOHN S. CLARK, B. A., *Professor of Latin.*
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics.*
MARIA L. SANFORD, *Professor of Rhetoric and Elocution.*
CHARLES W. BENTON, M. A., Litt. D., *Professor of French.*
O. J. BREA, *Professor of Scandinavian.*
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology.*
FREDERICK S. JONES, M. A., *Professor of Physics.*
CONWAY MACMILLAN, M. A., *Professor of Botany.*
FREDERICK J. E. WOODBRIDGE, M. A., *Professor of Philosophy.*
HARRY A. LEONHAEUSER, Lieut. U. S. A., *Professor of Military Science and Tactics.*
WILLIS M. WEST, M. A., *Professor of History.*
DAVID L. KIEHLE, LL. D., *Professor of Pedagogy.*
GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*
JAMES RICHARD JEWETT, Ph. D., *Weyerhaeuser Professor of Semitic Languages and History.*
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy and Director of the Observatory.*
CHARLES L. WELLS, Ph. D., *Professor of History.*
RICHARD BURTON, Ph. D., *Professor of English.*
FREDERICK KLAEBER, Ph. D., *Professor of Comparative and English Philology.*
MATILDA J. WILKIN, M. L., *Assistant Professor of German.*
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
JOSEPH BROWN PIKE, M. A., *Assistant Professor of Latin.*
EDWARD EUGENE MCDERMOTT, M. S., *Assistant Professor of Rhetoric and Elocution.*
D. T. MACDOUGAL, Ph. D., *Assistant Professor of Botany.*
WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*
JOHN ZELENY, B. S., *Assistant Professor of Physics.*
SAMUEL G. SMITH, D. D., *Lecturer on Sociology.*
CHARLES F. MCCLUMPHA, Ph. D., *Assistant Professor of English Literature.*
CHARLES P. SIGERFOOS, Ph. D., *Assistant Professor of Animal Biology.*
CHARLES H. HINTON, M. A., *Assistant Professor of Mathematics.*
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*
LOUIS J. COOK, M. D., *Director of the Gymnasium.*
FRANK M. ANDERSON, M. A., *Assistant Professor of History.*
FRANK L. MCVEY, Ph. D., *Assistant Professor of Political Science.*

INSTRUCTORS.

- CHARLES M. ANDRIST, M. L., *French and German*.
 CHARLES P. BERKEY, Ph. D., *Mineralogy*.
 EMMA BERTIN, *French*.
 AMELIA I. BURGESS, *Drawing*.
 HENRIETTA CLOPATH, *Drawing*.
 HENRY A. ERICKSON, B. E. E., *Physics*.
 OSCAR W. FIRKINS, M. A., *Rhetoric*.
 HARLOW S. GALE, B. A., *Psychology*.
 PAUL M. GLASOE, M. S., *Chemistry*.
 EVERHART P. HARDING, M. S., *Chemistry*.
 LOUISE G. KIEHLE, *Physical Culture*.
 JENNINGS C. LITZENBERG, B. S., *Assistant Physical Director*.
 OSCAR W. OESTLUND, M. A., *Animal Biology*.
 HENRY A. SANDERS, Ph. D., *Latin*.
 FREDERICK W. SARDESON, Ph. D., *Paleontology*.
 ALBERT SCHINZ, Ph. D., *French*.
 CARL SCHLENKER, B. A., *German*.
 JOSEPHINE E. TILDEN, M. S., *Cryptogamic Botany*.
 FRANK M. WARREN, *Military Drill*.
 NORMAN WILDE, Ph. D., *Philosophy*.
 HELEN A. WILDER, B. S., *Rhetoric*.
 ALICE YOUNG, M. L., *English*.
 ANTHONY ZELENY, M. S., *Physics*.

ASSISTANTS.

- FRANK H. KELLER, B. S., *Chemistry*.
 HOPE McDONALD, M. S., *History*.
 LEVI B. PEASE, B. S., *Chemistry*.
 FLORENCE POWELL, B. L., *Physical Culture*.
 HANNAH R. SEWALL, M. A., *Political Science*.

SCHOLARS.

- JOHN P. CURTIS, B. S., *Psychology*.
 CHESTER N. GOULD, B. A., *Rhetoric*.
 HARRY B. HUMPHREY, *Botany*.
 BERTRAM G. KNIGHT, B. S., *Physics*.
 BURT L. NEWKIRK, B. A., *Mathematics*.
 EDWARD P. SANFORD, *Rhetoric*.
 DAVID F. SWENSON, B. A., *Philosophy*.
 NELLIE A. WHITNEY, *Rhetoric*.
 CHARLES ZELENY, B. S., *Animal Biology*.

ADMISSION.

Examinations for admission are held only at the beginning of the year. See calendar and program of examinations.

Students prevented from entering at the beginning of the year may be admitted at a subsequent date, when the circumstances are such as to justify the action. Such students are, however, at a great disadvantage, and all students expecting to enter the University are urged to be present at the beginning of the year.

All applicants should present themselves to the registrar, who will furnish them with application blanks and directions how to proceed with their examinations and registration.

Entrance requirements for September 1899.

Students who present diplomas from any of the following named schools, or classes of schools, accompanied by a certificate showing the subjects represented by the diploma, are admitted to the freshman class without examination. Provided, **first**, that the schools granting such certificate maintain a full four years' course of high school work; and **second**, no student will be admitted if his certificate shows that he lacks more than **four** half year credits, or one full year and one half year credit, of the subjects required for admission to the course for which he applies.

1. Diplomas of any of the following named Minnesota high schools:

Albert Lea,	Little Falls.	Rochester.
Alexandria.	Luverne.	St. Cloud.
Anoka.	Mankato.	St. Paul—
Austin.	Marshall.	Central.
Chatfield.	Minneapolis,	Cleveland.
Crookston.	Central.	Humboldt.
Duluth.	East Side.	Mechanic Arts.
Faribault.	North Side.	St. Peter.
Fergus Falls.	South Side.	Sauk Center.
Glencoe.	Stanley Hall.	Spring Valley.
Hastings.	Minneapolis Academy.	Stillwater.
Henderson.	Northfield.	Waseca.
Hutchinson.	Owatonna.	Willmar.
Lake City.	Pillsbury Acad., Owatonna.	Winona.
Litchfield.	Red Wing.	Worthington.

The diplomas will be accepted for all that they represent of work actually completed. If subjects required for admission, have been omitted by the student in his preparatory work, he will be conditioned in those subjects and will be required to make them up, notwithstanding his diploma.

2. Diplomas from the advanced course of Minnesota normal schools.

3. Diplomas of any high school under the supervision of the State High School Board on the following conditions:

- (a) That the applicant present State High School Board certificates for eight (8) of the twelve (12) year-credits (exclusive of readings in English classics) required for admission to the University.
- (b) That he present in the form prescribed by the University the certificate of the principal of the high school for the remaining four (4) year-credits, and for a satisfactory course of reading in English classics.

4. Diplomas of schools in other states which would entitle the holder to admission to the freshman class of other reputable colleges or universities.

Blanks for the certificates mentioned above may be obtained from the registrar of the University. **No other forms of certificate will be accepted.**

5. High School Board certificates will be accepted in lieu of an examination in the subjects which they represent. Candidates for

admission, holding such certificates, should present them to the registrar at the time of making application for admission.

6. Candidates for admission who have credentials that are recognized by other reputable colleges or universities, which are not included in the foregoing list should present their credentials upon making application, and then take the examinations which may be prescribed by the enrollment committee. The result of the examinations will be considered, together with the other credentials, and each case will be passed upon by the enrollment committee and proper credit will be allowed.

In all cases the faculty reserves the right to require a student to take supplementary examinations, if he does not sustain himself creditably in his course.

Partial records will not be accepted, and will not exempt the holder from the examinations, even in the subjects which they represent. (An exception is made in the case of High School Board certificates.) That is, the certificates of principals of first-class high schools, and other recognized schools, will not be accepted for persons who have not completed the course prescribed and been regularly graduated by the said high school.

The enrollment committee will meet, to examine candidates with partial records, on the three first Mondays of each term. All candidates who present partial records after that date will be obliged to wait until the following term to be admitted. The examination of all such candidates will be conducted by the enrollment committee and may be an oral examination.

The enrollment committee will meet every day during the week commencing Sept. 5th, in room 25, main building, at 9 o'clock a. m.

Entrance requirements for 1900 and thereafter :

I. The University will admit graduates from any high school under the supervision of the State High School Board on the following conditions:

(1.) That the applicant present State High School Board certificates for eight (8) of the twelve (12) year-credits (exclusive of reading in English classics) required for admission to the University.

(2.) That he present in the form prescribed by the University, the certificate of the principal of the high school for the remaining four (4) year-credits, and for a satisfactory course of reading in English Classics.

II. The faculty has a standing committee of inspection for all academies and high schools not under the State High School Board supervision, whether within the state or elsewhere, and graduates from such schools as are approved by this committee, are admitted to the University on presenting, in such form as the University may prescribe, the principal's certificate covering all the work required in the respective courses, for admission to the University.

Credits in any subject not covered by the certificate, may be obtained by examination at the University.

All schools not under the supervision of the State High School Board, desiring to be accredited to the University, should make early application for inspection.

Advanced Standing--The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted just so far as they cover, or are an equivalent to, the work done in this University. In bringing records from other institutions, the certificate should show:

1. The subject studied; if a language, the work read, etc.
2. The time spent upon each subject.
3. The result—it is sufficient to state that the subject was creditably completed.

Records from institutions, whose entrance requirements are not essentially equivalent to the requirement of this University, will not be accepted unquestioned; the credit to be allowed will be decided in individual cases by the enrollment committee.

CHOOSING OF COURSES.

The courses of this college are open, free of all charge for instruction, to all persons over fourteen years of age, whether residents of the State or not. Applicants are free to select their course of study on admission, but cannot thereafter change them, except as allowed by vote of the faculty.

DAILY ROUTINE.

As a general rule each student has sixteen exercises a week, besides rhetorical work, which comes but once in the week, and gymnasium or physical culture work. Monday is taken as a holiday. The morning session begins at 8:30 o'clock; a general assembly of faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises.

EXAMINATIONS.

At the close of each term, examinations are held in the studies of the term. In order to be "passed" the student must obtain seventy-five per cent. In determining the standing of a student in any subject the result of his daily work in that subject is combined with the result of the final examination in the ratio of two to one.

Students who pursue any subject unsuccessfully are reported as "incomplete," "conditioned" or "failed." "Incomplete" worked must be made up within one term, at the convenience of the professor concerned, or become a "condition," subject to the rule governing conditions. "Conditions" not made up before the subject is offered again become "failures," subject to rule governing failures. "Failures must be taken over again in class. The examinations for conditioned students are held at the beginning of the fall term in the work of the fall term; at the beginning of the winter term in the work of the winter term; and at the beginning of the spring term in the work of the spring term.

A student who at any time is deficient in more than four studies of four hours per week, loses his class rank and is regarded as a member of the next lower class.

Students whose absences in any term exceed four weeks in the aggregate, are not permitted to take the term examinations without special permission of the faculty.

FAILURE TO KEEP UP WITH THE CLASS.

Any student of the freshman class who receives a "*condition*" or a "*failure*" on each of the four subjects of the first term, or on four of these subjects in the first and second terms, will be dropped from the rolls of the University, and not be allowed to re-enter the University until further preparation has been secured.

FEES.

All students in the college are required to pay an incidental fee of five dollars per term. No reduction is made for late entrance or for leaving before the end of the term. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

REGULATIONS REGARDING SEMINARS AND HONORS.

Honors are given for special work in departments on the following basis:

1. The student must have attained in his course at the close of the second term senior year, a general average of not less than ninety per cent.
2. He must have attained not less than ninety per cent in the department selected.
3. He must have taken at least three (3) terms of electives in the department selected.
4. He must have completed, in the department selected, seminar or individual work of high grade, equivalent in amount to one full term of regular work in one subject.
5. No student is allowed to enter upon this seminar work without a general standing of at least eighty-five per cent. at the time when he begins the work.
6. Double honors may be secured by taking seminar work in two departments. Seminar work does not count in a course for a degree.

GRADUATION.

Students completing courses of study to the satisfaction of the faculty of the college, are entitled to receive the appropriate baccalaureate degrees. Any person may undergo, at suitable times, examination in any subject; and if such person pass in all the studies and exercises of a course, he is entitled to the appropriate degree, **provided** however, that at least one full year must be spent at the University, before such degree shall be granted, and **provided**, the examination, in every case, be held before a committee of the faculty appointed for that purpose.

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS.

REQUIRED FOR ALL COURSES.

English.

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the requirements in English are outlined below somewhat in detail.

English Classics—(a).

A critical reading, in class, of English masterpieces, with composition work based upon the same. The following lists are suggested as well adapted for such study.

For the year 1900-1901—Shakspeare, "Macbeth;" Milton, "Paradise Lost," books i and ii; Burke, "Conciliation with America;" Macaulay, essays on "Milton" and "Addison,"

For the year 1901-1902—Shakspere, "The Merchant of Venice;" Burke, "Conciliation with America;" Scott, "Marmion;" Macaulay, "Life of Samuel Johnson."

For the year 1902-1903—Shakspere, "The Merchant of Venice;" Dryden, "Palamon and Arcite;" "The Sir Roger de Coverley Papers" in "The Spectator;" Tennyson, "The Princess;" Lowell, "The Vision of Sir Launfal."

In the study of these works the student should come to know the leading facts connected with the author and his time; he should be familiar with the subject matter of the work; thoroughly at home with the story; and have a clear idea of the form and structure of the work.

The teacher should call for frequent written exercises, such as will naturally suggest themselves. For instance, in "The Merchant of Venice," the following are among topics that might be selected:

The historical setting of the play; the Jew in Europe, as depicted by the play; Shakspere's purpose in the character of Shylock—to make him hateful or an object of pity; Portia's judgments; the comparison of certain characters.

English classics—(b).

A less critical knowledge of other standard or classic works, which may, perhaps, be read by the student at home, with written reports and brief oral discussions in class. Somewhat greater latitude is to be allowed here. The following works are noted as indicative of the minimum amount of work expected:

At least two of Shakspere's plays, beside the one studied critically.

One of Irving's works.

One of Hawthorne's novels.

Stevenson's "The Black Arrow."

One of Webster's orations.

In the case of graduates of schools under the supervision of the State High School Board, and of other accredited schools, the University will accept the principal's certificate, that a course of such reading, equivalent to three hours per week, for three years of the high school course, has been satisfactorily completed. Other candidates for admission, who, under the above rule, are not exempt from examination, in this subject, will be required to write an essay of not less than two hundred and fifty words upon a theme connected with one of the following named works:

(a) Shakspere, "Macbeth"; Milton, Paradise Lost"—books i and ii; Burke, "Conciliation with America"; Carlyle essay on "Burns".

(b) Any two of Shakspere's plays, beside the one studied critically.

One of Irving's works.

One of Hawthorne's novels.

Stevenson's "The Black Arrow."

One of Webster's orations.

English Composition and Rhetoric. (one year).

Candidates are expected to show a familiarity with the principles and technical terms in ordinary high school texts upon the subject, whether acquired by the direct study of such texts, or mainly by the study of selected English masterpieces. It should not be forgotten that the main purpose of this subject is to teach the student to use language correctly and forcibly. To this end the student should be given constant exercise in composition writing. A knowledge of the subject matter of the texts used will be considered of less importance than the demonstration of ability to write good English.

A full year of work in the high school, five hours per week, should be devoted to this subject. Examination questions will be sent out by the State High School Board, to all schools taking the examinations under the supervision of the board

Elementary Algebra (one year).

The elementary algebra of any one of the following authors will furnish the necessary preparation: Ray, Greenleaf, Wells, Sensenig, Thompson and Quinby, Wentworth (School), Taylor (academic), Milne (high school), Stringham-Smith, Collins. If Olney's Complete Algebra or Wentworth's Elements of Algebra be used, selections may be made equivalent to the above.

Higher Algebra (one-half year).

Factoring highest common divisor, lowest common multiple, fractions, involution, evolution, theory of exponents and radicals (including imaginaries) as found in Olney's University Algebra or equivalent.

A fuller treatment of these subjects than is found in elementary algebras is required, inasmuch as the work of the freshman class in higher algebra does not include them. Wentworth's College or Higher Algebra, Wells' College Algebra, Olney's University Algebra, or an equivalent, will furnish the necessary preparation.

Plane Geometry (one year)—Phillips and Fisher, Wentworth, or equivalent; including the unsolved problems.

Solid Geometry (one-half year)—Phillips and Fisher, Wentworth, or equivalent; including the exercises.

History of Greece and Rome (one-half year).

The history of Greece and Rome should be made a study of the evolution of Greek and Roman institutions. Events should be considered in their bearing on that evolution. Any good outline history will answer as a text-book; but it should be supplemented by other material. It should be noted that a definite portion of the examination will be devoted to geography. A full half year in the high school should be devoted to this subject.

Europe in the Middle Ages (one-half year).

The topics to which special attention is called are the disintegration of the Empire of the West, Teutonic settlements and organization, the Empire of the Franks, the Holy Roman Empire, feudalism, the medieval church, the crusades, the free cities, and the rise of national monarchies. At least a half year is expected to be given to this subject in high schools. Applicants may offer an equivalent in *English* history, but they will find themselves better fitted for the history in the college classes if they have prepared in the history of the middle ages.

Physics (one year)—The candidate should be familiar with the subject as presented in Carhart & Chute, Nichols, Gage, Avery, or similar text-books. This is equivalent to a year's preparatory work with laboratory practice.

or

Chemistry (one year)—The non-metals and metals, as presented in Remsen, Williams, Storer and Lindsay or similar text-books.

 ADDITIONAL FOR THE CLASSICAL COURSE:
Latin Grammar (one year).

This will include the subjects of orthography, etymology and syntax, as found in Harkness, Allen & Greenough, or Bennett's Latin Grammar. Proficiency is particularly desired in the following subjects: classification of letters; rules of phonetic changes as given in sections 19-36, inclusive, in Harkness, or sections 9-11 (and elsewhere) in Allen & Greenough; the analysis of the verb forms; the rules of syntax and the principal parts of the irregular verbs.

Cæsar (one year).

First four books of the Gallic war. Special attention should be paid to the translation of passages of the text into correct and idiomatic English; grammatical questions connected with the text; more especially on the subjunctive mood, indirect discourse and the sequence of tenses. The pupil should be able to rewrite in *oratio recta* all the passages of *oratio obliqua* that occur in these books. The student is expected to be familiar with the life of Cæsar and an account of his wars, especially those carried on in Gaul, with the geography of that country, and the location of the different tribes mentioned in the text; the organization of the Roman army; the method of reckoning time, distance, etc.

Cicero (one year).

Six orations: four against Catiline, and any two of three following: "Poet Archaic" "Ligarius," and "Marcellus." A knowledge of the following subjects will be expected of the student: translation of passages of the text into correct and idiomatic English; grammatical questions, more especially in the syntax of the cases, the infinitive mood and participles; composition of words as given in sections 313-343 of Harkness' grammar, historical and geographical references found in the text; the life of Cicero and the history of his times, and of the Catilinian conspiracy; the antiquities connected with the text, particularly the Roman Senate, its origin, constitution, powers, duties, etc.; the functions of the consulship, prætorship and other offices.

Vergil (one year).

Six books of *Æneid*. In addition to translation into English, an acquaintance with the following subjects will be required: peculiarities in the form and construction of words; the life of Vergil, and an account of his times and writings; the geography, antiquities, biographies and mythology connected with the text.

Greek Grammar (one year)—Brooks' Attic Greek or other grammar.

Xenophon's Anabasis (one year)—Four books.

Homer's Iliad—Three books of the *Iliad* will be accepted in lieu of any two subjects required for admission to the classical course, except Latin or mathematics.

ADDITIONAL FOR SCIENTIFIC COURSE.

English—(a) (one year) The Latin element in English.

(b) (one year) History of English literature. Applicants will be required to show an acquaintance with the chief writers and events, from Shakspeare to the present time.

Substitute for (a)—Applicants will be allowed to substitute a second year's work in English literature for the requirement in the Latin element in English. The examination on the second year's work will require an acquaintance with the chief authors and events from Chaucer to Shakspeare, and a thorough study of the following English classics:

For the year 1900-01—Chaucer, "The Prologue" and "The Nonne Preestes' Tale;" Spencer "The Faerie Queene," book i, cantos i to iv; Shakspeare, "As You Like It" and "Julius Cæsar." Bacon, "Essays;" More, "Utopia;" Milton, "Lycidas" and "Comus;" Johnson, "Rasselas."

For the year 1901-1902—Chaucer, "The Knightes Tale," Spencer, "The Faerie Queene," book i, cantos i to iv; More, "Utopia;" Bacon, "Essays;" Marlowe, "Dr. Faustus;" Shakspeare, "The Merchant of Venice" and "The Tempest;" Milton, L'Allegro." "Il Penseroso," and "Areopagitica."

Either of the following named works will be found useful as an outline of the course and as a basis of work: S. A. Brooke's Primer of English Literature, or Pancoast's Introduction to English Literature.

and

German (two years)—(a) Joynes-Meissner, (b) Whitney's German Reader or Boisen's German Prose, and Buchheim's German Poetry. (c) Niebuhr's Heroen Geschichten. (d) Goethe's Sesenheim. Reference grammar, Whitney's or Brandt's. Equivalents will be accepted in lieu of the above texts.

OR

French (two years)—(a) Chardenal's Course first two books of Telemaque. (b) Whitney's French Grammar; Historiettes Modernes, by C. Fontaine; Le Francais Pratique, by Paul Bercey, translation, English to French from Blouet's Primer of French Composition.

OR *German and French* (two years of each.)

Chemistry or Physics (one year).

Whichever is offered under studies common to all courses, the other must be offered here.

{ *Botany* (one year)—Spalding and Bergen.

or

{ *Zoology* (one year).

One half a year of *physiology* and one half a year of botany or zoology will be accepted in lieu of this requirement.

Scientific students who offer four years of Latin, may present, instead of one year of history and one year of English, under studies common to all courses, two years of French or German.

Latin—As for the classical course

OR

ADDITIONAL FOR THE LITERARY COURSE.

Latin (four years) as for the classical course.

and

{ *German* (two years)—See statement for scientific course.
or
French (two years)—See statement for scientific course.

{ *English* (two years)—See statement for scientific course.

and

or { *German* (two years)—See statement for scientific course.

and

{ *French* (two years)—See statement for scientific course.

FOR THE CIVIC COURSE.

Students who are prepared to enter the classical, scientific or literary course will be admitted to this course upon the same conditions.

FRESHMAN YEAR.

REQUIRED OF ALL:

Freshmen will divide between departments of English and Rhetoric according to the following schedule:

	TERM		
	I	II	III
Classical	Rhetoric	English	English
Scientific	English	English	Rhetoric
Literary	English	Rhetoric	English
Civic	Rhetoric	English	English

- 1 **English**—Old English, course 1, two terms; Rhetoric, course 1, one term.
- 2 **Mathematics**—I—Higher algebra; II—Trigonometry; III—Analytical geometry.
- 3 **Military Drill** [2]—Required of men.
Physical Culture [3]—Required of women
- 4 **Gymnasium** [1]—Required of men.

In the scientific course students take one year of language and one long course (two years) and two short courses (one year each) in science. One of the short courses in science must be a physical science. The long course in physics begins in sophomore year and is continued in junior year. When this latter course is taken students must elect in sophomore year between another language and psychology and logic.

ADDITIONAL FOR

CLASSICAL COURSE.

- 5 **Greek:**
Courses II, III, IV.
- 6 **Latin:**
Courses I, II.

NOTES.

All subjects of the freshman year are given four times each week except as otherwise indicated.

Figures in **bold face type** following a subject indicate the year of the course,—as **1st**, **2d**, **3d**, etc.

For outline of work covered by the various courses, see department statements, as indicated.

SCIENTIFIC COURSE.

- CHOOSE ONE
- 5 **Botany:**
Long—Course I.
Short—Course I.
 - 5 **Chemistry:**
Long—Course I.
Short—Course I.
 - 5 **Zoology:**
Long—Course I.
Short—Course II.
- CHOOSE ONE
- 6 **Botany:**
Short—Course I.
 - 6 **Chemistry:**
Short—Course I.
 - 6 **Zoology:**
Short—Course II.
 - 6 **German:**
A—Course III [3d]
B—Course I. [1st]
 - 6 **French:**
A—Course I. [3d]
B—Course III. [1st]
 - 6 **Latin:**
Courses I and II.

LITERARY COURSE.

- CHOOSE ONE
- * 5 **German:**
A—Course III. [3d]
 - * 5 **French:**
A—Course I. [3d]
 - * 5 **Latin:**
Courses I and II.
- CHOOSE ONE
- * 6 **German:**
A—Course III. [3d]
B—Course I. [1st]
 - * 6 **French:**
A—Course I. [3d]
B—Course II. [1st]

*The languages chosen for the freshman year must be continued through the sophomore year also.

CIVIC COURSE.

- CHOOSE ONE
- 5 **German:**
A—Course III. [3d]
B—Course I. [1st]
 - 5 **French:**
A—Course I. [3d]
B—Course III. [1st]
 - 5 **Latin:**
Courses I and II.
- CHOOSE ONE
- 6 **Botany:**
Long—Course I.
Short—Course I.
 - 6 **Chemistry:**
Long—Course I.
Short—Course I.
 - 6 **Zoology:**
Long—Course I.
Short—Course II.

SOPHOMORE YEAR.

Subjects which in this year are alternatives and which are not elected, may be taken as electives in junior or senior year.

CLASSICAL COURSE.	SCIENTIFIC COURSE--CONT.	LITERARY COURSE.	CIVIC COURSE.
<p>1 Greek: Courses V, VI, VII.</p> <p>2 Latin: Courses III, IV, V.</p> <p>3 French: B—Course IV. [1st] German: B—Course I. [1st] English: Course II. History: Course I.</p> <p>4 Botany: Short—Course I. Chemistry: Short—Course I. Physics: †Long—Course I. Short—Course III. Zoology: Short—Course II. Mathematics: Courses IV, V.</p> <p>5 Rhetorical Work [1].</p> <p>6 *Military Drill [2]. Required of men.</p> <hr/> <p style="text-align: center;">SCIENTIFIC COURSE.</p> <p>1 Botany: Long—Course II or III. Chemistry: Long—Course II. Zoology: Long—Course I. Physics: †Long—Course I. Short—Course III.</p>	<p>2 Botany: Short—Course I. Chemistry: Short—Course I. Zoology: Short—Course II. Physics: Short—Course III.</p> <p>3 German: A—Course IV. [4th] B—Course I. [1st] C—Course V. [2d] French: A—Course I. [4th] B—Course III. [1st] C—Course V. [2d] Latin: Courses III, IV, V.</p> <p>4 German: A—Course IV. [4th] B—Course I. [1st] C—Course II. [2d] French: A—Course I. [4th] B—Course III. [1st] C—Course V. [2d] Latin: Courses III, IV, V. English: Course II. Philosophy: Psychology—C'se I. (a), (b) Logic—Course I. (c)</p> <p>5 History: Course I.</p> <p>6 *Military Drill [2]. Required of men.</p>	<p style="text-align: center;">Students must continue the two languages chosen in the freshman year through this year also.</p> <p>1 German: A—Course IV. [4th] French: A—Course I. [4th] Latin: Courses III, IV, V. German: A—Course IV. [4th] C—Course II. [2d] French: A—Course I. [4th] C—Course V. [2d]</p> <p>3 French: B—Course II. [1st] German: B—Course I. [1st] English: Course II. History: Course I.</p> <p>4 Botany: Short—Course I. Chemistry: Short—Course I. Zoology: Short—Course II. Physics: †Long—Course I. Short—Course III. Mathematics: Courses IV, V</p> <p>5 Rhetorical Work [1].</p> <p>6 *Military Drill [2]. Required of men.</p>	<p>1 History: Course I.</p> <p>2 Philosophy: Psychology—C'se I. (a), (b) Logic—Course I. (c)</p> <p>3 German: A—Course IV. [4th] B—Course I. [1st] C—Course II. [2d] French: A—Course I. [4th] B—Course III. [1st] C—Course V. [2d] Latin: Courses III, IV, V. English: Course II.</p> <p>4 Botany: Long—Course II or III Short—Course I. Chemistry: Long—Course II. Short—Course I. Zoology: Long—Course I. Short—Course II. Physics: †Long—Course I. Short—Course III. Mathematics: Courses IV, V.</p> <p>5 Rhetorical Work [1].</p> <p>6 *Military Drill [2].</p>

*Students may substitute an equivalent amount of gymnasium work for the military drill of the second term of this year.
†Students who choose this course must continue it through the junior year pursuing course II.

JUNIOR AND SENIOR YEARS.

The work of the junior and senior years is entirely elective, and consists of sixteen exercises or recitations per week, selected from the following lists. Junior and senior electives are interchangeable. The only limitations imposed upon the choosing of subjects are as follows:

(a) Subjects cannot be chosen unless the work leading up to, and preparing for, such subjects has been completed.

(b) Not more than nine-twenty-fourths of the work of the two years shall be selected from any one department.

JUNIOR YEAR—FIRST TERM.

Animal Biology [4] (a). Animal histology. Lectures and laboratory work on the cell and tissues, methods and technique. Open to those who have completed the course in zoölogy.

(b) Comparative anatomy of vertebrates. Must be preceded by the course in zoölogy (and junior course (a), if it is intended to pay special attention to microscopic anatomy).

(c) Physiology—lectures and demonstrations.

Assyrian [4]—Grammar and reading of selected texts.

Botany [4]—(a) Plant physiology. (b) Plant morphology. (c) Elements of archegoniate and metaspermic taxonomy. (d) Elements of algology. (e) Elements of mycology. (f) Plant ecology. (g) Cellular morphology and dynamics. (h) Physiology of the cell.

Chemistry [4]—(a) Quantitative analysis.

(b) Water analysis.

Comparative Philology [2]—General introduction to the science of language.

Drawing [4]—(a) Freehand. (b) Antique. (c) Design.

Elocution [2]—(a) Gesture, voice building, and principles of vocal expression.

(b) Vocal interpretation of miscellaneous classic literature.

English [4]—(a) The Bible as literature. (b) Shakspeare's predecessors.

French [3]—Aubert, Litterature Classique; Descartes, Corneille, Racine; Paul Bercey, Selections translated into French.

Spanish [1]—Through the medium of the French.

German [4]—(a) (Second year of German) Course II—Goethe's *Dichtung und Wahrheit*.

(b) Faust.

Greek [4]—(a) Archæology of Greek art; open to students of all courses.

(b) Greek grammar begun.

Hebrew Accidence [4]—With translations from and into Hebrew.

History [4]—(a) Course II—Cæsar and the Roman Empire, (not offered in 1899-1900).

(b) Course III—Constitutional history of France to the close of the hundred years war.

(c) Course V—American constitutional history to 1783.

Latin [4]—Oratory—Tacitus and Cicero. Study of growth and characteristics of Roman oratory.

Mathematics [4]—Determinants and co-ordinate geometry of three dimensions.

Mineralogy [4]—(a) Elements of mineralogy; the physical characters of common minerals.

(b) General mineralogy; crystallography and the physical characters of minerals, with a study of the rock-forming species.

Pedagogy [4]—Philosophy of education.

Physics [4]—(a) Heat with laboratory practice. Open to those who have completed course III.

(b) Static electricity. Open to those who have completed course I.

Political Science [4]—Economics,—elements.

Psychology [4]—(a) Of sensation. (b) Psychology of the senses [3] and the anatomy and physiology of the nervous system [1].

Rhetoric [4]—Literary criticism.

Scandinavian [4]—(a) Smith's Grammar; Bennett's Phrase-Book; Broch's Læsestykker.

(b) History of Scandinavian languages; Scandinavian archæology, Norse mythology; history of the Viking age; history of Icelandic, Norwegian, Danish and Swedish literatures from the earliest times to 1500 A. D., [2]; critical reading of masterpieces of Scandinavian literature [2].

(c) [4]—Old Norse. Sweet's Icelandic primer; [2] Wimmer's Formlære; [2] Nygaard's Udvalg af den Norroene Literatur.

JUNIOR YEAR—SECOND TERM.

Animal Biology [4]—(a) Animal histology—continued.

(b) Physiology. Lectures and demonstrations.

(c) Comparative anatomy of vertebrates—continued.

Arabic [4]—Grammar and reading of selected texts.

Botany [4]—(a) Plant physiology. (b) Plant morphology (c) Elements of archegoniate and metaspemic taxonomy. (d) Elements of algology. (e) Elements of mycology. (f) Plant ecology. (g) Cellular morphology and dynamics. (h) Physiology of metabolism and irritability.

A continuation of the work of the previous term.

Chemistry (a) [4]—Quantitative analysis. (b) [2]—Theoretical chemistry. (c) [4]—Gas analysis.

Comparative Philology [4]—Introduction to Teutonic philology.

Drawing [4]—(a) Freehand. (b) Antique. (c) Design. (d) Instrumental.

Elocution [2]—(a) The psychological side of vocal expression.

(b) Vocal interpretation of American poets.

English [4]—(a) Shakespere. (b) The Romantic Movement.

French [3]—Aubert's La Littérature Française; Pascal. Molière, La Fontaine; lectures on French literature; composition.

Spanish [1]—Hossfeld's Spanish method.

German [4]—(a) Course II continued—Schiller's Wilhelm Tell or Jungfrau von Orleans.

(b) Lessing's Laocoön and Dramaturgie.

Greek [4]—(a) Archæology of Greek art. Open to students of all courses.

(b) Grammar continued and Anabasis begun.

Hebrew Accidence [4]—Grammar and reading of selected texts.

History [4]—(a) Course II—Medieval history (not offered in 1899-1900). (b) Course III—French constitutional history from the Hundred Years' War to Louis XIV. (c) [2] Course IV—Topics in English constitutional and economic history. Given in conjunction with the department of political science. (d) Course V—American constitutional history from 1783-1816. (e) [2]—Course VI—American history as seen in constitutional law. (f) Course VII—Central Europe in the six century.

Latin [4]—(a) Tacitus, history and annals. History of the early empire.

(b) Medieval Latin—Especially designed for students in advanced English history.

Mathematics—(a) [4] Co-ordinate geometry of three dimensions. (b) [2] Method of least squares.

Mineralogy [4]—General mineralogy; ores and economic minerals.

Pedagogy [4]—Methodology.

Physics [4]—(a) Electricity and magnetism, with laboratory practice. Open to those who have completed course iii. (b) Magnetism. Open to those who have completed course i.

Political Science—(a) [4] The State and the Government. (b) [2] Economic history.

Psychology [4]—(a) Of knowledge, feeling and will. (b) A continuation of course ii, into association, memory, feeling, reason and willing. (c)

Rhetoric [4]—Literary criticism.

Scandinavian [4]—(a) Grammar and phrase-book. A continuation of the work of the previous term.

(b) Lectures [2]; critical readings [2]; a continuation of the work of the previous term.

(c) Old Norse; a continuation of the work of the previous term.

JUNIOR YEAR—THIRD TERM.

Animal Biology [4]—(a) Animal histology—continued.

(b) Animal physiology—continued. Open to those who have completed the first and second term's work in this subject.

(c) Comparative anatomy of vertebrates—continued.

Astronomy [4]—General astronomy. Open to those who have completed the freshman mathematics.

Botany [4]—(a) Plant physiology. (b) Plant morphology. (c) The elements of archeogoniate and metaspermic taxonomy. (d) Elements of algology. (e) Elements of mycology. (f) Plant ecology. (g) Cellular morphology and dynamics. (h) Physiology of metabolism and irritability. A continuation of the work of the previous term.

Chemistry (a) [4]—Quantitative analysis (volumetric).

(b) [4]—Organic chemistry.

(c) [2]—Industrial chemistry.

(d) [4]—History of chemistry.

Comparative Philology [4]—Comparative phonology of English and German.

Drawing [4]—(a) Freehand. (b) Antique. (c) Design. (d) Instrumental.

Elocution [2]—(a) The psychological side of vocal expression.

(b) Vocal interpretation of British poets.

English [4]—(a) Old English poetry. (b) XIX century essays.

French [3]—Lemaitre—"Les Contemporains;" Renan, Daudet; Rambaud—"Histoire de la Civilisation en France." Spanish [1]—continued.

German [4]—(a) Course II continued—Freitag's *Die Journalisten* or Lessing's *Minna von Barnhelm*.

(b) History of German literature; lyric poetry.

Greek [4]—(a) Lyric and bucolic poets; collateral reading; theses; dialect; lectures.

(b) Anabasis continued.

Hebrew Syntax [4]—Reading of selected portions of the historical books and of the Psalms.

History [4]—(a) Course II—Early modern history (not offered in 1899-1900). (b) Course III—Philosophy of history. (c) Course V—American constitutional history since 1816.

(d) [2]—Course VI—American history as seen in constitutional law. (e) Course VII—Eastern Europe and "Greater Europe" in the XIX century.

Latin [4]—Outlines of the history and principles of Roman law.

Logic [4]—Elementary.

Mathematics [4]—Descriptive geometry.

Mineralogy [4]—(a) Quantitative mineralogy; the assay of gold and silver ores.

(b) Physical mineralogy; investigation with the goniometer and stauroscope, or micro-chemical methods and applications.

Pedagogy [4]—School administration.

Physics [4]—(a) Light. Open to those who have completed course iii.

(b) Voltaic electricity. Open to those who have completed course i.

Political Science (a) [4]—Modern industrialism. (b) [2]—Minnesota political institutions.

Psychology [4]—Experimental "Psychical Research."

Rhetoric [4]—(a) Literary criticism.

(b) Advanced rhetoric.

Sanitary Science [1]—Open to both juniors and seniors. The subjects are changed alternate years.

Scandinavian [4]—(a) Grammar and phrase book. A continuation of the work of the previous term.

(b) Lectures [2]; critical reading [2]. A continuation of the work of the previous term.

(c) Old Norse. A continuation of the work of the previous term.

Sociology [4]—General.

SENIOR YEAR—FIRST TERM.

Animal Biology [4]—(a) Comparative anatomy of invertebrates.

(b) Embryology of invertebrates.

(c) Embryology of vertebrates.

Courses (a) (b) (c) are open only to those who have completed the course in zoölogy and junior course (a).

(d) Taxonomy: entomology, ichthyology and ornithology.

Open to those who have the necessary preparation.

Astronomy [4]—Practical astronomy. Open to those who have completed the junior astronomy and mathematics.

Anatomy [4]—With freshmen in department of medicine.

Botany—For electives in botany, see junior year, first term.

Chemistry (a) [4]—Organic chemistry; lectures and laboratory work. (b) [4]—Chemistry of carbohydrates. (c) [2]—Colloquium.

Comparative Philology [2]—Principles of etymology and semasiology.

Drawing [4]—(a) Still life and nature. (b) Life. (c) Modeling.

Elements of Contracts [4]—This subject counts as a full elective. Students who enter the law college will receive credit for this work.

Elocution [2]—American oratory. Open to students who have completed junior elocution.

English [4]—(a) Literary criticism. (b) Select chapters of English historical grammar.

French [4]—V. Hugo's *Quatre Vingt Treize*; lectures and composition on the literature of the xviii century; Howell's farces translated into French.

Geology [4]—(a) Physical geology; geodynamics. (b) Paleontology. (c) [1]—Outline of general geology.

German [4]—(a) Faust. (b) Modern authors.

Greek [4]—(a) Tragedy and epic poetry; alternate courses, see Greek course x.

(b) Xenophon's Symposium.

History—For electives in history see junior year, first term.

Latin [4]—(a) Lucretius, Cicero, Ovid, Roman mythology.

(b) [2]—Patristic Latin—Augustine.

Mathematics [4]—(a) Descriptive geometry with applications. (b) Mechanics.

Oriental History [4]—History of the Hebrews from the earliest times to the fall of Samaria.

Pedagogy [2]—Ancient education.

Philosophy [4]—(a) History of philosophy; Greek philosophy; Plato.

(b) The theory of knowledge.

(c) Aesthetics.

Physics [4]—Light; advanced laboratory work.

Political Science [4]—Elements of jurisprudence.

Psychology [4]—(a) Advanced. Original research. (b) Physiological. Study of brain cells and tracts.

Rhetoric [4]—Debate.

Sanskrit [4]—Grammar and reader.

Scandinavian [4]—Courses (a) (b) (c) of the junior year are open to seniors.

(d) Lectures [2] on Danish, Norwegian and Swedish literatures from 1500 to 1800, in connection with the history of the respective countries.

(e) [2]—Critical reading of masterpieces of Scandinavian literature.

(f) [2]—History of Danish, Norwegian and Swedish literatures of the nineteenth century, in connection with the history of their respective countries.

SENIOR YEAR—SECOND TERM.

- Animal Biology* [4]—(a) Comparative anatomy of invertebrates—continued.
 (b) Embryology of invertebrates—continued.
 (c) Embryology of vertebrates—continued.
 (d) Taxonomy: entomology, ichthyology and ornithology—continued.
- Anatomy* [4]—With freshmen in the department of medicine.
- Astronomy* [4]—Practical astronomy—a continuation of the work of the previous term.
- Botany* [4]—See courses of junior year—open to seniors also.
- Chemistry* (a) [2]—Electro-chemical analysis. (b) [4]—Analysis of iron.
- Drawing* [4]—(a) Still life and nature. (b) Life. (c) Modeling.
- Commentaries of Blackstone* [4]—The statement concerning the elements of contracts—see first term—will apply to this subject also.
- Elocution* [2]—British oratory—continuation of the work of the previous term.
- English* [4]—(a) Fiction. (b) Interpretation of *Béowulf*.
- French* [4]—Readings from Duruy, Thiers, Martin, and concerning Bonaparte. The romantic movement in the XIX century; Mme. de Stael, Chateaubriand, V. Hugo, De Vigny; lectures and composition.
- Geology* (a) [2] Historical geology. (b) [2] Petrographical geology. (c) [2] Paleontological geology. (d) [4] Economic geology. (e) [4] Paleontology.
- German* [4]—(a) Lessing's *Laocoön* and *Dramaturgie*. (b) Modern German authors.
- Greek* [4]—(a) Neo-Hellenic; grammar, conversation exercises, reading. (b) Homer.
- History*—For electives in history see junior year, second term.
- Latin* [4]—(a) Roman satire; elements and development of satire; study of different Roman authors. (b) [2]—Patristic latin—Lactantius.
- Mathematics* [4]—(a) Differential equations. (b) Mechanics.
- Oriental History* [4]—From the fall of Samaria to A. D. 70.
- Pedagogy* [2]—Medieval and modern theories.
- Philosophy* [4]—(a) History of philosophy; medieval and modern philosophy; Descartes. (b) Fundamental problems. (c) History of Ethics.
- Physics* [4] Heat; advanced laboratory work.
- Political Science* [4]—Public international law. [2]—Money and banks.
- Psychology* [4]—Advanced. Original research.
- Sanskrit* [4]—Story of Nala.
- Rhetoric* [4]—Debate.
- Scandinavian* [4]—Courses (a, b, c) of the junior year are also open to seniors. Courses (d, e, f) of the first term continued.

SENIOR YEAR—THIRD TERM.

- Animal Biology* [4]—(a) Comparative anatomy of invertebrates—continued.
 (b) Embryology of invertebrates—continued.
 (c) Embryology of vertebrates—continued.
 (d) Taxonomy: entomology, ichthyology and ornithology—continued.
- Anatomy* [4]—With the freshmen in the department of medicine.
- Aramaic* [2]—Classical—grammar and translations. *Biblical*—grammar and translations, given alternate years.
- Astronomy* [4]—Practical astronomy. A continuation of the work of the previous term.
- Botany* [4]—See courses of the junior year, open to seniors also.
- Chemistry* (a) [4]—Domestic chemistry.
 (b) [1]—Photographic chemistry.
 (c) [2]—Micro-chemical analysis.
 (d) [2]—Colloquium.

- Comparative Philology* [4]—Comparative grammar of the Greek, Latin and Teutonic languages.
- Drawing* [4]—(a) Still life and nature. (b) Life. (c) Modeling.
- Elements of Criminal Law* [4]—The statement concerning the elements of contracts—see first term—will apply to this course also.
- Elocution* [2]—Ancient oratory.
- English* [4]—(a) Tennyson. (b) [2]—Old English Poetry. (c) Browning.
- French* [4]—Literary schools of the xix century in France; romanticism; realism; naturalism; criticism; readings from Sainte Beuve, Taine, Daudet.
- Geology* [4]—(a) Applied geology. (b) Paleontology. (c) Petrography. (d) Special problems. (e) [2]—Geology of Minnesota.
- German* [4]—(a) History of German literature; lyric poetry. (b) Modern authors.
- Greek* [4]—(a) Later Greek writers. See course xii. (b) Demosthenes.
- History*—For electives in history see junior year, third term.
- Isaiah* [2]—A critical study.
- Latin* [4]—(a) Elegiac poetry. (b) Latin writing.
- Mathematics* [4]—(a) Differential equations. (b) Mechanics.
- Oriental History* [4]—Mohammedan history to the end of the crusades.
- Pedagogy* [2]—Medieval and modern theories.
- Philosophy* [4]—(a) History of philosophy; modern; Hume. (b) Principles of ethics.
- Physics* [4]—Electricity—Advanced laboratory work.
- Political Science* [4]—American public economy.
- Psychology* [4]—(a) Advanced. Original research. (b) [2]—Anthropological psychology.
- Rhetoric* [4]—Essays upon art subjects.
- Sanskrit* [4]—Selections from Rig-Veda.
- Scandinavian* [4]—Courses (a) (b) (c) of the junior year are also open to seniors. Courses (d) (e) (f) of the first and second terms continued.

NOTE—Seniors contemplating entering the medical department are permitted to elect between the two colleges in the courses in *chemistry*, *histology* and *physiology* (it being understood that no repetition of work is allowed). The medical department accepts a year's work done in any or all of these three courses, in this college, in lieu of a year's work done in the corresponding courses in the medical department.

Courses of Instruction.

ANIMAL BIOLOGY.

- Course I Zoology, long course.*
Freshman i, ii, iii, sophomore i, ii, iii. PROFESSOR NACHTRIEB AND ASSISTANTS
 Parker & Haswell's Text-book of Zoology; lectures and laboratory work.
- Course II. Zoology, short course.*
Freshman or sophomore i, ii, iii. ASSISTANT PROFESSOR SIGERFOOS
 Text-book; lectures and demonstrations. Laboratory work arranged for so far as possible.
- Course III Histology.*
Junior i, ii, iii. PROFESSOR NACHTRIEB AND ASSISTANT PROFESSOR SIGERFOOS
 Stöhr-Schaper's Text-book of Histology; lectures and laboratory work on the cell, tissues and organs; methods and technique. Open to those who have completed course i or course ii.
- Course IV. Embryology of vertebrates.* *Senior i, ii, iii.* PROFESSOR NACHTRIEB
 Laboratory and reference work, with the ontogeny of some vertebrate as a centre.
 Hertwig-Mark's Text-book of the Embryology of Man and Mammals used as text.
 Collateral: Marshall's Vertebrate Embryology; Minot, Human Embryology, and Roule, L'Embryologie Comparée. Open to those who have completed courses i or ii and iii.
- Course V Embryology of invertebrates.*
Senior i, ii, iii. ASSISTANT PROFESSOR SIGERFOOS
 Laboratory and reference work, with the ontogeny of some invertebrate as a centre.
 Text references: Haddon, An Introduction to the Study of Embryology; Korschelt and Heider, Lehrbuch der vergleichenden Entwicklungsgeschichte der Wirbellosen Thiere; Roule, L'Embryologie Comparée. Open to those who have completed courses i and iii.
- Course VI. Comparative anatomy of invertebrates.*
Senior i, ii, iii. PROFESSOR NACHTRIEB
 Laboratory and reference work. Open to those who are sufficiently prepared.
- Course VII. Comparative anatomy of vertebrates.*
Junior or senior i, ii, iii. ASSISTANT PROFESSOR SIGERFOOS
 Laboratory and reference work. Open to those who are sufficiently prepared.
- Course VIII. Taxonomy: entomology, ichthyology and ornithology.*
Junior or senior i, ii, iii. MR. OESTLUND
 Lectures, laboratory and museum work. Open to those who have completed either course i or course ii.
- Course IX. Physiology.* *Junior or senior i, ii.* ASSISTANT PROFESSOR SIGERFOOS
 Lectures and demonstrations. The American Textbook of Physiology used as guide. Open to all.

Course X. Physiology. Junior or senior iii. ASSISTANT PROFESSOR SIGERFOOS
Laboratory and reference work. Open to those who have satisfactorily completed course ix.

Course XI. Philosophical zoology.
PROFESSOR NACHTRIEB AND ASSISTANT PROFESSOR SIGERFOOS
Occasional lectures for those pursuing advanced courses.

JOURNAL CLUB.

This club meets once a week throughout the year to listen to abstracts and the discussion of current zoological literature. Attendance is voluntary.

FOR GRADUATES.

For graduates of the department and those of equal preparation, whether candidates for an advanced degree in the department or not, any line of research or advanced work that can be carried on profitably.

For less advanced students any regular work of the department for which the applicant is sufficiently prepared.

ASTRONOMY.

FOR UNDERGRADUATES.

Course I. General astronomy. Junior iii. PROFESSOR LEAVENWORTH
The text-book work is supplemented by lectures, especially on the history of the science, and on recent astronomical discoveries and theories. Open to those who have completed course i and ii of mathematics.

Course II. Practical astronomy. Senior i, ii, iii. PROFESSOR LEAVENWORTH
The theory of instruments, the use of the ephemeris and nautical almanac, the various methods of determining time, latitude, longitude, parallax, the position of the celestial bodies and the method of least squares; observatory practice including photography, and spectrum-analysis. Open to those who have completed course i, and courses i to v, of mathematics,

FOR GRADUATES.

Course III. Extended course in practical astronomy. PROFESSOR LEAVENWORTH

Course IV. Orbit Work. PROFESSOR LEAVENWORTH

Course V. Astrophysics. PROFESSOR LEAVENWORTH

Course VI. Astrophotography with photographic measurements.
PROFESSOR LEAVENWORTH

BOTANY.

Course I. General botany. Freshman sc. and civ. i, ii, iii, sophomore cl. and lit., i, ii, iii.
PROFESSOR MACMILLAN AND ASSISTANT PROFESSOR MACDOUGAL
This course comprises two terms of morphological and one of physiological lectures with laboratory work and collateral reading. Vine's Elementary Text-book of Botany will be used as a reference hand-book throughout the year.

**Course II. General plant morphology.* PROFESSOR MACMILLAN
Open to students who have completed course i and to those who have finished a course in zoology. The course includes a view of the comparative anatomy and development of plants and includes the study of types extending over the three great divisions of the vegetable kingdom,—algæ, fungi, and higher plants. Laboratory work, lectures and collateral reading. Throughout the year.

**Course III. General plant physiology.* ASSISTANT PROFESSOR MACDOUGAL
Lectures, reading and laboratory work. The course embraces about seventy-five qualitative experiments dealing with the principal functions of the plant, and one to three lectures per week. Open as an elective to all students who have followed a course in botany or zoology. Throughout the year.

*Students who select the "long course" in botany are required to pursue course i followed by either course ii or course iii as they may choose.

Course IV. Elements of archegoniate and metaspERMic taxonomy.

Junior or senior i, ii and iii. PROFESSOR MACMILLAN

Lectures, reference reading and herbarium work. The course is primarily designed to afford students an opportunity to become proficient in the determination of plant species. Open to those whose preparation is deemed adequate.

Course V. Elements of algology.

Junior or senior i, ii and iii. MISS TILDEN

Laboratory and reference work. The course includes one term's work upon the freshwater algae, one upon the brown algae, and one upon the red algae. Its bearing is rather toward comparative morphology than toward taxonomy. Open to those who have completed course i.

Course VI. Elements of mycology.

Junior or senior i, ii, iii. PROFESSOR MACMILLAN

Laboratory and reference work. The course includes a comparative morphological and taxonomic survey of the fungi with collateral reading in Schroeter, DeBary, Ludwig, Zopf and Brefeld. Open to those who have completed course i.

Course VII. Plant ecology.

Junior or senior iii. PROFESSOR MACMILLAN

Lectures, collateral reading and field observations. The course is designed to cover generally the domain of adaptational adjustments in plant embryology, anatomy, physiology and distribution. Particular attention is devoted to the problems of ecological distribution. Open to those who have completed course i and whose preparation is deemed adequate. Open also as a minor to candidates for the degree of master of science.

Course VIII. Cellular morphology and dynamics.

Junior or senior i, ii, iii. PROFESSOR MACMILLAN

Laboratory work and collateral reading. The course includes a survey of cell-structure and the various phenomena of division, fusion and metamorphosis, together with a review of the history of cytologic investigation from the time of Malpighi and Grew to the present. Assignments from the works of Strasburger, Henneguy, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory. Open to those whose preparation is deemed adequate. Open also as a major or minor to candidates for the degree of master of science.

Course IX. Physiology of the cell.

Junior or senior i. ASSISTANT PROFESSOR MACDOUGAL

Lectures, reading and laboratory work dealing with the chemical and physical properties of the cell, relation of protoplasm to chemical agents, temperature, moisture and electricity; streaming, locomotor and contractile movements. Open as an elective to all students who have followed a course in botany or zoology, and as a minor to candidates for a masters degree.

Course X. Physiology of metabolism and irritability.

Junior or senior ii and iii. ASSISTANT PROFESSOR MACDOUGAL

Lectures, reading and laboratory work. The course embraces a series of exact determinations of the movements of fluids in absorption, metabolism, excretion and physical processes, the principal constituents of the plant, synthesis of foods, respiration, translocation, enzymatic action, growth and its relation to environmental factors, the irritable organization of the plant body, and mechanism of movement. To follow course viii and open to those eligible to that course. Open also as a major to candidates for the degree of master of science.

FOR GRADUATES.

Course XI. Morphology and taxonomy.

PROFESSOR MACMILLAN

Special problems in structure, life histories, embryology, classification and phylogeny. Important literature and necessary apparatus will be provided for whatever

research is entered upon under the direction of the department, and the results of the investigation 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. Open as a major or minor to candidates for an advanced degree.

Course XII. Physiology.

ASSISTANT PROFESSOR MACDOUGAL

Problems in nutrition, growth and irritability. Particular attention is to be paid to the history of related investigations and the development of efficient methods of research in the subject under consideration. The results of the original work accomplished must be presented in a form suitable for publication. Open as a major to those who have completed course iii, to candidates for master of arts or science, and as a major or minor to candidates for doctor of philosophy.

Course XIII. Palaeobotany.

DR. SARDESON

Lectures and laboratory work with collateral reading designed to cover the historical literature. Schenck's *Handbuch* will be used as a guide in the laboratory. Open as a partial minor to candidates for the degrees of master of arts or of science.

JOURNAL CLUBS.

Journal clubs in morphology and physiology are held weekly under the direction of Professor MacMillan and Assistant Professor MacDougal, at which the attendance of students is required, as may be indicated to them.

CHEMISTRY.

FOR UNDERGRADUATES.

*Course I. (a) General chemistry.**Freshman i.*

Lectures and laboratory work. The course includes a detailed study of the chemical and physical properties of the non-metals and their more important compounds.

(b)

Freshman ii.

Lectures and laboratory work. This course includes a study of the more common metals, their compounds and characteristic reactions.

(c)

Freshman iii.

Lectures and laboratory work. A continuation of course (b) with an introduction to organic chemistry.

*Course II. Qualitative analysis.**Sophomore i.*

(a) Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation. Open to those who have completed course i (b).

(b)

Sophomore ii.

A continuation of course ii (a),

(c).

Sophomore iii.

Lectures and laboratory work. Reactions and the separation of the acids. Open to those who have completed course i.

Course III. Quantitative analysis.

Lectures and laboratory work. An introduction to gravimetric analysis and a quantitative separation of the metals. Open to those who have completed course ii.

Course IV. Quantitative analysis.

Continuation of course iii. A completion of gravimetric analysis and an introduction to volumetric analysis.

Course V. Volumetric analysis.

Lectures and laboratory work. A continuation of course iii. Open to those who have completed course iv.

For further elective courses, open to juniors and seniors, see statement under School of Chemistry.

COMPARATIVE PHILOLOGY.

PROFESSOR KLAEBER

This department, besides offering courses in the general principles of linguistic science, affords an opportunity for elementary studies in comparative Indo-Germanic philology. The main starting point for the comparative treatment of the Indo-Germanic languages will be the Germanic family; individual old Germanic dialects also will be investigated in detail.

FOR UNDERGRADUATES.

Course I. General introduction to the science of language. Two hours a week.

Junior and senior i.

The principles of linguistic growth; the psycho-physical and the historical aspect of language, classification of language; methods of comparative philology. Lectures and exercises; discussion of standard works, such as Whitney's *Language and the Study of Language*; Paul's *Principien der Sprachgeschichte*; Wegener's *Grundfragen des Sprachlebens*; Jespersen's *Progress in Language*; etc.

This course will be sufficiently general in its nature to be of use to all students who wish to obtain an insight into the life of language.

Course II. Principles of etymology and semantics. Two hours a week.

Junior and senior i.

Growth of vocabulary; change of words in form and meaning. Lectures and exercises, with especial reference to English and other Teutonic languages.

Course III. Introduction to Teutonic philology.

Junior and senior ii.

Outlines of the historical and comparative study of the Teutonic languages. The external history and the internal development (phonological, morphological, lexical) of the various branches of the Teutonic group.

Course IV. Comparative phonology of English and German.

Junior and senior iii.

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

Course V. Comparative grammar of the Greek, Latin, and Teutonic languages.

Junior and senior iii.

With a general survey of the field of Indo-Germanic philology.

FOR GRADUATES.

Course VI. Gothic Grammar.

The relation of Gothic to the other Teutonic dialects will be particularly emphasized. Braune's *Gotische Grammatik*; Heyne's *Ulphilas* (9th edition); Uhlenbeck's *Kurzgefasstes etymologisches Wörterbuch der gotischen Sprache*; Paul's *Grundriss der germanischen Philologie*.

Course VII. Old Saxon.

Grammar and interpretation of the *Héliand*.

Course VIII. Urgermanische Grammatik.

Relation of the Teutonic to the other Indo-European languages. The Germanic portions of Brugmann's *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen*; Kluge's *Vorgeschichte der altgermanischen Dialekte*; Noreen's *Abriss der urgermanischen Lautlehre*; Streitberg's *Urgermanische Grammatik*; etc.

Course IX. Old High German.

Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch*. See also under "German Department."

N. B. The undergraduate courses are open to graduate students subject to the rules of the Graduate Department.

Related courses will be found under English.

DRAWING.

- Course I. Drawing.* *Junior i, ii, iii.*
From models, casts and nature. Study of the principles of perspective and light and shade. In charcoal, line, and wash.
- Course II. Antique.* *Junior and senior i, ii, iii.*
Studies of the human figure, from casts, in charcoal. Fractions, torsi, masks, busts, statues and groups.
- Course III. Design.* *Junior or senior i, ii, iii.*
The anatomy of pattern and geometrical design, planning of ornament, color harmony, plant analysis and conventionalism, traditional ornament and animate forms.
- Course IV. Instrumental.* *Junior ii, iii.*
Problems, projections, sections, developments and interpenetrations. With conventional renderings in line and wash.
- Course V. Still life and nature.* *Senior i, ii, iii.*
Studies of groups of still life and plants and flowers. In pen and ink or water color or oil. Open to those who have taken course i or course ii.
- Course VI. Life.* *Senior i, ii, iii.*
Studies in charcoal from the living model (heads and figures with costumes). Sketches in pencil, charcoal, red chalk and pen and ink. Open to those who have taken course i or course ii.
- Course VII. Modeling.* *Senior i, ii, iii.*
In clay, from the antique, and casting in plaster.

ENGLISH LANGUAGE AND LITERATURE.

- Course I. (a) Old English.* MISS YOUNG
Elements of old English grammar and its relation to modern English grammar.
Reading of old English selections.
- (b) Reading of old and middle English selections.*
Brief outline history of the English language and of old English literature.
- The object of this work is to prepare the student for an intelligent study of modern English literature. Hence constant emphasis is laid upon the relation of old English to modern English.
- Course II. (a) Chaucer.* *Sophomore i.* ASSISTANT PROFESSOR McCCLUMPHA
Textual and critical studies in the Canterbury Tales and minor poems.
- (b) Shakspeare.* *Sophomore ii.*
In the course the following six plays will be read and discussed: Love's Labor's Lost, Twelfth Night, As You Like It, Othello, Henry VIII, and The Tempest.
- (c) The study of selected English prose writers,* *Sophomore iii.*
- Course III. The Bible as literature.* *Junior or senior i.* PROFESSOR BURTON
A study of the Bible with reference to its power and beauty of form and expression.
- Course IV. Literary criticism.* *Junior or senior i.* PROFESSOR BURTON
A study of the development of English criticism in its aim and method from the Elizabethan period to the present time.
- Course V. Shakspeare.* *Junior or senior ii.* PROFESSOR BURTON
Four plays will be taken up: Merchant of Venice, Hamlet, Lear, Winter's Tale.
- Course VI. Fiction.* *Junior or senior ii.* PROFESSOR BURTON
A study of the rise and development of the romance in English fiction.
- Course VII. Old English poetry.* *Junior or senior iii.* PROFESSOR BURTON
Interpretation of the oldest English poems as literature, and in relation to later poetry.

- Course VIII. Tennyson.* Junior or senior iii. PROFESSOR BURTON
A study of the poet as the representative modern English artist-singer.
- Course IX. Advanced courses in English philology.* PROFESSOR KLAEBER
(a) *Select chapters of English historical grammar.* Senior i.
(b) *Interpretation of Beowulf.* Senior ii.
With studies in Teutonic antiquities and heroic saga.
(c) *Old English poetry.* Senior iii.
Cynewulf and his school. (Two hours a week.)
- Course X. Shakspeare's predecessors.* Junior or senior i. ASSISTANT PROFESSOR McCLUMPHA
This includes the study of the Elizabethan lyrics, Spenser's *Faerie Queene*, and the early English dramatic literature.
- Course XI. The romantic movement.* Junior or senior ii. ASSISTANT PROFESSOR McCLUMPHA
This includes the so-called Lake Poets together with the poetical works of Keats and Shelley.
- Course XII. XIX Century essays.* Junior or senior iii. ASSISTANT PROFESSOR McCLUMPHA
This course includes a study of the prose works of Lamb, DeQuincey, Macaulay, Carlyle, Arnold and Ruskin.
- Course XIII. Browning.* Junior or senior iii. ASSISTANT PROFESSOR McCLUMPHA
Critical reading and discussion of his poetical works.

GRADUATE AND SEMINAR COURSES.

The following courses are offered by PROFESSOR BURTON.

- Course XIV. The essay.* For graduates.
A study of the origin and development in English literature of the essay as a prose form.
- Course XV. The Pre-Raphaelite English poets.* Senior seminar.
A study of Morris, Swinburne and the Rossettis with their group.

The following courses are offered by PROFESSOR KLAEBER.

- Course XVI. Anglo-Saxon historical prose.*
- Course XVII. Advanced grammar of Old English,* and critical reading of difficult texts.
- Course XVIII. Systematic investigation of the Old English vocabulary.*
- Course XIX. An outline grammar of the Middle English dialects,* and reading of select Middle English texts.

N. B.—The undergraduate courses IX, (a), (b), (c) are open to graduate students subject to the rules of the graduate department.

The following courses are offered by ASSISTANT PROFESSOR McCLUMPHA.

- Course XX. The Elizabethan school of literary criticism.* First term.
- Course XXI. The dramatic productions of the Elizabethan age.* Second term.
- Course XXII. The dramatic works of Ben Jonson.* Third term.

JOURNALS.

In the reading room and general library will be found the principal current critical papers, literary magazines, technical journals and valuable sets of periodicals, American, English and German.

FINE ARTS.

Students presenting satisfactory evidence of fitness are allowed, under the conditions mentioned below, to take artistic drawing, painting, or modeling as one study through the junior and senior years; provided that no student shall receive more than six credits in fine arts and music together.

A minimum of eight hours per week must be given to lessons and practice, the character of the work to be reported upon each term as in the case of other studies.

The work must be taken under instructors in the Minneapolis School of Fine Arts, and the instruction be paid for by those receiving it. Special rates are made to University students.

FRENCH.

FOR UNDERGRADUATES.

Course I. Advanced grammar and composition.

Freshman i, ii and iii and sophomore i, ii and iii.

Various authors will be read: Racine, Corneille, Pascal, Feuillet, Daudet, Gréville, Sand, etc. Open to freshman who have completed the French required for entrance.

Course II. French begun.

Freshman or sophomore, lit., i, ii and iii.

Chardenal's French Course; Blouet's French composition; Mme. Foa's Petit Robinson de Paris; Muller's Les Grandes Découvertes Modernes; Fontaine's Historiettes Modernes.

Course III. French begun

Freshman or sophomore, sci. or civ., i, ii and iii.

Chardenal's French Course; Blouet's Composition; Luquiens French Prose of Popular Science. Octave Feuillet; Lacombe's Petite Histoire de France; articles from recent scientific journals.

Course IV. French begun.

Sophomore cl., i, ii and iii.

Chardenal's "Practical Course of French" or Brachet's "Historical French Grammar;" some of the writers of the French classical school: Pascal, Corneille, Montesquieu, etc.

Course V. (a) The xix century in France.

Junior i.

The Romantic school, Mme. de Stael, Chateaubriand, Victor Hugo, Cousin, Michelet, Ste. Beuve. Lectures and compositions.

(b) The realist movement

Junior ii.

Taine, Renan, Gautier, Daudet Lectures on the literary current of the century.

(c) Howell's farce—"The Elevator"—translated into French.

Junior iii.

Taine's Philosophie de l'Art en Italie et en Grèce; lectures on the literature of the eighteenth century with a view to the causes of the French revolution.

Course VI. Lectures on the history of the French language.

Senior i, ii, iii.

Literary criticism and the history of French literature. Brunetière, Taine, Bourget, Lemaître, Hugo, Lamartine.

Course VII. Italian.

Senior i, ii, iii.

Ahn's Italian course. Goldoni, Tasso, Petrarch, &c. (Once a week.)

Course VIII. Spanish.

Junior i, ii, iii.

Edgren's Spanish grammar, Knapp's modern Spanish readings, Cervantes, Calderon. (Once a week.)

NOTE. Once a week, through the junior year, Spanish is offered and advanced work in the same way through the senior year, the following junior class takes up Italian. The work of both the Italian and Spanish courses is conducted altogether in French.

FOR GRADUATES.

Course IX. Romance languages. Old French.

Origines de la langue Française, par Petit de Julleville, Morceaux Choisis des Auteurs Français du Moyen Age. par L. Clédat. Some of the oldest monuments of the French language interpreted and translated into modern French, such as Les Serments de Strasbourg; La Vie de Saint Alexis; La Cantilene d'Eulalie; the chronicles of Villehardouin, La Chanson de Roland, Froissart. Phonetic changes studied and their laws examined. Special attention is given to those forms which have entered into the English language. This course is especially valuable to students in English philology.

*Course X. History of the novel in the six century.**Course XI. Italian.* Interpretation of Dante's Inferno.*Course XII. Old Spanish.* El Poema del Cid.

GEOLOGY.

FOR UNDERGRADUATES.

*Course I. Physical geology.**Junior or Senior i.* PROFESSOR HALL

1, Geodynamics discussing the atmosphere, water, terrestrial heat, plants and animals, as geologic agents; 2, structural geology, explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relations to the arrangement of material in the earth; 3, physiographic geology, pointing out the more prominent earth features and discussing their origin, significance and the agencies affecting them; 4, an enumeration of the common rock making minerals in their formation, occurrence and alterations.

*Course II. Historical geology.**Junior or senior ii.* PROFESSOR HALL, DR. SARDESON AND MR. UPHAM

A study of the strata of the earth. An outline of the salient features of the earth's history, discussing its several eras with their faunas and floras. The special purpose of the course is to outline the geographical history of the North American continent. Lectures and reading, twice a week.

Course I and II supplemented by either III or IV are intended primarily for students not intending to specialize in geology.

*Course III. Petrographical geology.**Junior or senior ii.* PROFESSOR HALL AND DR. BERKEY

General considerations on the origin and occurrence of rocks; i. e. Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the crystalline rocks with a view to their general description. Kemps Handbook of Rocks. Reference reading and demonstrations. Twice a week.

*Course IV. Paleontological geology.**Junior or senior ii.* DR. SARDESON

A study of the more important types of fossils in their geological relations. Lectures and laboratory. Twice a week. Open to those who have completed course i or course xi.

*Course V. Applied geology.**Junior or senior iii.* PROFESSOR HALL

An outline of the economic relations of geology. The course comprises a discussion of the nature and distribution of the non-metallic materials of an economic value including coal, mineral oils and natural gas; phosphates and other natural fertilizers, together with soils; the geologic conditions of water supply; abrasives and fctile materials; natural and artificial building stones; mortars and cements for construction, road-making, followed by a brief summary of the nature and distribution of ore deposits of the less and more important metals. Williams Applied Geology and reference reading.

Course VI. Petrography.

Senior iii. PROFESSOR HALL

An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their crystalline habit, mineral composition and genetic relations. The course extends into an examination of some Minnesota groups of crystalline rocks. Practically a continuation of course iii. Laboratory, with lectures and reference reading.

Course VII. Paleontology.

Junior or senior iii. DR. SARDESON

The course treats of paleontological evidence, its sources and interpretation and its relation to the theory of evolution. Lectures and demonstrations. Occasional expeditions can be arranged for field work. Open to students of geology and biology.

Course VIII. Economic geology.

Senior ii. PROFESSOR HALL

History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical processes involved in their formation and subsequent alterations; a description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead and zinc.

Course IX. Paleontology.

Senior i, ii, iii. DR. SARDESON

The several chief types of organisms as represented by fossils will be studied successively. The leading fossils and their phylogenetic history will be treated with considerable detail. Lectures and laboratory. Open to those who have completed course vii.

Course X. Special problems.

Senior iii. PROFESSOR HALL

The investigation by individual students of particular problems, involving the field work of an investigation of some particular formation and with the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field; the keeping of note-books, preparation of geological maps, profiles and sections will be taught

Course XI. An outline of general geology.

[1] Junior or senior i. PROFESSOR HALL

This course treats of the leading physiographic facts and principles; the microscopic characters of the common rocks and a discussion of the general principles of petrographical and stratigraphical geology. Sections and reading supplemented by excursions and practical problems.

Course XII. Geology of Minnesota.

[2] Junior or senior iii. PROFESSOR HALL

An outline of physiographic features; a review of the geography, petrology, paleontology and stratigraphy of the rocks of the several periods of geologic history embraced within the State; a discussion of the material resources of Minnesota, particularly in building stones and metallic products.

Students desiring courses viii, ix or x must take courses preparatory to the same in junior year.

FOR GRADUATES.

Course XIII. Petrographical problems.

PROFESSOR HALL

A study of rocks as geological bodies; the genesis of rocks and their chemical and dynamical alterations, illustrated in the gneisses and gabbro schists of the Minnesota river valley or the granites and basic eruptives of Central Minnesota.

Course XIV. The Keweenaw eruptives

PROFESSOR HALL

of Eastern and Northeastern Minnesota; their stratigraphic relations, textural and structural characters, or other problems to be selected on consultation.

Course XV. Glacial geology.

PROFESSOR HALL

The local features of glacial phenomena. Field work will form the special feature of this course embracing the formations at Minneapolis or some area accessible

from it, as a survey of the glacial lakes in the vicinity, the gorge below the Falls of Saint Anthony, the Dalles of the St. Croix and other problems. The special field to be selected on consultation.

Course XVI. Paleontologic geology.

MR. SARDESON

A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.

Course XVII. Paleontology.

MR. SARDESON

The study of a selected group of fossils; a practical acquaintance with the forms and literature of the group is sought. This course is to be supplemented by a thesis.

GERMAN.

FOR UNDERGRADUATES.

Course I. German begun.

Freshman and sophomore (all courses) i, ii, iii.

ASSISTANT PROFESSOR WILKIN, MR. ANDRIST AND MR. SCHLENKER

- (a) German grammar (Joynes-Meissner) and reader (Harris). Translation from German into English; reading of easy stories and poems; practice in writing German script.
- (b) German grammar and reading continued. Exercises, oral and written, in translating English into German. Dictation of prose and poetry.
- (c) 1. Classical prose and poetry. 2. Scientific prose. Composition, letters and essays; reading at sight.

For those who have not had German upon entrance.

Course II. German, second year.

Sophomore and junior i, ii, iii. MR. ANDRIST AND MR. SCHLENKER.

- (a) Goethe's *Dichtung und Wahrheit*; grammar, inflection.
- (b) Schiller,—his life and works. Wilhelm Tell, or *Jungfrau von Orleans*. Shorter poems dictated and committed to memory; advanced grammar; syntax, derivation and composition.
- (c) Lessing,—life and works, *Minna von Barnhelm*; Freytag's *Die Journalisten*. Exercises in dictation and composition; rapid sight-reading of narrative prose; practice in writing and speaking German.

For those who have completed course i.

Course III. Critical study in German classics.

Freshman i, ii, iii.

PROFESSOR MOORE, ASSISTANT PROFESSOR WILKIN AND MR. ANDRIST

- (a) Historical prose. Writing from dictation; oral and written exercises based on the text. Whitney's German Grammar (Inflection).
- (b) Goethe,—Sketch of life and works. Critical reading of the *Italiensche Reise* and *Gedichte*; oral and written exercises based on the text. Whitney's German Grammar continued (Syntax).
- (c) 1. Heine,—life and works; *Harzreise* and *Buch der Lieder* Whitney's German Grammar continued (derivation and composition); 2, scientific prose selections. (Brandt, Dippold). Original letters, notes, and essays by the class.

For those who have completed the German required for entrance.

Course IV. Classic drama.

Sophomore i, ii, iii. MR. SCHLENKER

- (a) Schiller's *Wallenstein*, or *Maria Stuart*; outline of author's life and works.
- (b) Goethe, life and works; *Tasso* or *Iphigenia*.
- (c) Lessing, life and works; *Nathan der Weise*, or *Emilia Galotti*.

For those who have completed course iii.

Course V. Advanced subjects in literature and criticism.

Junior and senior i, ii, iii. PROFESSOR MOORE

- (a) Goethe's *Faust*; history of its composition. *Faust* legend; its treatment in literature before and since Goethe's time. The plan of Goethe's *Faust*; changes in the

order of the scenes; solution of the Faust problem in Part II. Lectures; essays by the class upon related topics.

(b) Lessing's *Laocoon* (25 chapters) and selections from his *Dramaturgie*. Lessing's study of Sophocles, Aristotle and Shakspeare; application of his conclusions in the dramas *Philotas*, *Minna von Barnhelm*, and *Emilia Galotti*. *Nathan der Weise*; its ethical significance; theological writings. Lectures and theses by the class.

(c) German lyrical poetry from Luther to Goethe. Outline of the history of German literature since the Reformation.

For those who have completed course ii or iv.

Course VI. German literature since the death of Goethe. PROFESSOR MOORE
Rapid reading of recent authors. For those who have completed course v.

FOR GRADUATES.

Course VII. Life and works of Luther. PROFESSOR MOORE

Course VIII. Old High German. PROFESSOR KLAEBER
Braune's *Althochdeutsche Grammatik*; Braune's *Althochdeutsches Lesebuch*.

Course IX. Seminar. PROFESSOR MOORE
Goethe's *Faust*, Part II.

Course X. Teachers' seminar. PROFESSOR MOORE
Historical German grammar. Methods of modern language instruction.

GREEK.

FOR UNDERGRADUATES.

Course I. (a) Greek Grammar. Junior i.

Brooks' Introduction to Attic Greek.

(b) *Greek Grammar and Anabasis.* Junior ii.

Brooks' Introduction completed and *Anabasis* begun.

(c) *Anabasis continued.* Junior iii.

Course I is open to students in the scientific, literary and civic courses. Those students entering the University who have not had the opportunity of pursuing Greek in preparatory schools and desire to take the classical course are also admitted to these courses, but in their case, the work if successfully accomplished, will be counted as removing in part the entrance conditions in Greek.

Course II. Xenophon's Symposium. Freshman i, senior i.
Smith's *History of Greece*, Book IV; Grote's *History of Greece*, chapters 48 to 66;
Greek prose composition; reading at sight.

Course III. Lysias. Freshman ii.
Smith's *History*, Book V; Grote's *History*, chapters 72 to 85; Greek prose composition; reading at sight.

Course IV. Demosthenes. Freshman iii, senior iii.
Smith's *History*, Book VI; Grote's *History*, chapters 86 to 95.

Course V. Plato. Sophomore i.
Collateral reading; thesis; reading at sight.

Course VI. Homer. Sophomore ii, senior ii.
Smith's *History* Introduction and Books I and II; Grote's *History* Part I; reading at sight.

Course VII. Tragedy. Sophomore iii.
Collateral reading; theses.

Courses II, IV and VI, are open to students in scientific, literary and civic courses who have taken course I.

Course VIII. *Archaeology of Greek art.* Junior i and ii.
Collateral reading; theses; lectures. Open to students in all courses.

Course IX. *Lyric and bucolic poetry.* Junior iii.
Collateral reading; study of dialects; theses; lectures.

Course X. *Tragedy and epic poetry.* Senior i.

(a) The trilogy of Aeschylus.

(b) Oedipus Tyrannus; Oedipus Coloneus; Antigone.

(c) The Choephorae of Aeschylus; the Electra of Sophocles; the Electra of Euripides.

(d) The Odyssey.

Collateral reading; theses; lectures on epic poetry and the drama.

Course XI. *Neo-Hellenic.* Senior ii.

Collateral reading; theses; composition.

Course XII. *Later Greek writings.* Senior iii.

Selections from Polybius, Plutarch, Arrian, the Septuagint and the New Testament.

Course XIII. *Seminar in Greek poetry or Epigraphy.* Senior i, ii, iii.
One hour per week.

Course XIV. *Institutions and life of the Greeks.* Junior ii.
Collateral reading; lectures; theses.

GRADUATE COURSES.

Course XV. (a) *Greek poetry, epic, lyric, dramatic, bucolic*, with critical reading of authors,

(b) *Greek oratory*, and history with critical reading of authors.

(c) *Epigraphy*.

HISTORY.

Course I. *English constitutional history, with brief survey of continental history.*

Sophomore i, ii, iii. PROFESSOR WELLS AND ASSISTANT PROFESSOR ANDERSON

Required of civic students in the sophomore year, and may be taken as an alternative by sophomores in other courses, or as an elective in the junior or senior year. Required for admission to all other courses of history except course ii.

This course includes a general view of the salient features of European history from the fourth to the eighteenth century, with a detailed study of the development of the English constitution.

FIRST TERM—General history of Western Europe from the Barbarian invasions to the territorial formation of the leading European states. (France 987, Germany 962, England 959.) A study of the transition from the Roman Empire to modern European states, with special reference to the Frankish Kingdom, the rise and fall of the Carolingian Empire.

SECOND TERM—English constitutional history from the Norman Conquest to the Tudor period. A brief introduction will consider the principal institutions of the Anglo-Saxon period, and in connection with the later history attention will be paid to important features of continental history: feudalism, the crusades, the papacy, and the Holy Roman Empire.

THIRD TERM—English constitutional history from the accession of the Tudors to the House of Hanover. In connection with the study of this period some consideration will be given to international relations, the Continental Reformation, the Counter Reformation, and the Thirty Years' War. r

Course II. *Roman and medieval History.* Junior or senior i, ii, iii. PROFESSOR WELLS
A study of the history of Europe from the time of Cæsar to the peace of Westphalia.

First term—Cæsar and the Roman empire to the death of Heraclius. Special attention given to the social, economic and political conditions, the provincial administration, the organization of the Christian church, the beginnings of the Papacy, and the German conquests and settlements.

Second term—The rise of the Franks, the growth of the Papacy, the Carolingian empire, feudalism, the holy Roman empire, the Crusades, Monasticism, the struggle between the Papacy and the empire, the rise of the cities, Scholasticism and the universities.

Third term—The reforming councils and the Papacy, the Italian cities, Humanism, the Renaissance, the Protestant Reformation, the Counter-Reformation and the consequent religious and political settlements leading up to the Thirty Years' War and concluding with the peace of Westphalia and the condition of Europe in the seventeenth century.

This course will not be given in 1899-1900, but will be given in 1900-1901.

Course III. The early constitutional history of France and the philosophy of history.

Junior or senior i, ii, iii. PROFESSOR WELLS

Open to those who have completed course i. A study of the development of the French constitution including a careful comparison with the English constitutional development; concluding with a study of the application of philosophy to history.

First term—Brief outline of French history giving special consideration to the rise and progress of feudalism, the development of the monarchy, the formation and constitution of the cities, the rise of the third estate, and the relations with the church, from the treaty of Verdun to the close of the Hundred Years' War.

Second term—The establishment of absolute monarchy, the beginning of international relations, the reformation in France, the struggle with the Huguenots, France in the Thirty Years' War, Louis XIII and Richelieu, Mazarin and Louis XIV, the Gallican liberties, the economic system of Colbert, the revocation of the Edict of Nantes, and the peace of Utrecht to the close of the reign of Louis XIV.

Third term—The philosophy of history; the consideration of the philosophic method as applied to history and a criticism of some of the leading theories, with Hegel's Philosophy of History as a basis; followed by a rapid review of oriental and classical history with a view to the application of these theories and principles.

The philosophy of history in the third term may be elected separately by those who have had courses i and ii. For the work of the first and second term ability to read French is not absolutely required, but will be of great service, and students who desire to take this course are advised to continue their French.

Course IV. English, economic and constitutional history.

[2] *Junior or senior ii.* PROFESSOR WELLS

Given in connection with the department of political science. Open to all who have passed in English constitutional history to the Revolution of 1688. This course is an advanced study of economic and constitutional topics in the history of England from the beginning of the fourteenth to the beginning of the seventeenth century. The principal object is to show the interdependence of economic and constitutional movements by a careful and detailed study of the more important phases of the history and condition of the people. On the economic side attention is given to the agricultural changes, the growth of guilds, the effect of enclosures on the peasant revolts, the subsequent development of the woolen industry, and the resulting influences on the character of the nation's economic life, as affected by discoveries, inventions and the organization of companies in Elizabeth's reign.

The corresponding development on the constitutional side is shown in the organization and growth of parliament, the methods of taxation, the rights and powers of the House of Commons, the incorporation and municipal government of towns, the Wiclif movement, the War of the Roses, leading up to the firm establishment of the monarchy and the rise of international relations under the Tudors, closing with the unity and strength attained under Elizabeth.

Course V. Constitutional history of the United States.

Junior or senior i, ii and iii. PROFESSOR WEST

Open to those who have completed course i, and required for courses vi and xiii-xvii. The aim is to make this a "practice course"; the work is done partly by co-operative topical reports, and students are expected to consult primary sources to a greater degree than is possible in most undergraduate courses.

First term—Colonial: The development of selected European germs in an American environment, the divergence from the European types, and the final separation in the Revolution. The topics given most attention are the development of representative government in the different colonies, especially in New England; the effects of the Stuart restoration and the critical colonial period, 1660-1689; the character of French colonization and the cause of the failure of France in the struggle for the new world; the constitutional struggle preceding the Revolution and the progressive American standard of political rights.

Second term—The formation and organization of the Union: The transition from colonial to commonwealth governments; the central government under the confederation; the making of the constitution; the organization by the Federalists and the centralizing tendencies they set in motion; the victory of Jeffersonian democracy and the modification of Jeffersonianism in the war of 1812.

Third term—The Growth of Nationality: Social and economic conditions in 1800; territorial expansion; the frontier and its meaning; Jacksonian democracy; the slavery struggle; civil war and reconstruction; economic development and questions.

Course VI. American history since 1789 as shown in the development of state and federal constitutional law.

ASSISTANT PROFESSOR ANDERSON

Offered to advanced law students and qualified seniors. Two hours a week through the year.

This course is not designed to be a systematic treatment of either history or constitutional law. It consists of a careful analysis of cases selected from Thayer's Cases on Constitutional Law, studied in their historical setting and with reference to the course of development. Politics I and History V are suitable preparation.

Course VII. Europe since the French revolution.

Junior or senior i, ii, iii. PROFESSOR WEST

Open to those who have completed course i. Students will have Wilson's *The State or Lowell's Governments of Continental Europe*, and Andrews' *Fyffe*, or *Mueller*. The reserves are well supplied with multiple copies of the more desirable authorities, and a large part of the work is necessarily done from periodicals, annual registers, year books, and the like. The great movements of this century toward national autonomy and toward political and industrial democracy make the subject matter of the course. A chief aim is to put the student into intelligent contact with immediately contemporary history. The arrangement of the work by terms is as follows:

First term—The French Revolutions and France today. The course is introduced by lectures upon the state of Europe in the eighteenth century and by a more detailed study of the Old Regime in France, political, social, and economic. Special attention is given to the economic features of the Revolution and to the constructive work of the revolutionists and its continuation by Napoleon. A brief treatment of the government after the restoration, and of the revolution of 1830, and a fuller study of the revolution of 1848 and the Second Empire, with a rapid sketch of events since its fall, are followed by a more minute treatment of the present constitution and its workings, and of economic conditions today. Courses ii and iv are desirable as preparation.

Second term—Germany, Italy, and Austro-Hungary are taken up by topics, grouping events so far as possible about the successive French Revolutions already treated, with special attention to the reconstruction since 1848, to existing consti-

tutions and to present political and economic questions. The smaller western states are passed over rapidly in lectures, with a more careful study of the constitutions of Switzerland, and the Scandinavian states. This term's work affords much comparative study of constitutions.

Third term—The Eastern question is traced through the century; Russia; the new nations in the Balkan peninsula, with some account of the Turkish Empire; England since 1832, and her colonial empire: and European colonies in general.

GRADUATE COURSES.

Those desiring to take any of the following courses should make early application to the professor who offers them and should state order of preference and time of meeting preferred. Undergraduates with the approval of the department, will be admitted to many of these courses, for honors, subject to the rules of the faculty.

Course VIII. Medieval history.

PROFESSOR WELLS

One meeting a week through the year. Subject: Relations of Church and State.

A study of the rise and development of the organization of the church in its relations to (1) the Roman Empire before and after Constantine; (2) the Frankish Kingdom and Empire; (3) the Holy Roman Empire.

Course IX. Modern history.

PROFESSOR WELLS

One meeting a week through the year. Subject: The Reformation in Germany.

Introductory studies on the Papacy, Monasticism, Scholasticism, Humanism, Mysticism, Wiclif, Hus, Tauler, Wessel and Erasmus. Critical study of the life of Luther and of the reformation movement from the documents and contemporary or nearly contemporary writers. Ability to read German is required.

Course X. English constitutional history.

PROFESSOR WELLS

One meeting a week through the year. Critical and detailed study of the reign of Henry II, with special attention to the legal and constitutional reforms, based on a careful reading of the chronicles of William of Newburgh and Benedict of Peterborough. A working knowledge of Latin is required.

Course XI. English constitutional history.

PROFESSOR WELLS

One meeting a week through the year. Critical and detailed study of the reigns of Henry III and Edward I, with special attention to the establishment of the Great Charter and the evolution of Parliament. Based on a careful reading of Bracton and the Chronicles of Matthew Paris and William Rishanger. A working knowledge of Latin is required. Courses x and xi are not given in the same year.

Course XII. French constitutional history.

PROFESSOR WELLS

One meeting a week through the year. Subject: Fendalism in France, the evolution of the monarchy and the origin and constitution of the cities. Ability to read French is required.

Course XIII. Topical research in American colonial institutions.

PROFESSOR WEST

One meeting a week through the year. This seminar is open also to seniors who have completed course v. The scope of the work is indicated by the following topics selected from the list of those that have been pursued: Local government as seen in the Maryland manor, the patroon organization in New Netherlands, the New England town, the Virginia parish; evolution of bicameral legislatures; the use of the ballot; non-English influences; colonial taxation; colonial tariffs. For all research work in American history the library of the Minnesota Historical Society will be found a valuable addition to the resources of the University library.

Course XIV. A critical study of authorities for early New England history—based upon a reading of Winthrop's New England.

PROFESSOR WEST

This is primarily a course in historical criticism. Each member of the seminar has a group of secondary authorities assigned him whom he is to criticise in the light of the original sources. The study involves also a careful comparison of the chief

sources with each other, and incidentally it leads to a minute treatment of political, social, and economic development in early New England. The number admitted to the course is strictly limited to six.

Course XV. The making of the Constitution of the United States. PROFESSOR WEST

Two hours a week. Undergraduates who have completed course v with distinction will be admitted to this seminar, when the numbers are not otherwise full. Each member studies in detail the transition in one of the original colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia convention is then taken up and the accounts of later writers are compared with the sources. "We the people," the "compact" theory, and the province of the supreme court as "final arbiter," are topics especially investigated, with such further aids as the writings of the day and the discussions of the ratifying state conventions afford. Besides the class work each student will present a written report upon the history of some important bill providing for the admission of a state, and upon some constitutional question in connection with congressional legislation.

Course XVI. Constitutional and political history of the United States during the Civil War and the period of Reconstruction. PROFESSOR WEST

Courses xv and xvi will not be given in the same year.

Course XVII. Seminary in American political biography.

ASSISTANT PROFESSOR ANDERSON

In this course the work will each year center about the political activity of a single important character. In the choice of a subject two points will be especially borne in mind.

1. To select a character not only important *per se* but representative of some great historical movement or idea.
2. To select one who has left an abundance of material, valuable not only for his own part but throwing light upon the action of others.

It is the aim to give each member of the class an opportunity to work up carefully topical divisions of the field and an acquaintance with the entire body of writings relating to the subject somewhat more special than can be secured in the general courses. The subject for this year will be John Quincy Adams or James Madison as may be most acceptable to students desiring the course.

LATIN.

FOR UNDERGRADUATES.

Course I. Livy, books i and xxi and xxii. Freshman i and ii.

With sight reading from other writers of history; construction of the Latin sentence; composition of words, with special attention to laws of phonetic change; Latin composition based on the text; rise and development of Roman institutions.

Course II. Study of the rise and development of Roman literature. Freshman iii.

With reading of portions of the text of different authors.

Course III. Plautus and Terence. Sophomore i.

Study of early Latin, language and literature; development of the drama; Latin composition.

Course IV. Horace. Sophomore ii.

Study of his times, style and works.

Course V. Tacitus and Pliny. Sophomore iii.

Private life of the Romans.

Course VI. Oratory. Junior i.

Tacitus—Dialogues de Oratoribus, with selections from Cicero. Study of the elements, development and characteristics of Roman oratory.

Course VII. Tacitus annals and histories. History of the early empire.

- Course VIII. Outlines of Roman law.* Junior iii.
Lectures with translations, at sight, of texts illustrating the subject.
- Course IX. Lucretius, Cicero, Ovid, Roman mythology.* Senior i.
- Course X. Roman satire, Juvenal and Persius.* Senior ii.
Study of the elements and development of satire, with a comparison of the Roman writers in this field of literature.
- Course XI. Latin elegiac poetry.* Senior iii.
Embracing a comparative study of Catullus, Tibullus, Propertius and Ovid.
- Course XII. Patristic Latin.* [2], Senior i, ii.
Study of some of the early church fathers, especially Augustine and Lactantius.
Not offered in 1899-1900.
- Course XIII. Medieval Latin.* Senior ii.
Especially designed for advanced students in English history. Selections from the early Latin chronicles of England. Students desiring to take this course are requested to confer with the department of Latin two weeks before the beginning of the term.
- Course XIV. Latin writing.* Senior iii.
A study of Latin style. Translation of extended pieces of English prose into Latin.
Latin composition, *i. e.*, short essays composed in Latin.
- Course XV. Latin seminar,* once a week throughout the junior year.

FOR GRADUATES.

- Course XVI. Roman drama.* Plautus, Terence, Seneca, fragments.
- Course XVII. Roman history.* Livy, Tacitus, Suetonius.
- Course XVIII. Roman law.* Institutes and digest.
- Course XIX.* Same as course xiv.
- Course XX. Cicero* and his works— letters, philosophy and oratory.

MATHEMATICS.

FOR UNDERGRADUATES.

- Course I. Higher algebra.* Freshman i.
Simple equations, proportion, progression, variation, quadratic equations, simultaneous equations of the second degree, inequalities, binomial theorem, indeterminate coefficients and higher equations.
- Course II. Logarithms and plane and spherical trigonometry,* Freshman ii.
With numerous applications.
- Course III. Analytical geometry.* Freshman iii.
The conic sections, both by rectilinear and polar coördinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of coördinates, properties of loci by means of their equations.
- Course IV. Differential calculus.* Sophomore i, ii.
Differentiation of algebraic and transcendental functions, development of functions, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and curve tracing.
- Course V. Integral calculus.* Sophomore iii.
Integration of the various forms, rectification of curves, quadrature of plane and curved surfaces, cubature of volumes, equations of loci by means of the calculus.
- Course VI. Determinants and co-ordinate geometry of three dimensions.* Junior i, ii.
The plane, the straight line in space, quadric surfaces, applications. Each of the above courses requires all of the preceding course.

- Course VII. Method of least squares.* *Junior ii.*
A study of the combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics and astronomy. Open to all who have completed the first five courses.
- Course VIII. Descriptive geometry.* *Junior iii, Senior i.*
Problems relating to points, lines, planes, solids, surfaces of revolution and warped surfaces; orthographic, isometric, horizontal, oblique, and perspective projections; shades and shadows. Recitations, lectures and practice. Open to those who have completed courses i, ii, iii.
- Course IX. Applied mechanics.* *Senior i, ii, iii.*
Statics, dynamics, strength and elastic properties of the ordinary materials of construction, hydro-mechanics (study of the laws of pressure and the flow of liquids). Recitations and lectures. Open to those who have completed the first five courses.
- Course X. Differential equations.* *Senior ii, iii.*
Open to those who have completed the first five courses.

FOR GRADUATES.

- Course XI. Determinants.*
- Course XII. Advanced work in co-ordinate geometry.*
- Course XIII. Advanced work in differential calculus.*
- Course XIV. Advanced work in integral calculus.*
- Course XV. Quaternions.*
- Course XVI. Differential equations.*
- Course XVII. Theory of functions.*
- Course XVIII. Hyperbolic and elliptic functions.*
- Course XIX. Spherical projections.*
- Course XX. History of mathematics.*

Courses IV-X are offered to those who do not elect them in their undergraduate years.

MILITARY SCIENCE AND TACTICS.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of a battalion of infantry, and a platoon of artillery.

A uniform of prescribed pattern is worn by all cadets during drill.

The uniform consists of blouse, trousers, vest and cap, modeled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$20 and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman class i, ii, iii, and sophomore class i, ii, iii.

The sophomore class will be required to receive instruction in the elementary principles governing in the art of war, one hour per week, second term.

Military drill may be taken voluntarily by others outside of the freshman and sophomore classes and to encourage this, as it is considered beneficial not only to the individual student but to the State generally, the extra work is considered by allowing two year's drill to count as one study in the third term of the senior year. It is understood, however, that only one credit can be thus obtained.

Officers are selected by the commandant of cadets, and upon confirmation receive commissions signed by the president of the University and bearing the official seal. In general they are taken from the senior class, are required to be good students in the other departments, of soldier-like bearing and force of character, and able to pass a creditable examination in drill regulations.

Military instruction is intended to be so conducted as to develop a soldier-like bearing and foster a spirit of gentlemanly courtesy, soldierly honor and obedience to lawful authority, as well as to familiarize students with company and battalion manœuvres, guards and the theoretical and practical use of fire arms.

On the graduation of each class the commandant will report to the Adjutant-General of the Army the names of the graduates who have shown special aptitude for the military service and furnish a copy thereof to the Adjutant-General of the State.

The names of the three most distinguished students in Military Science and Tactics will, when graduated, be inserted in the U. S. Army Register and be published in General Orders from the Headquarters of the Army. Preference being given to those so reported in selecting officers to fill vacancies in the U. S. Army. (See Inspector-General's Report for (1891.)

MINERALOGY.

FOR UNDERGRADUATES.

Course I. General mineralogy.

Junior i. DR. BERKEY

The morphology of minerals, consisting of the elements of crystallography and the projection and construction of figures of crystals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and the rock making minerals; the basis of mineral classification.

Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analysis to the determination of species.

Course II. Descriptive mineralogy.

Junior ii. PROFESSOR HALL AND DR. BERKEY

The ores and economic minerals are described and their crystal forms, physical properties and chemical composition, together with their occurrence and association, are treated. The most important groups of minerals are studied. Minerals are discussed in their genetic relationships and distribution.

Laboratory practice in the determination of minerals; an introduction to the methods of quantitative blowpipe analysis; special topics; reference reading and discussions.

Course III. Quantitative mineralogy.

Junior iii. PROFESSOR APPLEBY AND MR. CHRISTIANSON

Determination of values of ores. Lectures, recitations and laboratory work. Course i, metallurgy, in the school of mines.

Course IV. The morphology of minerals.

Junior iii. DR. BERKEY

A study of crystallography, embracing projection and geometric relations of crystal planes.

Course V. Physical mineralogy.

Senior i. PROFESSOR HALL AND DR. BERKEY

A study of the structure of crystals and crystal grains as determining their transmission of electricity, heat and light; goniometric and stauroscopic practice, embracing the elements of lithology. Lectures and laboratory work.

Course VI. Physico-chemical methods, with their applications.

Senior ii. DR. BERKEY

The methods of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds.

Course VII. An outline of mineralogy.

Junior or senior. DR. BERKEY

A study of the methods of identification of minerals, with their applications. Conferences, readings and demonstrations. Once a week throughout the year.

FOR GRADUATES.

Course VIII.

PROFESSOR HALL AND DR. BERKEY

Original problems in morphological and physical mineralogy.

Course IX.

Special investigations in physical and chemical mineralogy.

DR. BERKEY

Course X.

Description of mineral occurrence and association. Genetic relationships. Field work in connection with the different phases of the particular problem in hand.

PROFESSOR HALL AND DR. BERKEY

MUSIC.

Students who are sufficiently advanced in music are allowed, under the conditions mentioned below, to take instrumental or vocal music as one study through the junior and senior years; provided that no student shall receive more than six credits in music and fine arts together.

For instrumental music, whatever the instrument, pupils must be sufficiently advanced to play, with facility and accuracy, the major and minor scales and the equivalent of Czerny's Velocity Studies for the piano. For vocal music, pupils must be able to read music with fair readiness and to have voice good enough to justify devoting time to the study. The student's fitness will be determined by examination.

A minimum of eight hours per week must be given to lessons and practice, the character of the work to be reported upon each term, as in the case of other studies.

The work to be taken under instructors in the Northwestern Conservatory of Music and the instruction to be paid for by those receiving it. The Conservatory makes special rates to the students of the University.

PEDAGOGY.

PROFESSOR KIEHLE

These courses are provided for those who wish, by a more extended scholarship and a more systematic study of education, to prepare for positions of supervision and teaching in the departments of higher education. They are also for the general student who, in the home and in the state, is interested in the proper care, training and education of children and youth, and who is willing to give to this subject the same intelligent study that is accorded to other problems of history and sociology.

*Course I. Philosophy of education.**Junior i.*

The study of this course will be from the standpoint of the developing mind, including subjects as the following; education defined; the development and education of mind conditioned by its physical embodiment; the natural order in the development of mental powers, and the proper method by which to improve them; education of the child in its social environment.

*Course II. Methodology.**Junior ii.*

This course is the counterpart of the preceding, being conducted from the standpoint of the subject matter as it is presented in the several subjects of science, including the following: the course of study; the conduct of the recitations; the natural order in which to prepare and present a given lesson.

*Course III. School systems.**Junior iii.*

This course will be for an inquiry into the provision which society makes for the education of its youth, and the methods by which schools are supported and their affairs administered. The following will be the order of study:

1. The school system of Minnesota.
2. A comparison of the systems and institutions of other states, and relation of the federal government to the whole.
3. The systems of Germany, France and England.

The courses in the history of education will consider the order of progress in which society prepares its youth for the duties of citizenship, and unifies them with itself at the various stages of civilization.

*Course IV. Ancient education.**Senior i.*

This will cover the pre-Christian period of Asiatic, Greek and Roman life. (Two days each week.)

*Course V. Medieval education.**Senior ii.*

Will trace the development of education within the reorganization of society in Europe under the direction of the Christian church. (Two days each week.)

*Course VI. Modern education.**Senior iii.*

Beginning with the Renaissance, this course will discuss the theories of education begotten of the spirit of Christian individualism as represented by men and movements of modern times. (Two days each week.)

Seminars—These will be offered weekly during the year for a more careful study of special educational problems, philosophies and classics, as the interests of students suggest.

Visitation of schools. By the courtesy of the boards of education and the superintendents, the students in pedagogy will pursue a systematic course of observation in the several grades of instruction in the cities of St. Paul and Minneapolis, to be reported and considered in class.

Lectures. A special course of twelve lectures upon important subjects will be given by professors and representatives of departments during the second term. The full program will be announced during the fall term.

The Pedagogical Society is an organization of graduate and undergraduate students pursuing work in this department. Its purpose is to investigate and report for discussion selected subjects and problems of education. Its meetings are held on the second Friday of each month, and its annual meeting for the election of officers is held in May.

PHILOSOPHY AND PSYCHOLOGY.

FOR UNDERGRADUATES.

COURSES IN PSYCHOLOGY.

*Course I. Descriptive psychology and logic.**Terms i, ii, iii.* PROFESSOR WOODBRIDGE AND DR. WILDE

Required of all sophomores in the civic course and open to juniors and seniors in other courses.

First term—Psychology of sensation.

Second term—Psychology of knowledge, feeling and will.

Third term—Elementary logic.

Text-books: James, Psychology, Briefer Course, and Jevons, Lessons in Logic.

*Course II. Experimental psychology.**Junior i, ii, iii.* MR. GALE

First term—Three hours a week in the psychology of the senses through lectures, demonstrations, experiments, and the reading of Ziehen, Introduction to Physiological Psychology; James, Psychology, and special works. One hour a week in the anatomy and physiology of the nervous system through lectures, demonstrations with models, original preparations, and lantern slides, and with practical laboratory dissections.

Second term—Association, memory, reasoning, feeling, and willing.

Third term—The phenomena of "psychical research", i. e., thought-transference, clairvoyance, theosophy, hypnotism, into insanity.

*Course III. Advanced psychology.**Senior i, ii, iii.* MR. GALE

Laboratory and experimental work in original research. Eight hours a week.

*Course IV. Physiological psychology.**Senior i.* MR. GALE

Special advanced study of brain cells and tracts through original material and through the comparative and development methods.

Course V. Anthropological psychology [2]. *Senior iii.* PROFESSOR WOODBRIDGE
Study of primitive intellectual, moral and religious conceptions. Two hours a week.

COURSES IN PHILOSOPHY.

Course I. History of philosophy.
Junior and senior i, ii, iii. PROFESSOR WOODBRIDGE AND DR. WILDE
Lectures and special study of individual philosophers.
First term—Greek philosophy. Special study of Plato.
Second term—Medieval and early modern philosophy. Special study of Descartes.
Third term—Modern philosophy. Special study of Hume.

Course II. The theory of knowledge. *Junior and senior i.* PROFESSOR WOODBRIDGE
Open only to students who have taken courses i or ii in psychology, or course i in philosophy.

Course III. Aesthetics. *Junior and senior i.* DR. WILDE
The history and principles of æsthetic theory.

Course IV. Fundamental problems of philosophy.
Junior or senior ii. PROFESSOR WOODBRIDGE
An introductory course in philosophy designed for students not electing long courses in the department.

Course V. The history of ethics. *Junior and senior ii.* DR. WILDE

Course VI. The principles of ethics. *Junior and senior iii.* DR. WILDE
Discussions of the fundamental notions of morality. May be elected in conjunction with course v, or independently.

FOR GRADUATES.

COURSES IN PSYCHOLOGY.

Course VI. Experimental psychology of feeling. MR. GALE
Rhythm, melody, harmony, color, proportion, movement, conduct.

Course VII. Experimental psychology of reasoning. MR. GALE
By question blanks, individual trials, analysis and other means.

Course VIII. Psychology of childhood. MR. GALE
Study of a larger mass of original material (on two children) than any yet published—especially in feeling and reasoning.

Course IX. Reading of psychological works in German, French and Italian. MR. GALE

Course X. Brain histology and brain microphotography. MR. GALE
Technical practice in the methods of Golgi and Weigert, and especially in the cutting of series. Study of a large and valuable collection of original preparations and photographs, with the works of Donaldson, Edinger, Obersteiner, Kölliker, His, Flechsig, Retzius, Golgi and Ramon y Cayal.

COURSES IN PHILOSOPHY.

Course VII. Pre-Socratic philosophy. PROFESSOR WOODBRIDGE
A critical study of the fragments of early Greek philosophy, with attempts at systematic reconstruction. 1898-'99.

Course VIII. The philosophy of Aristotle. PROFESSOR WOODBRIDGE
A critical reading of his logical treatises, the metaphysics and the psychology in the original Greek. 1899-1900.

Course IX. The philosophy of Kant. PROFESSOR WOODBRIDGE
A critical reading of the three Critiques; the relation of Kant to the development of modern philosophy. 1898-'99.

- Course X. The philosophy of Hume.* PROFESSOR WOODBRIDGE
A critical reading of Hume's philosophical works; the position of Hume in the development of English philosophy. 1899-1900.
- Course XI. Advanced logic.* PROFESSOR WOODBRIDGE
Theory of knowledge and analysis of belief.
- Course XII. Advanced ethics.* DR. WILDE
A critical reading of the chief historical works on ethics.
- Course XIII. The philosophy of Hegel.* DR. WILDE
Lectures and discussions on the development of Post-Kantian Idealism, 1899-1900.
- Course XIV. Post-Kantian Realism.* DR. WILDE
Lectures and discussions on the realistic opposition to Kant, 1900-01.

PHYSICAL CULTURE.

FOR WOMEN.

MISS KIEHLE

The course in physical culture is offered to the women of the University as a regular part of their work in the freshman year, and may be taken in any of the following years. It consists of systematic exercises for the freedom and development of all parts of the body.

It is a common observation that students often enter the University with an imperfect physical development because of an excessive use of some muscles, while others are weakened through disuse. This occasions attitudes and movements that are unseemly in appearance and unhealthful in their general effect.

The purpose of this course is to develop a strong and symmetrical physique with a graceful and easy carriage.

A physical examination is made of each student and physical measurements are taken in the fall and again in the spring.

In addition to the regular class work, "sports and pastimes" are open to all young women of the university. These include basket ball, battle ball and numerous other ball games, and also running games all of which tend to cultivate the play instinct and give the nerve stimulus that come from natural play.

FOR MEN.

DR. COOKE

A well equipped gymnasium in charge of a professional medical director is now open for the young men. The training and exercises will be under the immediate oversight and authority of the medical director and will be wholly with a view to the healthful physical development of the entire student body.

All young men are required to be examined by the medical director of physical culture upon registration and during the course as often as the indications of the physical condition may require.

The decision of the director will be either:

1. Advisory, indicating what course of hygiene and exercise will best sustain and improve the health of the student, or
2. Mandatory, requiring the students to pursue the course of hygiene and physical exercise necessary for the proper care of health, and the discharge of their duties as students.

Gymnasium work is required of all men in the freshman class, one hour per week, (in two half hour periods if the director so decides) throughout the year.

PHYSICS.

The mathematics of the freshman year is required as preparation for all courses in this department.

Course I (long—first year).

Sophomore i, ii, ii.

- (a) Dynamics.
- (b) Liquids, gases and sound.
- (c) Heat and light.

Course II (long—second year).

Junior i, ii, ii.

- (a) Static electricity.
- (b) Magnetism.
- (c) Voltaic electricity.

Open to those who have completed course i.

Course III (short).

Sophomore i, ii, iii.

General physics complete, with experimental lectures and laboratory practice.

Course IV. Heat, light and electricity.

Junior i, ii, iii.

With laboratory practice. Open to those who have completed course iii.

Course V. Advanced laboratory work

Senior i, ii, iii.

In diffraction, interference, polarization, calorimetry, electrical capacity and potential.

FOR GRADUATES.

Course VI. Advanced work in some special field; experimental investigations being the principal feature of the work.

Course V is also open to graduate students desiring the work.

POLITICAL SCIENCE.

FOR UNDERGRADUATES.

ECONOMICS.

Course I. Elements.

Junior i. ASSISTANT PROFESSOR MCVEY

A thorough course in the elements of economics. The text book work is supplemented by occasional lectures and special problems. The aim is to thoroughly inculcate accepted doctrine, and show the nature and bearings of questions unsettled. Text book, to be selected.

Course II. Modern industrialism.

Junior iii. ASSISTANT PROFESSOR MCVEY

The development of the modern industrial system from the middle of the eighteenth century. So far as time allows the phenomena of corporations, monopolies and trusts are treated. Particular attention is paid to the question of state interference.

Course III. English economic and constitutional history.

Junior or senior ii [2]. ASSISTANT PROFESSOR MCVEY

A course for advanced study of economic and constitutional topics in the history of England from the beginning of the fourteenth to that of the seventeenth century. The principal object is to show the interdependence of economic and constitutional movements. On the economic side such topics as manors, guilds, enclosures, peasant revolts, woolen industry, discoveries, invention and the formation of companies are treated. Given in co-operation with the history department. For further information see history course.

Course IV. Money and banks.

Senior ii [2]. PROFESSOR FOLWELL

A presentation of the general principles, and their exemplification in American experience.

Course V. American public economy.

Senior iii. PROFESSOR FOLWELL

The object is to open the subject of American administration and finance. Taxation is the leading topic. As time allows transportation, public education, protection, land policy, labor laws, weights and measures, receive attention.

POLITICS.

Course I. The state and the government. Junior ii. ASSISTANT PROFESSOR McVEY
The object of this course is to define the state and to show the historical development of government institutions. Examples of such growth are studied in the institutions of France, England and the United States.

Course II. Minnesota political institutions.
[2] Junior and Senior iii. ASSISTANT PROFESSOR McVEY

An analytic study of the commonwealth government, its growth and origin. This course includes the discussion of state and national relations. Papers on the various political institutions of the state are required from the students. Meets twice a week during the spring term. McVey's Handbook of Minnesota.

Course III. The elements of jurisprudence. Senior i. PROFESSOR FOLWELL
A summary of substantive private law and a brief synopsis of administrative law, followed by a discussion of the contents and construction of the organic law of modern free states.

Course IV. Public international law. Senior ii. PROFESSOR FOLWELL
An elementary course illustrated from American experience.

The preparation of papers on topics related to the instruction is part of the regular work in the courses given in this department.

Dr. McVey conducts during the year a society of volunteers of the junior sections who desire to write upon or debate subjects of current interest. Meetings, semi-monthly.

A moot senate meets weekly during the second term for practice in parliamentary procedure. Open to volunteers from the junior and senior classes.

SOCIOLOGY.

Course I. General Junior iii. DR. SMITH
History and principles of the science, with discussion of pauperism, crime, and care of unfortunates.

FOR GRADUATES.

The particular lines and subjects of study are selected by individuals or groups after consultation with the head of the department. So far as possible instruction will be given to groups. Courses may be expected in the following subjects.

Course V. Economic schools and movements. PROFESSOR FOLWELL

Course VI. Comparative economics. ASSISTANT PROFESSOR McVEY

Course VII. The science of statistics. PROFESSOR FOLWELL

Course IV. The science of the state. POLITICS, PROFESSOR FOLWELL

Course V. Comparative politics. PROFESSOR FOLWELL

Course VI. The neutrality of states. PROFESSOR FOLWELL

Course II. Comparative sociology. SOCIOLOGY, DR. SMITH

Course III. Anthropology. DR. SMITH

Course IV. Social institutions. DR. SMITH

When found advantageous these courses or some of them may be offered in alternate years.

For fuller details regarding graduate courses see circular No. 2, departments of political science and history.

When insufficiently grounded in elementary subjects, graduates are permitted to join undergraduate classes, but are expected to do more work than is required of undergraduates.

The *political science seminar* conducted by Professor Folwell meets weekly on Fridays at 1:30 p. m. throughout the year. Open to all graduate students of the department and to seniors especially interested.

PUBLIC HEALTH (SANITARY SCIENCE).

FOR UNDERGRADUATES.

Course I. Personal health. PROFESSOR HEWITT

Its essentials: how the individual is to obtain and use them. One hour a week.

Laboratory work, elementary examination of air, light, water, soil, clothing and food as affecting health.

Course II. The hygiene of the family and the house. [1] *Junior iii.*

Lecture, one hour a week. Laboratory (optional), two hours or more a week. Experimental work in ventilation and lighting, water supply, disposal of refuse of habitations, prevention and control of ill health and disease, duty of the family to the community.

Course III. Public health of communities and states. [2] *Junior iii.*

Its essentials and their relations to pressing social and political problems. International hygiene. One hour a week. Laboratory work (optional), (two hours a week), experimental study of public water supply, disposal of refuse, the hygiene of public buildings, streets, parks, etc. Boards of health and sanitary organizations.

FOR GRADUATES.

Course IV. Sanitary chemistry and physics as used in practice. Examples and experiments.

Course V. Sanitary relations of plants and animals to human health, demonstrations by experiments and examples.

Course VI. Literature and practice of the examination of water and air supply, illustrated by the study of existing examples and experiments.

Course VII. The causes of ill health, sickness and premature death, their discovery and prevention. Text-book and laboratory demonstration.

RHETORIC AND ELOCUTION.

RHETORIC.

Course I. Rhetoric. *Freshman i, or ii, or iii.*

Course II. English composition and rhetoric. *Sophomore i, ii.*

Course III. Addresses, toasts, orations. *Sophomore iii.*

Course IV. Literary criticism. *Junior i, ii, iii.* PROFESSOR SANFORD

Study of models of English poetry, oratory, fiction, etc., with critical essays.

Open to those who have completed course i.

Course V. Lectures upon the history of art. *Senior iii.* PROFESSOR SANFORD

With essays on art subjects. Open to students who have completed course i.

Course VI. Debate. *Junior or senior i, ii.* PROFESSOR SANFORD

Course VII. Advanced rhetoric. *Junior i, ii, iii.* MR. FIRKINS

Course VIII. Applied English etymology. *Agricultural freshmen i.* MR. FIRKINS

(b) *Applied English syntax.* *Agricultural freshmen ii.*

ELOCUTION.

Course IX. Reading. *Sophomore ii, iii.* ASSISTANT PROFESSOR McDERMOTT

Sketches from standard authors studied with special attention to articulation, enunciation, flexibility of voice and purity of tone.

Course X. Gesture, voice building and principles of vocal expression.

[2] *Junior i.* ASSISTANT PROFESSOR McDERMOTT

This course aims at the following objects: An understanding of the vocal mechanism; the strengthening and cultivation of the voice; the correction of foreign accent, defective enunciation and common faults of quality such as aspirated, oral, pectoral, guttural and nasal tones; the specific application of the principles of clearness, simplicity, strength and variety in delivery. Interpretation is approached from within not from without and correct thinking is made the basis of correct expression.

Course XI. The psychological side of vocal expression [2].

Junior ii, iii. ASSISTANT PROFESSOR McDERMOTT

In this course the functions of the dramatic instinct, the will, the intellect, the imagination and the emotions are considered independently and conjointly with reference to delivery. The effect upon expression of the neglect of any one of these elements is shown, and literature is studied with a view to the harmonious development of all.

Course XII. The vocal interpretation of miscellaneous classic literature.

[2] *Junior i.* ASSISTANT PROFESSOR McDERMOTT

This course is supplementary and is intended to give opportunity for further practice of principles taught in course x and xi; but it may be taken independently and is open to any qualified junior or senior.

Course XIII. The vocal interpretation of American poets.

Junior ii. ASSISTANT PROFESSOR McDERMOTT

This is a continuation of course xii.

Course XIV. The vocal interpretation of British poets.

[2] *Junior iii.* ASSISTANT PROFESSOR McDERMOTT

This is a continuation of course xiii.

Course XV. American oratory. [2] *Senior i.* ASSISTANT PROFESSOR McDERMOTT

Standard orations are analyzed; synopses, oral biographies, accounts of historical settings and expositions of the orator's style and logic are required. Original orations and debates are prepared, and a short selection from the oration under consideration is committed for practice in delivery. Beside class, work each student is given a brief period for individual criticism; for this reason only a limited number can be taken.

Course XVI. British oratory. [2] *Senior ii.* ASSISTANT PROFESSOR McDERMOTT

Course XVII. Ancient oratory. [2] *Senior iii.* ASSISTANT PROFESSOR McDERMOTT

NOTE—Oratory may be taken as a half credit during the senior year, or it may be combined with either of the junior half credit courses and constitute a full credit. No student is admitted to oratory without examination unless he has completed one of the junior courses or unless he carries one of the junior courses with oratory. After the first term no student is admitted to junior work except upon examination. Courses x and xi are consecutive and constitute a half credit if taken throughout the junior year, but may be combined with xii, xiii and xiv to constitute a full credit.

SCANDINAVIAN LANGUAGES.

Course I. For beginners. *Junior and senior i, ii, iii.* PROFESSOR BREDÅ
Smith's grammar, Bennett's Phrase Book; Broch's Læsestykker; blackboard and oral exercises; composition

Course II. Advanced.

FIRST YEAR. (a) *Lectures* [2]. *i, ii, iii.*

History of Scandinavian languages; Scandinavian archæology; Norse mythology; history of the viking age; history of Icelandic, Norwegian, Danish and Swedish literatures from the earliest times to 1500.

SECOND YEAR. (a) *Lectures* [2]. *i, ii, iii.*

History of Danish, Norwegian and Swedish literatures from 1500 to 1800, in connection with the history of the respective countries.

THIRD YEAR. (a) *Lectures* [2]. *i, ii, iii.*

History of Danish, Norwegian and Swedish literatures in the 19th century, in connection with the history of the respective countries.

(b) *Throughout the course* [2]. Critical reading of masterpieces of Scandinavian literatures; essays and practical exercises.

The advanced course is open to all students properly qualified.

Junior and senior iii.

Course III. Old Norse.

(a) Sweet's Icelandic Primer.

(b) Wimmer's Formlaere.

(c) Nygaard's Udvalg af den Norroene Literatur.

FOR GRADUATES.

Course IV. Old Norse.

Gunnlaugssaga Ormstungu; Snorra Edda; Sæmundar Edda; Heimskringla.

Old Swedish. Noreen's Altschwedisches Lesebuch.

PROFESSOR BREDÅ

THE WEYERHAEUSER CHAIR OF SEMITIC LANGUAGES
AND HISTORY.

Course I. Hebrew accidence and syntax. *Junior or senior i, ii, iii.* PROFESSOR JEWETT
Translations from and into Hebrew.

Course II. Critical study of Isaiah. Twice a week. *Junior or senior iii.*

Course III. Assyrian. Grammar and reading of selected texts. *Junior or senior i.*

Course IV. Arabic. Grammar and reading of selected texts. *Junior or senior ii and iii.*

Course V. Aramaic. (a) *Classical*; (b) *Biblical.* Grammar and reading of selected texts. *A and b* will each come twice a week through the third term and will be offered in alternate years. *A* will be given in 1897-'98 and *b* will be given in 1898-'99.

Course VI. History of the Hebrews.

(a) From the earliest times to the fall of Samaria.

(b) From the fall of Samaria to A. D. 70.

Junior or senior i.

Junior or senior ii.

Course VII. Mohammedan history to the end of the Crusades.

This course may be taken independently of course vi.

Junior or senior iii.

The Teachers' Course

The course covers two years, or twenty-four terms work. In order to secure reasonable thoroughness in the subject matter, at least twelve terms, in addition to pedagogy, must be selected from the following list, and the study chosen must be pursued at least three terms. Preparatory to pedagogy two terms must be given to psychology, with the option of giving the second to logic. Psychology may be taken with pedagogy at the beginning of the teachers' course. The remaining terms may be selected under the general regulations of the University.

Latin,	Botany,	Geology,
French,	Zoölogy,	Pedagogy,
German,	Physics,	Philosophy,
English,	Chemistry,	History,
Political Science,	Mathematics, including Astronomy,	

The course of special lectures and the seminars are optional without credit; provided, however, that students who take at least ten or twelve special lectures, with the required readings and examinations upon the same—equivalent to half a term's work—will be allowed one half term's credit.

CONDITIONS FOR ENTRANCE.

This course is elective to juniors and seniors pursuing regular courses in the college of science, literature and the arts.

It is also open to all graduates from the advanced course of the State normal schools of Minnesota, who have had one year's experience in teaching; to all graduates of State high schools of the first and second classes, who have had two years' experience in teaching; and to all who can pass the entrance examinations for any course in this college, and who have had two years' experience in teaching.

THE UNIVERSITY TEACHERS' CERTIFICATE.

Students who complete the teachers' course, and all who complete courses for degrees in the college of science, literature and the arts, and have also completed the required courses in pedagogy, will receive, upon the vote of the faculty, this certificate, which by State law authorizes them 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 perpetual by the indorsement of the state superintendent of public instruction and the president of the University.

UNCLASSED STUDENTS.

Applicants for admission as unclassified students must present credentials, or pass examinations, entitling them to admission to the freshman class as regular students. It is provided, however, that persons of mature years, who are well prepared for the work they wish to take, may be admitted by a vote of the faculty. Unclassified students who have been previously enrolled must renew their application at the beginning of each year as though applying for the first time. Unclassified students desiring to change their lines of study must again present their application to the committee.

The committee on unclassified students will meet daily during examination (the first) week of the first term in president's office, to consider applications, and all applications must be presented to the committee and not to individual members. Unclassified students will not be admitted after the third week of the term. Action upon applications made after that time will be deferred until the beginning of the following term. Students who are admitted are not allowed to pursue more than two lines of study. All applications, after they have been approved, are to be placed on file with the registrar.

No unclassified student is admitted to the work of the junior or senior year until after a full year's work in the lower classes—but the committee on unclassified students may allow exceptions in case of persons of mature age, upon recommendation of departments concerned.

THE UNIVERSITY SUMMER SCHOOL.

This school will open Monday, July 31st, and continue in session four weeks, closing Friday, August 25th. This school is organized under the authority of the Department of Public Instruction in the interest of the teachers of the high schools and the graded schools of the State. The instruction will be given in two sections.

I. THE UNIVERSITY SECTION,

which will provide for special and graduate work in several university subjects for teachers in high schools, and for others who wish, as students, to continue work in lines already begun. Instruction will be given by members of the University faculty or under their supervision, and as the work is completed credit will be given upon the records of the University. All of the advantages of the laboratories, museums and library of the University will be open to the classes of this section.

II. THE ELEMENTARY SECTION

will provide for teachers of the primary and elementary grades in the study of common school subjects with a view to teaching them. These will include arithmetic, grammar, history of the United States, physiology, botany, physics, music, penmanship, and special method courses with illustrative lessons.

Circulars of information will be sent free upon application to the superintendent of public instruction, St. Paul, or the registrar of the University.

School of Technical and Applied Chemistry

GENERAL STATEMENT.

The regular four years' course in the School of Chemistry, leading to the degree of bachelor of science, is designed for those who wish to become teachers of chemistry, analysts, investigators, manufacturing and applied chemists. The course here presented includes general, organic, analytical theoretical and applied chemistry. The course includes, beside these various chemical subjects, extended work in physics, metallurgy, mineralogy, crystallography, geology, botany, bacteriology, drawing, language and mathematics. Electives are offered in the senior year which will enable the student to extend the range of work if desired. It is therefore intended that, besides the special design, the student will find the work of sufficient range to give him a broad, liberal scientific education.

UNCLASSED STUDENTS.

Unclassed students are subject to the same rules and regulations as other unclassified students in the college of science, literature and the arts.

GRADUATE WORK.

The degree of master of science or doctor of philosophy will be conferred upon graduates of any reputable college or university upon fulfillment of the regular requirements of the University. (See graduate department.)

ELECTIVES.

These are offered in order to give the students an opportunity of selecting subjects important to them, but which are not at present included in the regular course. The chief object is to enable them to take up animal biology and its allied subjects preparatory to special physiological chemistry. The course is also arranged so that history of philosophy, economics and history may be conveniently taken.

EQUIPMENT.

Laboratories. The chemical laboratories consist of twenty-four rooms fitted for general, analytical and a wide range of technical and research work. On the third floor of the building devoted to chemistry and physics are the general laboratories, general lecture and preparation rooms and the industrial museum. On the second floor are the analytical laboratories, library and balance room, organic lecture room, water analysis room, professors' private laboratories and office of the director of the laboratories. On the first floor are the organic and research laboratories, gas analysis rooms, technical laboratories and store rooms.

The general laboratories are arranged with ventilating hoods and with modern laboratory tables, supplied with cupboards and drawers, and with water and gas. The technical laboratories are arranged with laboratory tables especially adapted to the work for which they were designed. The store rooms are supplied with apparatus and chemicals necessary for general and analytical work. The laboratories are especially well supplied with lecture apparatus, balances, microscopes, spectrosopes, polariscopes, charts and models, glass and platinum ware; with technical apparatus for general commercial analysis, soil analysis, for water and gas analysis, for iron and steel analysis and for the analysis of sugar, milk, butter and other products.

Library. The chemical library contains complete sets of many of the more important journals. It contains besides these special sets, a well represented list of analytical and technical works, as well as many rare old works of great historical value. Most of the important journals are taken, thus enabling the student to keep abreast of the times. All books are easily accessible, with only the necessary restrictions to guard against injury and loss.

INDUSTRIAL MUSEUM.

Considerable space is given to a collection in industrial, technical and applied chemistry. There is a large collection of chemicals with specimens of each in the various stages of preparation and purification. A collection of nearly all the elements with most of their important salts; a large number of mining and metallurgical specimens, including most of the important ores, together with many rare specimens in crystallography. The collections of coals and petroleum are especially valuable for lecture and technical work. There is a large collection of dyes, organic and inorganic, mordants, textile, and other materials used in dyeing and bleaching, with a rapidly increasing collection of clays and materials used in the making of glass, earthenware, porcelain and brick. A collection of furnace products, models and series of charts, blue prints and photographs illustrating a wide range of technical and chemical processes is being added.

COURSE OF STUDY.

FRESHMAN YEAR.

FIRST TERM.

Algebra (3)
Trigonometry (2)
German or French or
Latin or English (4)
Chemistry (4)
Freehand drawing (4)
Military drill (2)

SECOND TERM.

Algebra (3)
Trigonometry (2)
German or French or
Latin or English (4)
Qualitative analysis (4)
Constructive geometry (4)
Military drill (2)

THIRD TERM.

Descriptive Geometry (4)
Analytical geometry (2)
German or French or
Latin or English (4)
Qualitative analysis (4)
Elementary mechanics (4)
Military drill (2)

SOPHOMORE YEAR.

Analytical geometry (5)
German or French (4)
Physics (4)
Mineralogy (4)
Quantitative Analysis (4)
Bacteriology (2)
Military drill (2)
Rhetorical work (1)

Botany (4)
German or French (4)
Physics (4)
Mineralogy (4)
Quantitative Analysis (4)
Military drill (2)
Rhetorical work (1)

Botany (4)
German or French (4)
Physics (4)
Organic Chemistry (4)
Quantitative Analysis (4)
Assaying (3) lab. Monday
Military drill (2)
Rhetorical work (1)

JUNIOR YEAR.

Organic chem. (4)
Geology (4)
Physics (4)
Water Analysis (4)
Metallurgy (3)
Inorganic Preparations (3)

Theoretical chemistry (3)
Geology (4)
Physics (3)
Iron & Steel Analysis (4)
Wine & Beer Analysis (2)
Gas Analysis (4)
Metallurgy (3)

History of chem. (4)
Applied geology (4)
Metallurgy (3)
Micro-chemistry (3)
Colloquium (2)
Industrial chemistry (4)
Crystallography (3)

SENIOR YEAR.

Chemistry of Car-
bohydrates (4)
Metallurgy (4)
Mineral analysis (3)
Colloquium (2)
Elective [4]
Elective [4]
Thesis

Electro-chemistry (3)
Metallurgy (4)
Geology (4)
Special problems (3)
Elective [4]
Elective [4]
Thesis

Food adulterations (2)
Photographic chemistry (2)
Electro-metallurgy (4)
Applied chemistry (2)
Metallurgy (4)
Elective [4]
Elective [4]
Thesis

COURSES IN CHEMISTRY.

- Course I. The metallic elements.* *Freshman i.* 96 hours.
Lectures and laboratory work. The course includes a study of the more common metals, their compounds and characteristic reactions.
- Course II. Qualitative analysis.* *Freshman ii.* 96 hours.
Lectures and laboratory work. The course includes the qualitative separation and the characteristic tests for the more common metals. Open to those who have completed course i.
- Course III. Qualitative analysis.* *Freshman iii.* 96 hours.
Lectures and laboratory work. The course includes a study of the acids, their detection and separation. Open to those who have completed course ii.
- Course IV. Quantitative analysis.* *Sophomore i.* 96 hours.
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis. Open to those who have completed course iii.
- Course V. Quantitative analysis.* *Sophomore ii.* 96 hours.
Lectures and laboratory work. A continuation of course iv. Open to those who have completed course iv.
- Course VI. Volumetric analysis.* *Sophomore iii.* 96 hours.
Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. Open to those who have completed course v.
- Course VII. Theoretical chemistry.* *Junior i.* 48 hours.
Lectures and readings. The course includes a study of Lothar Meyer's *Modernen Theorien der Chemie*, Oswald's *Grundriss der Allgemeinen Chemie* and Remsen's *Theoretical Chemistry*. Open to those who have completed course iii.
- Course VIII. History of chemistry.* *Junior ii.* 48 hours.
Lectures and reading. The course includes a full historical discussion of alchemy and chemistry. Open to those who have completed course iii.
- Course IX. Organic chemistry.* *Junior iii.* 96 hours.
Lectures and laboratory work. The course includes the aliphatic series with a preparation of the more important compounds, supplemented by Levy's *Anleitung für Darstellung Organischer Präparate*. Open to those who have completed course v.
- Course X. Organic chemistry.* *Junior i.* 96 hours.
Lectures and laboratory work. A continuation of course ix. The course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's *Organischer Präparate*. Open to those who have completed course ix.
- Course XI. Water analysis.* *Junior i.* 96 hours.
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water. Open to those who have completed course vi.
- Course XII. Gas analysis.* *Junior ii.* 96 hours.
Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases. Open to those who have completed course xi.
- Course XIII. The chemistry of sugar.* *Senior i.* 96 hours.
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis. Open to those who have completed course vi.

- Course XIV. Industrial chemistry.* *Senior iii, 48 hours.*
Laboratory work and reading. The course includes the analysis of various commercial products. Open to those who have completed course vi.
- Course XV. Wine and beer analysis.* *Senior ii, 48 hours.*
Lectures and laboratory work. The course includes the determination of alcohol and other constituents in wine and beer, with a special study of fermentation. Open to those who have completed course vi.
- Course XVI. Special problems.* *Senior i, 48 hours or more.*
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems. Open to those who have completed course vi.
- Course XVII. Photographic chemistry.* *Senior iii, 48 hours.*
Lectures and laboratory work. The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography. Open to those who have completed course vi.
- Course XVIII. Domestic chemistry.* *Senior iii, 96 hours.*
Lectures and laboratory work. The course includes a study of the common household products, as sugar, starch, bread, soap, soda, vinegar, coffee, tea; the various ethereal oils, spices, milk and meat. Open to those who have completed course v.
- Course XIX. Electro-chemical analysis.* *Senior ii, 48 hours.*
Lectures and laboratory work. The course includes the qualitative and quantitative separation of the metals by electrolysis. Open to those who have completed course vi.
- Course XX. Micro-chemical analysis.* *Junior iii, 48 hours.*
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substances by means of the microscope. Open to those who have completed course vi.
- Course XXI. Applied chemistry.* *Senior iii, 48 hours.*
Some of the subjects discussed in this course are: Pigments, paints, oils, varnishes, gun powder, nitro-glycerine, gun cotton and the chemical manufacture of acids, bases and salts. Open to those who have completed course vi.
- Course XXII. Food adulterations.* *Senior iii, 48 hours.*
An examination of common food products for adulterants. Open to those who have completed course vi.
- Course XXIII. Iron and steel analysis.*
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods as well as the determination of associated elements, sulphur, phosphorus, silicon, manganese, carbon and others. Open to those who have completed course vii.
- Course XXIV. Mineral analysis.*
The course includes the analysis of building stones and some of the most important minerals.
- Course XXV. Inorganic preparations.*
The preparation of inorganic salts, supplemented by Bender's Anorganische Präparatkunde.
- Course XXVI. Colloquium.* A thorough quiz in general inorganic chemistry.
- Course XXVII. Colloquium.* A thorough quiz in general organic chemistry.
- Course XXVIII. Special problems.*
This course includes work on ores of base metals, limestones, slags, etc. 48 hours or more.

THE COLLEGE OF

ENGINEERING AND
THE MECHANIC ARTS

The College of Engineering and the Mechanic Arts

FACULTY.

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FREDERICK S. JONES, M. A., *Professor of Physics.*

ANTHONY ZELENY, M. S., *Instructor in Physics.*

HENRY A. ERICKSON, B. E. E., *Instructor in Physics.*

OFFICERS OF THE DEPARTMENT OF CHEMISTRY.

CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*

GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*

OFFICERS OF THE DEPARTMENT OF DRAWING AND INDUSTRIAL ART.

WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*

AMELIA I. BURGESS, *Instructor in Freehand Drawing.*

NELLIE S. TRUFANT, *Instructor in Freehand Drawing.*

HENRIETTA CLOPATH, *Instructor in Freehand Drawing.*

OTHER DEPARTMENTS GIVING INSTRUCTION.

CHRISTOPHER W. HALL, M. A., *Professor of Mineralogy.*

CHARLES P. BERKEY, Ph. D., *Instructor in Mineralogy.*

JOHN G. MOORE, B. A., *Professor of German.*

CHARLES W. BENTON, Litt. D., *Professor of French.*

HARRY A. LEONHÆUSER, Lieutenant U. S. A., *Professor of Military Science.*

FRANK M. WARREN, *Instructor in Military Science.*

FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy.*

WILLIAM S. PATTEE, LL. D., *Lecturer on Contracts and Torts.*

HARRY W. DIXON, *Engineer.*

SPECIAL LECTURERS, 1898-'99.

In addition to the regular work of instruction given by the officers of the University, lectures are given by non-resident engineers on special subjects. Practical engineers who are leaders in their profession contribute one or more lectures each, according to the nature of the subject.

The following lecturers have contributed to this course during the past year.

WM. I. GRAY, E. E., *Electrical Engineer and Contractor, Minneapolis.* Electric light plants for small towns.

J. J. CARTY, *Chief Engineer, New York Telephone Company, New York City,* Telephone Disturbances.

TRUMAN HIBBARD, *General Manager, Willow River Electric Light and Power Company, Hudson, Wisconsin.* Hydro-Electric Power Plants.

CAPTAIN FREDERICK V. ABBOTT, U. S. A., *St. Paul.* Coast Defenses.

A. B. CHOATE, *Minneapolis.* Highway Legislation.

E. E. WOODMAN, *St. Paul.* Economics of Railway Transportation.

ORGANIZATION OF THE COLLEGE.

In this college there are three regular courses of study, viz: civil engineering, mechanical engineering and electrical engineering, leading to corresponding professional degrees.

DRAWING AND INDUSTRIAL ART.

A four years' course, in drawing and industrial art, is offered to students prepared for admission to the freshman class, and who show a talent for such work. No degree is offered for the completion of this course.

UNCLASSED STUDENTS.

Applicants for admission as unclassified students must present credentials, or pass examinations, entitling them to admission to the freshman class as regular students. It is provided, however, that persons of mature years, who are well prepared for the work they wish to take, may be admitted by a vote of the faculty. Unclassed students who have been previously enrolled must renew their application at the beginning of each year as though applying for the first time. Unclassed students desiring to change their lines of study must again present their application to the committee.

The committee on unclassified students will meet daily during examination (the first) week of the first term in room 24, mechanic arts building, to consider applications, and all applications must be presented to the committee and not to individual members. Unclassed students will not be admitted after the third week of the term. Action upon applications made after that time will be deferred until the beginning of the following term. Students who are admitted are not allowed to pursue more than two lines of study. All applications, after they have been approved, are to be placed on file with the registrar.

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS.

The importance of special interest and thoroughness in the mathematics required for admission, is urged upon the attention of those who are preparing to take any of the courses in engineering.

For a detailed statement of the preparation expected under each of the following subjects, see statement under requirements for admission to the college of science, literature and the arts, pages 52 to 57 of this catalogue.

- English classics, (a) and (b).
English composition, (one year).
Elementary algebra, (one year).
Higher algebra, (one-half year).
Plane geometry, (one year).
Solid geometry, (one-half year).
History of Greece and Rome, (one-half year).
Europe in the Middle Ages, or English history, (one-half year).
Civil government, (one year), will be accepted in lieu of this history requirement.
Physics, (one year).
Chemistry, (one year).

Any two of the following, (one-half year each):

- Physiology,
Botany,
Astronomy,
Geology,
Zoology.

English, (two years) and German or French, (two yr. .) } or { German, (two years) and French, (two years) } or { Latin, (four years).

Students who lack more than two year-credits, of the subjects required for admission, cannot be admitted until further preparation has been secured.

ADMISSION—GENERAL REQUIREMENTS.

For a statement of the general regulations governing admission, including examinations, certificates, credentials, conditions, accredited schools, choosing of courses, and advanced standing; daily routine; University examinations; fa lure to do satisfactory work; and graduation; see pages 48 to 52 of this catalogue.

COURSES OF STUDY.

FRESHMAN YEAR.

FIRST TERM.

The same for all courses: Mathematics, 5; German, 4, or French, 4; General chemistry, 4; Freehand drawing, 4; Carpentry, 3; Military drill, 2.

SECOND TERM.

For the civil engineering course: Mathematics, 5; German or French, 4; Qualitative analysis, 4; Mechanical drawing, 4; Surveying, 3; Military drill, 2.

For the mechanical and electrical engineering courses: Mathematics, 5; German or French, 4; Qualitative analysis, 4; Mechanical drawing, 4; Carpentry, 3; Military drill, 2.

THIRD TERM.

For the civil engineering course: Descriptive geometry, 4; German or French, 4; Surveying, 4; Platting, 2; Mathematics, 4; Military drill, 2.

For the electrical and mechanical engineering courses: Mathematics, 4; German or French, 4; Qualitative analysis, 4; Descriptive geometry, 4; Pattern work and foundry, 3; Military drill, 2.

SOPHOMORE YEAR.

FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Analytical geometry, 5.	Analytical geometry, 5.	Analytical geometry, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Materials of engineering, 2.	Materials of engineering, 2.	Materials of engineering, 2.
Descriptive geometry, 4.	Descriptive geometry, 4.	Descriptive geometry, 4.
Topography, 4.	Pattern work and foundry, 4.	Pattern work and foundry, 5.
Rhetorical work, 1.	Rhetorical work, 1.	Rhetorical work, 1.
Military drill, 2.	Military drill, 2.	Military drill, 2.

SECOND TERM.

Differential calculus, 5.	Differential calculus, 5.	Differential calculus, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Highways, 3.	Working drawings, 4.	Working drawings, 4.
Engineering instruments, 4.	Mechanism, 2.	Mechanism, 2.
Working drawings, 4.	Machine work, 5.	Machine work, 5.
Rhetorical work, 1.	Rhetorical work, 1.	Rhetorical work, 1.
Military drill, 2.	Military drill, 2.	Military drill, 2.

THIRD TERM.

Integral calculus, 5.	Integral calculus, 5.	Integral calculus, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Higher surveying, 4.	Mechanism, 2.	Mechanism, 2.
Field work, 4.	Forge work, 4.	Forge Work, 4.
Practical astronomy, 2.	Kinematic drawing, 4.	Kinematic drawing, 4.
Rhetorical work, 1.	Rhetorical work, 1.	Rhetorical work, 1.
Military drill, 2.	Military drill, 2.	Military drill, 2.

JUNIOR YEAR.

FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Curves and earthwork, 3.	Machine design, 4.	Machine design, 4.
Field work, 4.	Machine construction, 5.	Machine construction, 5.
Electric power, 4.	Industrial electricity, 2.	Industrial electricity, 2.

SECOND TERM.

Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Materials of engineering, 2. (Mech. laboratory).	Materials of engineering, 2. (Mech. laboratory).	Materials of engineering, 2. (Mech. laboratory.)
	Tool construction, 4.	Tool construction, 4.
Geology, 4.	Steam engine, 2.	Steam engine, 2.
Stresses in framed structures, 5.	Machine design, 4.	Machine design, 4.

THIRD TERM.

Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Structural details, 3.	Electrical laboratory, 3.	Electrical laboratory, 5.
Railroad work, 5.	Machine design, 4. (Valve gear).	Electrical design, 3.
or		
Municipal engineering, 4.	Dynamos and motors, 4.	Dynamos and motors, 4.
General astronomy, 4.	Steam engine, 2.	Steam engine, 2.
Stresses in framed structures, 4.	Mechanical laboratory, 2.	Mechanical laboratory, 2.

SENIOR YEAR.

FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Masonry, 5.	Thermodynamics, 5.	Thermodynamics, 5.
	Measurement of power, 2.	Electrical laboratory, 3.
Hydraulics, 4.	Steam boilers, 2.	Alternating currents, 5.
Bridge engineering, 5.	Machine design, 4. (Steam engine).	
Experimental laboratory, 2.	Mechanical laboratory, 3.	Mechanical laboratory, 3.
Elective, 4.	Elective, 4.	Elective, 4.

SECOND TERM.

Bridge design, 5.	Prime movers, 3.	Prime movers, 3.
	Gas engines, 2.	Alternating currents, 4.
Railway economics, 3.	Mechanical laboratory, 4.	
Experimental laboratory, 3.	Electrical laboratory, 2.	Electrical laboratory, 3.
Sanitary engineering, 3.	Machine design, 4.	Plant operation, 2.
	or	
	Railway design, 4.	Electric lights, 2.
Least squares, 2.	Electric lights, 2.	Electrical design, 2.
	or	or
	Electric railway, 2.	Electric railways, 2.
Elective, 4.	Elective, 4.	Elective, 4.
Thesis.	Thesis.	Thesis.

THIRD TERM.

Swing and arched bridges, 4.	Designs and specifications, 4.	Designs and specifications, 5.
	or	
	Railway design, 4.	
Geodesy, 3.	Mechanical laboratory, 4.	Electrical transmission, 4.
Law, 1.	Law, 1.	Law, 1.
Field work, 4.	Compressed air, 2.	
Suspension and arch bridges, 3.	Pumping machinery, 2.	Central stations, 2.
	Elective, 4.	Elective, 4.
Thesis, 4.	Thesis, 4.	Thesis, 4.

NOTE 1 For special work along railway engineering lines, see page 122.

NOTE 2. A course in elementary structural engineering is offered as an elective during the first term of the senior year, to mechanical, electrical and mining engineers.

Courses of Instruction

THE MODERN LANGUAGES.

The work in modern languages will be directed to those practical ends which are so essential to a well-rounded technical education. One year's work in German or French, is required. The grammar and extracts from standard authors, among them distinguished scientific men, receive such attention that the student may prepare himself for mastering technical literature.

GERMAN.

Course I. For those who present German for admission.

- (a) Schiller, *Gedichte and Braut von Messina*;
- (b) Goethe, *Gedichte and Italienische Reise*;
- (c) Dippold's *German Science Reader*;

Course II. For those who enter the University without German.

- (a) Joynes-Meissner's *German Grammar*;
- (b) Whitney's *German Reader*; grammar continued;
- (c) Scientific prose selections.

FRENCH.

Course I. For those who present French for admission:

- (a) Syntax and composition, Merimée, Duval, *History of French Literature*;
- (b) Victor Hugo, selections; *Les génies de la Science*;
- (c) Cuvier, *Les revolutions du globe*, *La Revue Scientifique*.

Course II. For those who enter the University without French:

- (a) Chardenal's *French Course*;
- (b) *La Nature*.
- (c) Luquien's *French Prose of Popular Science*.

MATHEMATICS.

In imparting a knowledge of the mathematical subjects, special emphasis is placed upon their practical application. This gives the student a firmer grasp of the more important parts of these subjects and some appreciation of their real value, before reaching those technical studies where mathematics furnishes the only sure basis for professional knowledge and a most powerful instrument for use in original research.

Course I. Higher algebra.

Freshman i, ii, 66 hours.

Advanced work on equations containing radicals, simple and quadratic equations, proportion, variation, progressions, summation of special series, binomial theorem, indeterminate coefficients, logarithmic series, Taylor's formula and the treatment of higher equations, including Cardan's rule for cubics.

Course II. Plane trigonometry.

Freshman i, ii, 44 hours.

Trigonometric functions of acute angles, of angles in general, application of logarithms, solution of right triangles, general properties of triangles, practical applications, including the solution of cubic equations having real and unequal roots.

Course III. Spherical trigonometry. *Freshman iii*, 22 hours.
Review of some truths of solid and spherical geometry. Napier's rules, solution of right spherical triangles, general properties of spherical triangles and the application of spherical trigonometry to the solution of practical problems.

Course IV. Analytical geometry. *Freshman iii*, 22 hours; *Sophomore i*, 55 hours.
Coördinate systems, transformation of coördinate algebraic equations of different degrees produced and discussed by the aid of these systems, transcendental equations and loci:—three dimensions; the point, plane, line, surfaces and solids.

Course V. Differential calculus. *Sophomore ii*, 55 hours.
The differentiation of algebraic and transcendental functions, successive differentiation, series, derivatives, maxima and minima, tangents, subtangents, normals, subnormals, illusory forms, asymptotes, direction and rate of curvature, radius of curvature, evolutes, envelopes, singular points and curve tracing.

Course VI. Integral calculus. *Sophomore iii*, 40 hours.
The integration of various algebraic and transcendental differentials, rectification of plane curves, quadrature of plane surfaces and surfaces of revolution, cubature of volume of revolution, and the production of the equations of loci by integrating certain conditional differentials.

Course VII. Some practical applications *Sophomore iii*, 15 hours.
Of the calculus to mechanics and physics, maxima and minima, center of gravity, center of hydrostatic pressure and moment of inertia.

The foregoing courses in mathematics are required, *in the order given*, of all undergraduates in each of the engineering courses, and in the school of mines. In the school of technical and applied chemistry, only courses i, ii and iv are required.

RHETORICAL WORK.

(a) *Sophomore i.*
An outline of rhetoric; study of the sentence; elements of style; choice and use of words; exercises in composition.

(b) *Sophomore ii.*
Outline of rhetoric continued; study of the paragraph and of the various kinds of composition, with especial emphasis on description and practical exposition; exercises in composition.

(c) *Sophomore iii.*
Sight composition; exercises in describing engineering instruments, machines, materials and structures.

The work throughout the year to be illustrated by models drawn from scientific, technical and other literature.

DRAWING AND INDUSTRIAL ART.

ENGINEERING DRAWING.

Course I. Freehand. *Freshman i*, [4].
Lettering, geometric forms and engineering details in outline, including the elements of perspective.

Course II. Mechanical. *Freshman ii*, [4].
Constructive geometry of lines, points, circles, conics, roulettes, spirals and miscellaneous curves. Conventional methods, freehand working drawings, and standard sizes and shapes.

Course III. Descriptive geometry. *Freshman iii*, [4].
Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments. Recitations and lectures.

- Course IV. Descriptive geometry.* *Sophomore i, [4] and [2].*
Orthographic, isometric, horizontal, oblique, and perspective projections; shades and shadows, line shading and brush tinting. Open to students who have completed course iii.
- Course V. Working drawings.* *Sophomore ii, [4].*
Engineering details, assembly drawings, mechanical movements, tracing and blue printing.
- Course VI. Machine drawing.* *Sophomore iii, [2].*
Detail and construction drawings of mining machinery, head frames, cars, skips and other mining appliances.
- Course VII. Topographic drawing.* *Sophomore i, [2].*
Plans, sections, timbering, and mine conventions. Topographic maps.
- Course VII. Instrumental.* *ii, iii, [4].*
Problems, projections, sections, developments and interpenetrations. With conventional renderings in line and wash.

FINE ART.

- Course I. Drawing.* *i, ii, iii, [4].*
From models, casts and nature. Study of the principles of perspective and light and shade. In charcoal, line, and wash.
- Course II. Antique.* *ii, iii, [4].*
Studies of the human figure, from casts, in charcoal. Fractions, torsis, masks, busts, statues and groups.
- Course III. Life.* *i, ii, iii, [4].*
Studies in charcoal from the living model (heads and figures with costumes). Sketches in pencil, charcoal, red chalk, and pen and ink. Open to those who have taken course i or course ii.
- Course IV. Water color.* *i, ii, iii, [4].*
From still life and nature. Open to those who have completed course i or course ii.
- Course V. Pen and ink.* *i, ii, iii, [4].*
Exercises in line work and drawing for illustrative work. Open to those who have completed course i or course ii.
- Course VI. Oil painting.* *i, ii, iii, [4].*
Studies of groups of still life, plants and flowers, and sketching from nature. Open to those sufficiently prepared.
- Course VII. Modeling.* *i, ii, iii, [4].*
In clay, from the antique, and casting in plaster.
- Course VIII. Lectures and reading.* *i, ii, iii, [1].*
On the principles and methods of perspective, light and shade, color, composition, and the history of art.

APPLIED ART.

- Course I. Design.* *i, ii, iii, [4].*
The anatomy of pattern and geometrical design, planning of ornament, color harmony, plant analysis and conventionalism, traditional ornament and animate forms.
- Course II. Analysis of ornament.* *i, ii, iii, [2].*
Study of the characteristics of style. Outlines of historic ornament. Lectures, recitations and collateral reading.
- Course III. Practical designing.* *i, ii, iii, [4].*
Original designs and accompanying working drawings for flat ornament; wood, stone and metal work.

Course IV. Lettering.

iii, [2].

Medieval and modern alphabets, plain and ornamental.

MECHANICS.

(a) APPLIED MECHANICS.

Course I. Statics and dynamics.

Junior i, 60 hours.

A study of the laws of equilibrium, motion, work and energy as applied to particles and rigid bodies. Recitations and lectures. Open to students who have completed the first five courses in mathematics.

Course II. Mechanics of materials.

Junior ii, 60 hours.

A study of the strength and elastic properties of materials of construction, the principles governing the design of beams, columns and shafts. Recitations and lectures. Open to students who have completed course i.

Course III. Hydromechanics.

Junior iii, 60 hours.

A study of the laws of equilibrium and flow of fluids. Open to students who have completed course i.

(b) THEORETICAL MECHANICS AND MATHEMATICAL PHYSICS.

FOR UNDERGRADUATES.

Course I. Theory and calculation of alternating currents.

Senior ii, iii, 44 hours.

Phenomena of transmission lines, transformers, generators, induction motors, synchronous motors and polyphase systems. Twice a week. Open to those who have completed electrical engineering, course ii.

FOR GRADUATES AND UNDERGRADUATES IN EITHER COLLEGE

who have completed calculus.

Course II. The potential function and spherical harmonics.**Course III. Analytical statics and electrostatics.****Course IV. Dynamics of rigid bodies.****Course V. Circular, hyperbolic and elliptic functions with their physical applications.**

FOR GRADUATES OF EITHER COLLEGE

who have had advanced work in mathematics.

Course VI. Directional calculus, vector analysis and determinants.**Course VII. Analytical theory of the conduction of heat.****Course VIII. Theories of elasticity and sound.****Course IX. Wave theories of light, heat and electricity.****Course X. Kinetic theory of gases.****Course XI. Hydrodynamics and fluid motion.****Course XII. Theory of functions with applications.**

PHYSICS.

Course I. Mechanics.

Sophomore i.

Dynamics of solids with laboratory practice. Before entering upon this course, the mathematics of the freshman year must be completed.

Course II. Mechanics.

Sophomore ii.

Hydrostatics, sound, with laboratory practice.

- Course III. Heat and light.* *Sophomore iii.*
With laboratory practice.
- Course IV. Static electricity and magnetism.* *Junior i.*
With experimental lectures.
- Course V. Voltaic electricity.* *Junior ii.*
And the theory of electrical measurements, with laboratory practice.

FOR GRADUATES.

- (a) *Special problems* in electricity, heat and light.
(b) *Investigations* in mechanics and optics.

CHEMISTRY.

- Course I. The metallic elements.* *Freshman i, 96 hours.*
Lectures and laboratory work. The course includes a study of the more common metals, their compounds and characteristic reactions.
- Course II. Qualitative analysis.* *Freshman ii, 96 hours.*
Lectures and laboratory work. The course includes the qualitative separation and the characteristic tests for the more common metals. Open to those who have completed course i.
- Course III. Qualitative analysis.* *Freshman iii, 96 hours.*
Lectures and laboratory work. The course includes a study of the acids, their detection and separation. Open to those who have completed course ii.

CIVIL ENGINEERING.

MUNICIPAL AND SANITARY ENGINEERING.

- Course I. Hydrographic survey.* *Sophomore iii, 20 hours*
Text work on making soundings; methods of determining discharge of streams. Following this the electric current meter of the department is rated and a survey made, employing it to determine the volume of flow in the Mississippi river, followed by a plat of the cross-section of the river at point of survey.
- Course II. Hydraulics.* *Senior i, 48 hours.*
Lectures on rainfall and evaporation; their mutual effect on water supply; how determined by soils and topographical features. Methods and means employed in water collection, purification and distribution for domestic supply, land drainage; etc. Text-book—Fanning—on flow of water through pipes; co-efficients for weir formula; flow of water in open channels; and reservoir embankments.
- Course III. Sanitary engineering.* *Senior iii, 36 hours.*
Sewerage systems, separate and combined; sewage disposal; house drainage and ventilation.
- Course IV. Municipal engineering.* *Junior iii, 44 hours.*
Problems relating to city streets, pavements, subways, etc.

RAILWAY AND HIGHWAY ENGINEERING.

- Course VI. (a) Curves and earthwork.* *Junior i, 36 hours.*
Problems attending final location surveys of railroads and track laying, theory of the computation of volumes and preparation of preliminary estimates. Carhart text-book and notes.
- (b) *Execution in the field of practical problems.* *96 hours.*
Illustrating the analytical work of (a), including computation of earthwork of railroad grades and pits, platting profiles and construction of maps.

Course VII. Railway structures. Junior I.

The different standard structures relating to railroad construction and maintenance are presented by lectures, the student making working drawings with bills of material, such structures as the following being treated: cattle guard, snow fence, timber culvert, pile bridge, water tank, station house, and trestle. Field and office. Details obtained from actual structures as far as possible.

Course VIII. Railway location and estimates. Junior III, 96 hours.

Reconnoitering and preliminary surveys are made, followed by field maps and final location; profiles and cross-sectioning. Complete estimates covering the cost of earth and rock work, timber structure and right of way involved in the actual construction of the line are made, together with plans of important bridges and a right of way map of the adopted location.

Course IX. Railway economics. Senior II, 36 hours.

Discussions on the economic location of railways. Text, Wellington.

Course X. Highway construction and maintenance. Sophomore II, 36 hours.

The economic relation of highways in transportation, with a treatment of the practical questions relating to materials and methods necessary to maintain good streets and highways. Lectures, Spalding as text, with collateral reading, reports and essays.

STRUCTURAL ENGINEERING.**Course XI. Stereotomy. (Elective). Sophomore II, 72 hours.**

Working drawings by which to cut the stones for masonry, wing walls, bridge abutments, culverts, domes and arches, including groined and cloistered arches, and the intersection of two or more galleries. Lectures and drawing.

Course XII. Stresses in framed structures. Junior II, 60 hours. Junior III, 48 hours.

Graphical and analytical determination of the stresses in framed structures, including roofs, highway and railway bridges, continuous girders, braced towers, portal and sway bracing, stand pipes. Study of the deflection of framed structures under different systems of loading. Lectures and recitations. Open to students who have completed course I in applied mechanics.

Course XIII. Structural details. Junior III, 36 hours.

Study of the methods of proportioning individual members of framed structures, and the designing of joints and splices in steel and wooden structures. Study of plate girder construction, with complete design of a plate girder railway bridge. Text-book work, lectures and drawing. Open to students who have completed course XII, and the first part of course XIII.

Course XIV. Bridge engineering. Senior I, 120 hours.

Survey of site for an important railway or city bridge. A complete design of the structure including computations, detail drawings, specifications and estimates of cost. Lectures, field work, computations and drawings. Open to students who have completed courses XII and XIII.

Course XV. Bridge design. Senior II, 120 hours.

Continuation of course XIV, with special application to the making of complete shop drawings. The design commenced in course XIV, is completed during this term, ready for the use of the manufacturer in the shop or mill. The design, when completed, has the same real practical value that it would have if executed in actual professional practice. Lectures, computations and drawings.

Course XVI. Swing bridges. Senior III, 96 hours.

Study of the different forms of swing, draw and lift bridges, including the determination of stresses, proportioning and detailing of parts, and complete designs of rim and center bearing turntables, end-locking apparatus, and operating machinery. Lectures, recitations and drawing. Open to students who have completed courses XII to XV (inclusive).

Course XVII. Suspension and arch bridges. Senior iii, 72 hours.

Theory of the suspension bridge and of solid braced elastic arches, with application to practical problems. Lectures, recitations and drawing. Open to students who have completed courses xii to xvi (inclusive).

Course XVIII. Masonry construction. Senior i, 60 hours.

Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations for tall buildings and bridge piers. Theory and design of masonry arches, including oblique arches. Design of other masonry structures such as dams, chimneys, retaining walls. Lectures and drawing.

Courses XIX. Experimental laboratory.

(a) Tests of strength and physical properties of brick, stone and cements,

(b) Special investigation of the properties of structural materials; strength of joints columns and framed structures. Original investigations of structural problems.

TOPOGRAPHICAL ENGINEERING.

Course XX. Surveying. Freshman ii, 36 hours.

Work consists of recitations, lectures and illustrative problems relating to chaining, field problems employing chain; methods of keeping field notes; determination of area—D. M. D. and rectangular co-ordinate method; compass and transit surveying; study of instruments and their adjustments; methods for overcoming obstacles; determination of heights and distances inaccessible; methods of supplying omissions, of platting compass and transit surveys; discussion of the methods of laying out and dividing land, including the public land surveys of the United States.

Course XXI. (a) Surveying. Freshman iii, 48 hours.

This time is devoted to the execution in the field of many of the problems discussed in the previous term. The care, proper use and adjustments of all instruments used are treated by field exercises. Chain, compass and transit surveys are made and circuits of level-lines run by each party. A meridian line is established by each party by observations on Polaris.

(b) *Draughting.* 48 hours,

This time is given to construction of diagonal scales, protractors, circular and straight verneirs. All surveys made in the field and platted and areas computed. Solution of problems and usual office reduction of all field notes.

Course XXII. (a) Topography. Sophomore i, 96 hours.

The methods of conducting topographical surveys are taken up in the order of increasing accuracy. At first a text-book is used to acquaint the student with the instruments employed, method of use and theory of adjustment. Lectures are given on the details of field work; parties of topographers are formed and each makes a complete topographic survey of a certain tract. Observations on Polaris at elongation for azimuth and at culmination for latitude conclude the field work. Individual work characterizes this course. Text, Baker.

(b) *Draughting.* 24 hours.

Notes taken in course ii (a) are reduced, areas computed and topographical maps made of lands surveyed.

Course XXIII. Analytical study of engineering instruments. Sophomore ii, 66 hours.

Continued, including stadia and gradientor. Reduction charts are made and stadia work of course ii reduced and platted, cross-wires are replaced in transits.

Course XXIV. Higher surveying. Sophomore iii, 48 hours.

Analytical study of the aneroid and mercurial barometers and barograph is made for determining their efficiency in hypsometric surveys; of the solar compass and solar transit and various solar attachments for establishing government standard lines and the plane-table and stadia as a rapid means of prosecuting topographical surveys. Text-books, Johnson's "Theory and Practice of Surveying" and Baker's "Engineering Instruments."

Course XXV. Field work and platting. *Sophomore iii*, 88 hours.

Observations are made with barometers for difference of level; checked with spirit levels. Meridians and parallels of latitude are run with solar compass and attachments, and an outline survey made, computed and platted. A plane-table survey, employing stadia and telemeter, is made by each party, and each student makes a map of the same.

Course XXVI. (a) Geodesy. *Senior iii*, 48 hours

Lectures and text-book; Geodetic reconnaissance; base-line measurement, employing bars and steel tape; measures of angles, horizontal and vertical; field methods for time, latitude, longitude and azimuth; theory of computing geographical positions. Lectures and text.

(b) Field and office work. 96 hours.

Making and reducing observations illustrating this work.

Course XXVII. Geodesy.

Precise and trigonometric leveling; adjustment of observations and projection of maps.

MECHANICAL ENGINEERING.

SHOP WORK.

Course I. Carpentry and joining. *Freshman i*, 72 hours.

Wood working, use of tools, lathe and bench work.

Course II. Carpentry and wood-turning. *Freshman ii*, 72 hours.

Lathe work, plain and ornamental. Preparation, course i.

Course III. Pattern making and foundry practice. *Freshman iii*, 72 hours.

Patterns for moulding, core boxes, flasks. Moulding, casting, mixing metals, brass work and core making. Shop practice and lectures. Preparation, course i.

Course IV. Pattern making and foundry practice. *Sophomore i*, 96 hours.

Continuation of course iii. Lectures and practice.

Course V. Blacksmithing. *Sophomore iii*, 96 hours.

Use of tools, forging, welding, tool dressing, tempering. Lectures and practice.

Course VI. Machine work. *Sophomore ii*, 96 hours.

Chipping, filing, machine work, gear cutting, finishing. Lectures and practice.

Course VII. Machine work *Junior i*, 120 hours.

Construction of some machine or instrument. Preparation, course vi.

Course VIII. Machine work. *Junior ii*, 96 hours.

Tool construction and other special work. Preparation, course vii.

Course IX. Machine construction. *Senior ii*, 96 hours. (Elective.)

Construction of patterns and machine work for special apparatus, or machinery, designed by the student.

Course X. Shop economics. *Senior iii*, 24 hours. (Elective.)

Shop and factory organization and management; cost systems.

MACHINE DESIGN.

Course XI. Principles of mechanism. *Sophomore ii and iii*, 48 hours.

The transmission of motion without consideration of the strength of parts. Gear wheels, cams, belts, screws, epicyclic trains, parallel motions, quick-return movements. Lectures and recitations. Preparation, course iv in mathematics.

Course XII. Kinematics. *Sophomore iii*, 96 hours.

Graphical diagrams of the paths, speeds, and accelerations of important mechanisms; centroids; analysis of mechanisms; construction of cams; kinematic pairs. Preparation, course xi, and vi engineering drawing.

- Course XIII. Machine design.* *Junior i and ii, 192 hours.*
 Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Preparation, course vii, mathematics.
- Course XIV. Machine design.* *Junior iii, 96 hours.*
 Application of graphical methods to the design of valve gears and link motions; Zeuner diagram, indicator cards. Lectures and drawing-room practice. Preparation, first part course xix.
- Course XV. Machine design.* *Senior i, 96 hours.*
 Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation, course xiv.
- Course XVI. Machine design.* *Senior ii, 96 hours.*
 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. Preparation, course xv.
- Course XVII. Designs and specifications.* *Senior iii, 96 hours.*
 Continuation of course xvi, with specifications for particular problems.
- Course XVIII. Tool design.* *Senior ii, or iii, 96 hours.*
 Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation. courses viii and xiii.

STEAM ENGINEERING AND PRIME MOVERS.

- Course XIX. Steam engine.* *Junior ii and iii, 48 hours.*
 Mechanics of the steam engine. Work in the cylinder; effect of reciprocating parts; steam distribution. Mechanism of steam engines. 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. Preparation, course i in applied mechanics.
- Course XX. Thermodynamics.* *Senior i, 60 hours.*
 The mechanical theory of heat as applied to the steam engine and other motors. Preparation, course i and iii in applied mechanics.
- Course XXI. Gas and oil engines.* *Senior ii, 24 hours.*
 Theory and construction of gas and oil engines; devices for starting, igniting, and governing; gas producers; the adaptation of oils for generating power. Preparation, course xx.
- Course XXII. Compressed air.* *Senior iii, 24 hours.*
 Air compressors and motors; pneumatic transmission. Air and ammonia refrigeration and ice manufacture. Preparation, course xx.
- Course XXIII. Pumping machinery.* *Senior iii, 24 hours.*
 Theory and construction of reciprocating and rotary steam pumps for water-works, mines and manufactures. Preparation, course iii, applied mechanics.
- Course XXIV. Steam boilers.* *Senior i, 24 hours.*
 Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, incrustation; methods of operating boilers with safety and economy. Preparation, course i in applied mechanics.

Journal Club—Open to the seniors and juniors. Once a week.

ENGINEERING LABORATORY.

- Course XXV. Materials of engineering.* *Sophomore i*, 24 hours.
Lectures and recitations on the production and properties of engineering materials.
- Course XXVI. Strength of materials.* *Junior ii*, 48 hours.
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Preparation, course ii applied mechanics.
- Course XXVII. Mechanical laboratory.* *Junior iii*, 48 hours.
Continuation of course xxvi; also exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and hoists. Preparation course xix.
- Course XXVIII. Measurement of power.* *Senior i*, 24 hours.
A study of the methods employed in measuring power. Dynamometers, Prony brakes: efficiency of motors; power required to drive machine tools and shafting. Recitations. Preparation, course iii in applied mechanics.
- Course XXIX. Mechanical laboratory.* *Senior i*, 72 hours. *Senior ii*, 96 hours.
Calibration of weirs, meters, dynamometers and other apparatus. Testing lubricating value of oils; calorimetry; tests of water motors, pumps, injectors, steam engines and boilers. Preparation, course xxvii.
- Course XXX. Mechanical laboratory.* *Senior iii*, 96 hours.
Tests of gas and hot air engines, locomotive testing, and special research work. Preparation, course xxviii.
- Course XXXI. Mechanical laboratory.* *Senior iii*, 72 hours.
Special modification of courses xxvii and xxix for students in mining and metallurgy.

RAILWAY MECHANICAL ENGINEERING.

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

- Course XXXII. Railway technology.* *Senior i* 48 hours.
The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists of a systematic course of shop visits carried on in the various railroad shops in the vicinity. Preparation, course vi, engineering drawing.
- Course XXXIII. Railway design.* *Senior ii and iii*, 192 hours.
(a) Of link and valve motions. Continuation of course xiv with special applications of the Stephenson link.
(b) Of locomotive and car details.
(c) Of the locomotive boiler.
(d) Of assembled parts. Preparation, course xxxii.
- Course XXXIV. Locomotive construction.* *Senior ii and iii*, 48 hours.
Lectures, reading and recitations on design and construction of locomotives, supplementing course xxxiii. This treats,—
(a) Of parts not involving the boiler and 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 proportions for various types, weight of drivers, special service; crank effort diagrams with iner-

tia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.

Course XXXVI. *Locomotive road testing.*

Senior iii.

FOR GRADUATES,

Courses are offered in:

Engineering design.

Experimental investigation.

Railway engineering.

ELECTRICAL ENGINEERING.

Course I. Industrial electricity.

Outline of industrial uses of electricity; application of Ohm's law; methods and calculation of wiring. 24 lectures with problems for *junior i*, electrical engineering and mechanical engineering. Preparation required: physics, courses iv and v.

Course II. Electrical generators.

Theory of electro-magnet and continuous current dynamo and motor; methods of regulation; construction and operation of dynamos and motors; methods of testing. 48 lectures and recitations for *junior iii*, electrical engineering and mechanical engineering. Preparation required: electrical engineering, course i; physics, courses v and vi; differential and integral calculus.

Course III. Electric power.

Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. 36 lectures and 48 hours laboratory. *Senior i*, mining, metallurgy; *junior i*, civil engineering.

Course IV. Electric laboratory.

- (a) Tracing circuits and locating faults; measurements of conductivity, insulation and capacity; construction and use of instruments; calibration of ammeters, voltmeters and recording wattmeters; tests of batteries; operation of dynamos and motors; magnetization, characteristic and efficiency curves of dynamos. 120 hours in lecture room and laboratory for *junior iii*, electrical engineering. Preparation required: physics, courses v and vi; electrical engineering, courses i and ii.
- (b) An abridgment of this course, 72 hours, is given to mechanical engineers.

Course V. Electrical design.

- (a) Problems in designing switches, electro-magnets and mechanisms; complete working drawings and specifications to accompany each design; *junior iii*, electrical engineering. 72 hours in draughting room. Preparation required: physics, courses v and vi; electrical engineering, courses i and ii; machine design, course i, and practical mechanics, courses i-iv.

Course VI. Alternating currents.

Phenomena, measurement and use of alternating currents; elementary theory of transformer and alternator; methods of regulation; various types of commercial apparatus. 108 lectures and recitations with problems for *senior i and ii*, electrical engineering. Preparation required: physics, courses v and vi; electrical engineering, courses i, ii and iii; differential and integral calculus.

Course VII. Electrical laboratory.

- (c) Measurement of self and mutual induction; capacity and impedance; calibration of A. C. measuring instruments; curves from alternators and transformers; regulation and efficiency tests of alternators, transformers and A. C. motors; magnetic tests of iron; *senior i*, electrical engineering. Laboratory, 72 hours. Preparation required, electrical engineering, courses i, ii, iv and vi.

Course VIII. Electric lighting.

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 lights. 24 lectures for *senior ii*, electrical engineering and mechanical engineering. Preparation required: electrical engineering, courses i and ii.

Course IX. Electrical laboratory.

(d) Photometric and electrical tests of lamps; regulation and comparison of different arc lamps for constant current, constant potential and alternating currents, regulation of constant current dynamos; special problems as assigned. 72 hours in laboratory for *senior ii*, electrical engineering and mechanical engineering. Preparation required: electrical engineering, courses iv and viii.

Course X. Plant operation.

Practice in operation and care of boiler, engine, motor, dynamo and circuits of the University lighting plant. Each senior spends one evening a week through the winter term.

Course XI. Electrical design.

(b) Design of a transformer, dynamo or other problem as assigned. 48 hours in draughting room. Preparation required, electrical engineering, courses ii, v and vi.

Course XII. Electric railways.

History and development; different systems of distribution, location and calculation of feeders; line and track construction; choice of motors, trucks, generators and engines, operation and repairs. 24 lectures. Preparation required: electrical engineering, courses ii, iv and viii, mechanical engineering, courses in thermodynamics and prime movers.

Course XIII. Telegraph and telephone.

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. 24 lectures with problems. Preparation required: electrical engineering, courses i, iv, vi and vii.

Course XIV. Electrical transmission.

Utilization of natural forces; various methods of transmission; theory of electric motor; power distribution with constant current, constant potential and alternating systems; study of particular plants. 48 lectures and recitations for *senior iii*, electrical engineering. Preparation required: electrical engineering, courses i, ii, and vi.

Course XV. Electrical design.

(c) Designs, specifications and estimates of an electric light or power plant, or other approved problem. *Senior iii*, electrical engineering, draughting, 124 hours. Preparation required: electrical engineering, courses v and viii.

Course XVI. Central stations.

Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam and water power; location and design of station; switchboard; calculation, erection and maintenance of lines; erection of boilers, engines and dynamos; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. 24 lectures for *senior iii*, electrical engineering. Preparation required: electrical engineering, courses ii, vii and viii; mechanical engineering, courses in thermodynamics and prime movers.

Course XVII. Electrical laboratory.

(c) Efficiency tests and special problems.

Course XVIII. Journal reading.

Discussion of current electrical periodicals. Two hours per week throughout the year. Open to seniors and juniors.

Course XIX. Theory of alternating currents.

Mathematical discussion of the properties and applications of alternating currents.

Open to those who have completed course vi. Two lectures and recitations per week through two terms.

FOR GRADUATES.

1. *Alternating currents.*
2. *Problems in design and operation of generators, motors and plants.*
3. *Experimental investigation.*

As an organization of the University of Minnesota, the college of engineering and the mechanic arts, has the general advantages of the University. Students find available all the resources of the institution so far as their technical lines will permit their use. For the information of those who are seeking to become acquainted with the methods of work in the various technical departments and the equipment in use for the prosecution of professional work, the following condensed statements are offered.

CIVIL ENGINEERING.

Geodesy. For this work the department has a secondary base-line apparatus, a three hundred foot standard steel tape, astronomical transits and repeating theodolites, heliostopes, a telemeter, deflection magnetometer, precise levels, two marine chronometers, one on sidereal and the other on mean solar time.

Highway engineering. The department has suitable apparatus for conducting the usual tests applied to road materials.

Railroad work. The usual equipment of transits, levels, planimeters, gradienters, level-rods, range-poles, chains and tapes, is provided.

Surveying. The department has for this work, the necessary outfit consisting of compasses—plane, railroad and pocket, transits, tapes, hand levels, aneroid and mercurial barometers, solar compasses and solar attachments, pantometers and anemometers.

Structural engineering. The department has a large collection of working drawings of prominent structures throughout the country; photographs of bridges, buildings and roofs, in this country and abroad. It also has a series of nearly all the structural shapes manufactured by Carnegie Steel Co.; a series of models of the principal joints used in modern structures; models of arches of different forms; templets for cutting the stone used in the construction of skew arches; calculating machines, etc.

A new experimental laboratory in structural engineering has just been completed. This laboratory contains a large Olsen testing machine of two hundred thousand pounds capacity, with complete attachments, including automatic and autographic recording apparatus, extension head for full size columns ten feet long, and transverse beam for bending tests upon twenty foot beams. This is one of the most complete machines of its kind in the country.

The laboratory also contains an excellent equipment for the testing of cements, including a Riehlé cement testing machine, sieves, briquette moulds, damp closet, tanks and all other apparatus necessary for this work.

Topography. For this work the department has plane-tables, telemeter rods, stradia transits, reduction charts and slide rules, clinometers, pedometers, current-meters, compasses, a relief map, a complete topographic map of the District of Columbia, besides a large collection of topographic sheets presented by the U. S. coast and geodetic and geological surveys.

Library. The civil engineering library is located on the main floor of engineering building where are to be found all the more important books relating to this line of work. There are complete sets of the leading technical journals and proceedings, and reports of a large number of state and university engineering societies.

Reading room. Here are to be found all the leading American periodicals, and some foreign, relating to civil engineering. The files of the most important are bound and are easy of access to the student.

Methods of instruction. It is the aim of the department to secure for its students special training in the preparatory studies which form the basis of all engineering work—such as mathematics, physics, mechanics and drawing—these being the tools for the special engineering work which follows.

A thorough course is then given in the theory and practice of the more important professional lines such as railroad and structural engineering and topography. Considerable time is devoted to hydraulics, municipal engineering, higher surveying and geodesy.

While theory is at all times made prominent it is always accompanied by practice according to the methods followed in actual professional work.

Inspection tours. The professional work of the department is illustrated in a practical manner by frequent visits to the engineering works and plants in the vicinity of Minneapolis and St. Paul.

MECHANICAL ENGINEERING.

The plan of instruction in this course is intended to give the student a thorough training in mathematics and the physical sciences; and in the fundamental principles of engineering.

The work is planned to make him familiar with the various applications of these principles, and with the practical details of machine construction and design.

EQUIPMENT.

The shops. The basement of the engineering building is occupied by the mechanical laboratory, machine shop, and wood working shop; the wing by the engine and boiler room, forge shop and foundry.

The machine shop contains representatives of the usual machine tools, gauges and small hand tools to be found in a well equipped modern machine plant.

The shop for pattern making and general wood work contains benches with vises and tools, lathes and lathe tools, an improved universal sawing machine, band saw, planer, and other power tools, and all hand tools used in carpentry and pattern making.

The forge shop is equipped with stationary and portable forges, a blower and exhaust fans, a one hundred pound drop hammer, and the necessary small tools used in blacksmithing.

The foundry contains an eighteen-inch Collian cupola, brass furnace, core oven, moulding tools, ladles, crucibles, and all of the tools and material needed in moulding and casting iron, brass or white metal.

The shop work is intended, not so much to give the student skill in the manual operations of the respective crafts, as a knowledge of the methods and processes of practical construction.

The mechanical laboratory, in which the experimental research of the department is conducted, has been considerably enlarged and its equipment greatly increased. Two testing machines of 50,000 pounds and 100,000 pounds capacity, and two transverse testing machines are provided for determining the strength, ductility, resilience and other characteristics of the various materials used in engineering work under tensile, compressive, transverse and torsional stress. Several forms of absorption and transmission dynamometers are available for determining the power generated by engines or other motors, or absorbed by shafting or machinery; a Carpenter coal calorimeter for determining the heat value of coal, and apparatus for the analysis of flue gases.

The laboratory is also provided with two machines for determining the lubricating qualities of oils and the relative values of metals used for journals and bearings; a mercury column and a Crosby direct pressure-gauge tester, for use in calibrating gauges and other pressure indicators. Besides the boilers in the university heating plant, there are in the laboratory, a 35 horse-power boiler and a high pressure boiler capable of carrying a working pressure of 300 pounds, with the necessary gauges, calorimeters, tanks and pyrometers, for making complete duty trials; three automatic steam engines equipped with condensers, indicators, brakes, scales and thermometers, which are employed to determine the efficiency in the use of steam under various conditions assumed or found in actual practice, and for valve setting and indicator work.

The operation and economy of other heat engines are illustrated by an Otto gas engine of five horse-power, a Rider two-cylinder and an Ericsson single cylinder hot air engine, a pulsometer, and steam pumps. The equipment also contains a Pelton and a Tuerk water motor, a water ram, injectors, weirs, nozzles, meters and other pieces of apparatus and instruments which an engineer is called upon to use in the course of his professional work.

A constantly increasing quantity of commercial testing is being done in connection with the regular work of the course which brings the student into

actual contact with the engineering world and affords him valuable experience and data for his future work.

The library of the department contains a collection of historic and recent works, the best standard books being purchased as soon as issued. There are a number of complete files of the transactions of engineering societies and of the leading technical publications. The reading room is amply supplied with both the general mechanical and railway press.

Railway mechanical engineering. Courses have been arranged for students wishing to specialize in this subject. The various courses may be elected separately, subject to the requirements for previous preparation, to fill out the electives, or options in the regular senior year of any department.

Students planning to elect these courses are encouraged to work, under special arrangements, in railway shops during the summer vacations. This has proved its value as preparatory to the special work of the senior year. In every possible way the methods of the department are intended to place the student in touch with the best railway work; keeping always in sight the limitations which railway experience has found financially and practically to exist.

The location of the University is particularly favorable, being between the cities of St. Paul and Minneapolis in proximity to the shops, yards and headquarters of the extensive railway systems or the Northwest, which offer exceptional facilities for the prosecution of this work. The Northwest Railway Club,, meeting monthly for papers and discussions, is open for the attendance of students, while several are enrolled as members.

Visits of inspection. During the year numerous visits are made to the manufacturing plants of Saint Paul and Minneapolis, which have proven to be of great value in supplementing the class room work.

ELECTRICAL ENGINEERING.

Equipment. The department of electrical engineering is associated with the department of physics, and has free use of its extensive apparatus and facilities for work. This includes three rooms with eight solid masonry pillars for the support of sensitive instruments; dynamo room with dynamos, motors, etc.; battery room; four laboratory rooms for general work; photometer room; photographic room; drawing room; library and reading room; professor's study and laboratory. All the rooms are wired for electric light, time and experimental current.

In addition to the extensive equipment of the department of physics, this department has a number of machines, including two alternators and exciters, two continuous current constant potential dynamos, three arc dynamos, nine continuous current motors and seven alternating motors. Five of the machines have sets of rings and brushes for obtaining single or multiphase alternating currents. Four are provided with wiping contact devices for exploring magnetic fields, studying armature reactions, obtaining instantaneous values of alternating currents, etc. Suitable switchboards

allow any desired combination of circuits. There is also a working equipment of primary and secondary cells, transformers, banks of incandescent lamps, arc lamps, adjustable absorption rheostats, cradle dynamometer, ammeters and voltmeters for direct and alternating currents, potentiometer, direct reading and recording wattmeters, galvanometers, secohm-meter, portable testing sets, condensers, carbon megohms, telephone instruments, arc and incandescent light photometers, a large variety of switches and other electrical supplies. The laboratory dynamo room is supplied with power by two motors of 10 horse power and 40 horse power connected respectively with the University lighting plant and the 500 volt power circuit of the Minneapolis General Electric Company. By a recent generous appropriation, large additions are being made.

The laboratory is now supplied with standards for measuring electromotive force, current, resistance, capacity, self-induction and candle-power. The power equipment gives continuous current up to 300 amperes and 1,500 volts and alternating current up to 100 amperes and 40,000 volts. A Lummer-Brodhun photometer with standards and accessories in a well-ventilated dark room gives excellent facilities for tests of arc and incandescent lamps. A Weber portable photometer allows the testing of street or other lamps *in situ* and of determining the illumination produced.

The libraries of the departments of physics and electrical engineering contain an excellent collection of works relating to these subjects. New books and trade publications are being added continually. Files of twenty-two physical, electrical and street railway journals are nearly complete and others are being collected and bound. These, with the files in the general and other departmental libraries of the University, offer excellent facilities for research work.

The reading room receives regularly the leading American and foreign periodicals devoted to physics, electrical engineering and allied interests. A journal club meets weekly for the discussion of current literature in mechanical and electrical engineering keeping the students in touch with current progress and best modern practice, and teaching them the value of the technical press.

There is a growing collection of samples furnished by various manufacturers and dealers, a great help in exhibiting best modern practice and in teaching young engineers to appreciate the merits of different products. A collection of samples from repair shops and elsewhere is of especial value in illustrating the treatment received by apparatus in commercial use and the necessity of careful design and construction. Free access is given to the private libraries and collections of the professors.

Instruction. The course aims to give the students a knowledge of phenomena and principles and the various applications of electricity, the methods and instruments used in measuring and transforming it, and practice in the design and operation of electrical apparatus. Practice and theory are taken together as far as possible. During the junior and senior years students have daily work with electrical instruments and apparatus and

with commercial problems. Occasional inspection tours among the extensive and varied electrical interests in Minneapolis and St. Paul furnish excellent illustration. All engineering students are strongly advised to spend their vacations in factories, repair shops, electric light and railway stations, etc., in order to obtain commercial experience, and that they may better appreciate the relations of their technical training to actual work.

It is the aim to train the students to be independent and efficient workers, and to adopt the methods of professional engineers. Students are required to verify the formulas used in various calculations, and are encouraged to derive their own formulas for simplifying work in special cases. At the same time they are expected to use logarithms, slide rule, tables, curves, charts and all legitimate means for obtaining accurate results with least amount of drudgery.

Laboratory work. In the more advanced work students are encouraged to determine for themselves as independent workers the best methods and conditions for accurate results. While the laboratory work is classified, the students are treated individually and are advanced as rapidly as their attainments warrant.

In fitting up the laboratory, care is taken to secure representative types of apparatus of commercial style and size, in order to acquaint the student with actual practice. In putting up new lines and in setting up apparatus, the students are required to work in accordance with standard practice. Each student is given a certain amount of practice in the construction of electrical apparatus.

Design. The electrical engineers have drawing and design in common with the mechanical engineers in the first three years. A large number of numerical problems are given during the course. During the junior and senior years, electro-magnets and mechanisms, dynamos and motors, lines, switches, switchboards and plants are designed. Complete working drawings and specifications for some special problem are elaborated. A file of nearly 600 blueprints and drawings in the department library in addition to those in other departments is available to the students.

DRAWING AND INDUSTRIAL ART.

This department occupies rooms in the mechanic arts building and Pillsbury hall. The equipment of models and illustrative material is quite extensive and embraces among its many collections the following: A complete set of Schroeder models for descriptive geometry; a collection of casts of architectural details and historic ornament; full length figures and busts of historic and classic sculpture, and collections of charts, prints and drawings. There is also a small library of standard works.

The course in industrial art is carefully outlined with a view to the gradual and progressive development of art training. The work in design is not entered upon until the beginning of the second year. It is essential that a thorough knowledge of drawing in all its varied aspects and mediums

should form the foundation of all decorative and industrial art. After such knowledge is acquired, every facility will be afforded students for pursuing the line for which their work shows especial aptitude. The course of study is arranged to enable the student to pursue one of three lines of work: regular art, design, and normal art.

COURSE OF STUDY.

FRESHMAN YEAR.

Language or science, [4].
English (with rhetoric), [4].
Drawing, [4].
Drawing, [4].
Lectures and reading, [1].

JUNIOR YEAR.

Archæology (i, ii.) and art lects., (iii) [4].
Pedagogy, or elective, [4].
Design or drawing, [4].
Drawing, [4].
Lectures and reading, [1].

SOPHOMORE YEAR.

Language or history, [4].
Science or language or psychology and logic, [4].
Drawing or pedagogy, [4].
Design or drawing, [4].
Rhetorical work, [1].
Lectures and reading, [1].

SENIOR YEAR.

Elective, [4].
Drawing or elective, [4].
Design or drawing, [4].
Painting or modeling, [4].
Thesis.

LIBRARIES AND READING ROOMS.

The reference and the seminar libraries of several departments of instruction within reach of technical students have already become valuable. In the engineering building is a library consisting chiefly of books devoted to civil and mechanical engineering, comprising nearly one thousand volumes; the library of the department of engineering and mechanics numbers nine hundred volumes of choice mathematical and scientific works; the departments of electrical engineering and physics together have an excellent collection of standard works relating to these subjects, which already numbers over fourteen hundred volumes; the chemistry library contains over five hundred technical works; the department of drawing and industrial art possesses a choice collection of between one hundred and two hundred volumes relating to drawing, art and design. The above number, upwards of three thousand volumes, comprises many works which are the private property of professors, yet accessible to the students.

In addition to the above are the larger libraries of the University, the City of Minneapolis, the Minneapolis Athenæum, the Minnesota Academy of Natural Sciences, the City of Saint Paul and others containing many works of value to the engineering and scientific student. The standard works bearing on special subjects are secured as they appear. The more important scientific and technical periodicals are taken and placed on file with the several departments.

Journal clubs are organized in several of the departments for the discussion of technical literature, both in the books and magazines, relating to

the best modern practice in the several professional lines. Thus students are kept in touch with the development along engineering lines and are taught how to use the technical press.

In addition to the foregoing, the college has many periodicals donated by the societies publishing them, and others loaned by members of the faculty, who at all times place their periodical list and entire professional libraries at the disposition of the students. Still others are secured by exchanging the several publications of the University and the Yearbook of Society of Engineers.

THE SOCIETY OF ENGINEERS

is a flourishing organization, holding regular meetings for the discussion of topics of current interest, hearing reports and lectures from members of the faculty and others. During the past year the special lecturers of the college have delivered their lectures under the auspices of this society. A Yearbook of the society is published, which presents the progress of the original work done by instructors and students.

THE GILLETTE-HERZOG PRIZES.

The Gillette-Herzog Manufacturing Company, of Minneapolis, offers for competition by the students of the college of engineering and the mechanic arts:

A first cash prize of fifty dollars, accompanied by a gold medal.

A second cash prize of thirty dollars, accompanied by a gold medal.

Under satisfactory conditions the following subjects are admitted:

- I. Civil engineering. (a) Structural engineering, as seen in the construction of fire-proof buildings, bridges and iron and steel structures generally.
 - (b) Municipal engineering, as exhibited in the problems of water supply and distribution and street pavement.
 - (c) Railroad and highway engineering, as safety switches, systems of block signalling, also machinery for highway construction and maintenance.
 - II. Mechanical engineering, as seen in machine design or processes of construction; elevators or hoists; stationary or travelling cranes; motor wagons; heating systems and smoke prevention; power generation transmission or distribution; refrigerating machinery and plans of manufacturing plants.
 - III. Electrical engineering (a) The use of electric lights, motors, magnets and heaters.
 - (b) The design of dynamos, motors and transformers.
- Honorable mention of any theses and designs of special merit, not awarded prizes, may be made by the judges.

The prizes were not awarded in 1898.

TECHNICAL ESSAYS AND THESES.

Technical essays. These are required as a part of the regular work of the course, and are upon topics connected with the subjects in which collateral reading is required. They are to be in the nature of a report made upon some special subject of investigation, as of a machine or instrument, or some special method of work. The purpose is not only to test the student's thoroughness, but to develop in him the ability to put the results of his investigation into logical form, suitable for publication. These essays are read before the whole class and thus give each student the benefit of the research work of others, and also the benefit of their criticism.

Theses. Each member of the senior class in this college, in addition to the final examination, must prepare a theses on some subject particularly relating to the course. This paper must contain some original research made by the student himself. It must be creditable as a technical paper and as a specimen of literary composition.

Theses shall be written in a clear hand or typewritten; the paper used shall be of the standard size and quality adopted by the University; all charts, maps, drawings or other illustrative matter shall be presented on tracing cloth or bond paper; the whole shall be suitably bound and a copy deposited in the library of the University. The subject of the thesis must be submitted to the head of the department in which the student is a candidate for a degree and the work of preparation must be formally begun at the beginning of the second term of senior year. During the third term the student is expected to put at least ten hours a week upon this work.

The subject of the thesis and the character of the work done upon it will be suggested in a large measure by the course of study pursued by the candidate. Great emphasis is laid upon the careful and accurate preparation of the thesis, because, more than any other work the undergraduate does, this certifies to his ability to undertake the difficult and responsible duties involved in the direction of engineering and industrial interests. The thesis must be completed and put in the hands of the faculty as early as the senior examination week of the third term.

FEEES.

An incidental fee of five dollars per term is required of all students in this college.

The fees for work in the various shops and laboratories of the college are as low as possible and yet cover the actual cost of the material used by the student. They will therefore be found to vary from year to year. These fees rarely amount to more than five dollars per term, more often falling below that figure than exceeding it.

Courses in Science and Technology.

It is very desirable that engineering students taking one of the courses leading to the professional degrees, civil engineer, mechanical engineer, or electrical engineer, should have a more liberal education than can now be obtained in the regular four years' course. This has led to the establishment of a five years' course in science and technology in which a student in the college of engineering may obtain more English and general culture studies, as well as more extended work in the technical sciences than has been offered heretofore. This course does not diminish in any way the regular courses in engineering—the work is merely distributed over a more extended period. Every subject now included in any one of the regular engineering courses is also included in the corresponding five years' course, and in addition to these there is the equivalent of one years' work in more general subjects.

At the end of the fourth year the degree, bachelor of science in engineering is conferred. The professional degree, civil engineer, mechanical engineer, or electrical engineer, is granted upon the completion of the fifth year, provided the choice of electives throughout the course has satisfied the requirements of the proposed engineering degree.

COURSE IN SCIENCE AND TECHNOLOGY.

FRESHMAN YEAR.

Engineering mathematics, 5.
 English, 4.
 French or German, 4.
 Chemistry or history, 4.
 Military drill, 2.

SOPHOMORE YEAR.

Engineering mathematics, 5.
 History, chemistry, French, German, or English, 4.
 Physics, 4.
 Engineering drawing, 4.
 Rhetoric, 1.
 Military drill, 2.

JUNIOR YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.	Elective, 4.
Engineering drawing, 4.	Engineering drawing, 4.	Technical work, 4.
Technical work, 2.	Technical work, 2.	Technical work, 2.
Elective, 4.	Elective, 4.	Elective, 4.
	Technical work, 2.	Technical work, 2.

SENIOR YEAR.

Technical work, 5.	Technical work, 5.	Technical work, 2.
Technical work, 2.	Technical work, 2.	Technical work, 2.
Elective, 4.	Elective, 4.	Elective, 4.
Elective, 4.	Elective, 4.	Elective, 4.
Political science, 4.	Political science, 4.	Political science, 4.

POST SENIOR YEAR.

The work of the post senior year is entirely elective, and consists of twenty exercises or recitations per week, selected from the following list. The only limitation imposed is that subjects cannot be chosen unless the work leading up to, and preparing for such subjects has been completed.

The following electives are offered:

In science:—Chemistry, physics, geology, mineralogy, astronomy and mathematics.

In technology:—Shop practice, engineering laboratory, drawing, design, specifications measurement and transmission of power, steam boilers, railway engineering

shop economics, hydraulics, sanitary and municipal engineering, bridge engineering, surveying, alternating currents, telephony and telegraphy, electric light, plant operation, central stations.

In literature and the arts:—English, French, German, history, political science, logic.

The subjects required for the completion of the five years' course will depend upon the particular professional degree desired. Thus for the courses in science and technology leading to the degrees bachelor of science at the end of four years, and the professional degree at the end of the fifth year, the electives would be selected as follows:

FRESHMAN YEAR.

Mathematics, 5.
English, 4.
French or German, 4.
Chemistry or history, 4.
Military drill, 2.

SOPHOMORE YEAR.

Mathematics, 5.
History or chemistry, 4 (one year of chemistry is required).
Physics, 4.
Engineering drawing, 4.
Rhetoric, 1.
Military drill, 2.

JUNIOR YEAR.

FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL AND ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.
Engineering drawing, 4.	Engineering drawing, 4.
Materials of engineering, 2.	Materials of engineering, 2.
Topography, 4.	Shop practice, 3.

SECOND TERM.

Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.
Engineering drawing, 4.	Engineering drawing, 4.
Surveying, 3.	Mechanism, 2.
Engineering instruments, 4.	Shop practice, 3.
	Mechanical laboratory, 2.

THIRD TERM.

Mechanics, 5.	Mechanics, 5.
Freshman surveying, 4.	Dynamos and motors, 4.
Higher surveying, 4.	Kinematics, 4.
Field work, 4.	Mechanism, 2.
Field work, 2.	Shop practice, 3.
	Electrical laboratory, 3 or 5.

SENIOR YEAR.

FIRST TERM.

<p>CIVIL ENGINEERING.</p> <p>Curves and earth work, 3. Mineralogy, 2. Field work, 4. Electric power, 4. Political science, 4.</p>	<p>MECHANICAL AND ELECTRICAL ENGINEERING.</p> <p>Thermodynamics, 5. Industrial electricity, 2. Machine design, 4. Shop practice, 4. Political science, 4.</p>
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SECOND TERM.

<p>Bridge stresses, 5. Mechanical laboratory, 2. Highways, 3. Geology, 4. Political science, 4.</p>	<p>Prime movers, 3. Gas engines, 2. Steam engines, 2. Machine design, 4. Shop practice, 4. Political science, 4.</p>
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THIRD TERM.

<p>Structural details, 4. Railroad work or Municipal engineering, 4. General astronomy, 4. Political science, 4.</p>	<p>Mechanical laboratory, 2. Steam engines, 2. Machine or electrical design, 4. Shop practice, 8. Political science, 4. Law, 1.</p>
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POST SENIOR YEAR.

FIRST TERM

<p>CIVIL ENGINEERING.</p> <p>Masonry, 5. Hydraulics, 4. Bridge engineering, 5. Elective, 4.</p>	<p>MECHANICAL ENGINEERING.</p> <p>Machine design or railway design, 4. Steam boilers, 2. Shop practice, 4. Mechanical laboratory, 3. Elective, 4. Measurement of power, 2.</p>	<p>ELECTRICAL ENGINEERING.</p> <p>Alternating currents, 5. Electrical laboratory, 3. Shop practice, 4. Mechanical laboratory, 3. Elective, 4.</p>
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SECOND TERM.

<p>Bridge design, 5. Sanitary engineering, 3. Railway economics, 3. Least squares, 2. Elective, 4. Experimental laboratory, 3.</p>	<p>Machine design or railway design, 4. Electric light or electric railway, 2. Electrical laboratory, 2. Mechanical laboratory, 4. Elective, 4. Elective or thesis, 4.</p>	<p>Alternating currents, 4. Electric light, 2. Electrical laboratory, 3. Plant operation, 2. Electric railway or electric design, 2. Elective, 4. Thesis, 1.</p>
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THIRD TERM.

<p>Geodesy, 3. Field work, 4. Swing and arch bridges, 4. Elective, 4. Thesis, 4.</p>	<p>Machine design or railway design, 4. Compressed air, 2. Pumping machinery, 2. Mechanical laboratory, 4. Elective, 4. Thesis, 4.</p>	<p>Design and specification, 5. Electrical transmission, 4. Central stations, 2. Elective, 4. Thesis, 4.</p>
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As the strictly professional courses offer little opportunity for specialization in the physical and technical sciences, and the liberal culture studies are necessarily very limited in such courses, the general course in science and technology affords an opportunity for more extended work in physics, chemistry and other sciences, together with additional studies in English, history, political science and similar subjects.

While the choice of electives in the general course in science and technology is very liberal there is necessarily less freedom in the selection of subjects in those courses which lead to the engineering degrees.

For the first two years no electives are offered and the work is common to the general and the five years' professional courses.

While the student is allowed to make his own selection of electives in the general course, subject to known requirements, the following is suggested as a representative non-professional technical course leading to the degree, bachelor of science in engineering at the end of four years.

A FOUR YEARS' GENERAL COURSE IN SCIENCE AND TECHNOLOGY.

FRESHMAN YEAR.

Mathematics, 5.
English, 4.
French or German, 4.
Chemistry or history, 4.
Military drill, 2.

SOPHOMORE YEAR.

Mathematics, 5.
History, chemistry, or language, 4.
Physics, 4.
Engineering drawing, 4.
Rhetoric, 1.
Military drill, 2.

JUNIOR YEAR.

FIRST TERM.

Mechanics, 5.
Physics, 4.
Engineering drawing, 4.
Materials of engineering, 2.
Chemistry, 4.

SECOND TERM.

Mechanics, 5.
Physics, 4.
Engineering drawing, 4.
Mechanism, 2
or surveying, 3.
Chemistry, 4.
Mechanical laboratory, 2.

THIRD TERM.

Mechanics, 5.
Physics, 4.
Engineering drawing, 4
or surveying, 4.
Mechanism, 2
or field work, 2.
Chemistry, 4.
Electrical laboratory, 3.

SENIOR YEAR.

Thermodynamics, 5
or mineralogy, 4.
Industrial electricity, 2.
Physics, 4.
Political science, 4.
Elective, 4.

Prime movers, 3
or geology, 4.
Steam engine, 2
or highways, 3.
Physics, 4.
Political science, 4.
Elective, 4.

Mechanical laboratory, 2
or astronomy, 4.
Steam engine, 2
or astronomy.
Physics, 4.
Political science, 4.
Elective, 4.

The required subjects are printed in Roman type; the electives, printed in italics, may be replaced by others selected from the general list.

The School of Mines

FACULTY.

CYRUS NORTHROP, LL. D., *President.*

THE DEPARTMENT OF MINING AND METALLURGY.

WILLIAM R. APPLEBY, M. A., *Professor of Metallurgy.*

CHARLES E. VAN BARNEVELD, B. A. Sc., E. M., *Associate Professor of Mining.*

PETER CHRISTIANSON, B. S., E. M., *Instructor in Metallurgy.*

EUGENE C. MILLS, E. M., *Instructor in Mining.*

THE DEPARTMENT OF GEOLOGY AND MINERALOGY.

CHRISTOPHER W. HALL, M. A., *Professor of Mineralogy and Geology.*

CHARLES W. BERKEY, Ph. D., *Instructor in Mineralogy.*

THE DEPARTMENT OF CHEMISTRY.

GEORGE B. FRANKFORTER, Ph. D., *Professor of Chemistry.*

CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*

EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*

EVERHARD P. HARDING, M. S., *Instructor in Chemistry.*

THE DEPARTMENT OF MATHEMATICS AND MECHANICS.

ARTHUR E. HAYNES, M. S., M. Ph., D. Sc., *Professor of Mathematics.*

BENJAMIN F. GROAT, *Instructor in Mechanics.*

THE DEPARTMENT OF ELECTRICAL ENGINEERING.

GEORGE D. SHEPARDSON, M. A., M. E., *Professor of Electrical Engineering.*

FRANK W. SPRINGER, B. E. E., *Instructor in Electrical Engineering.*

THE DEPARTMENT OF MECHANICAL ENGINEERING.

JOHN J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering.*

HARRY E. SMITH, M. E., *Assistant Professor of Mechanical Engineering.*

OTHER DEPARTMENTS GIVING INSTRUCTION.

FREDERICK S. JONES, B. A., *Professor of Physics.*

WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*

JOHN ZELENY, B. S., *Assistant Professor of Physics.*

ADMISSION.

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

Students prevented from entering at the beginning of the year may be admitted at a subsequent date, when the circumstances are such as to justify the action. Such students are, however, at a great disadvantage, and all students expecting to enter the school are urged to be present at the beginning of the year.

All applicants should present themselves to the registrar, who will furnish them with application blanks and directions how to proceed with their examinations and registration.

REQUIREMENT FOR ADMISSION TO THE FRESHMAN CLASS.

For a detailed statement of the preparation expected under each of the following subjects, see statement under requirements for admission to the College of Science, Literature and the Arts, pages 52 to 57 of this Catalogue.

- English classics,** (*a*) and (*b*).
- English composition,** (one year)
- Elementary algebra,** (one year).
- Higher algebra,** (one-half year).
- Plane geometry,** (one year).
- Solid geometry,** (one-half year).
- Chemistry,** (one year).

In addition to the above named required subjects, for which substitutes cannot be accepted, the student shall present evidence of preparation in seven year-credits to be chosen from the following list:

- | | | |
|---|---|-----------------------|
| <ul style="list-style-type: none"> Physiology, Botany, Astronomy, Geology, Zoology, | } | (One-half year each). |
|---|---|-----------------------|
- English literature,** 1st year.
 - English literature,** 2d year.
 - German language,** 1st year.
 - German literature,** 2d year.
 - French language,** 1st year.
 - French literature,** 2d year.
 - Latin grammar.**
 - Caesar** [4 books].
 - Cicero** [6 orations]
 - Vergil** [6 books].
 - Greek grammar.**
 - Anabasis** [4 books].

Students who lack more than two year-credits, of the subjects required for admission, cannot be admitted until further preparation has been secured.

ADMISSION—GENERAL REQUIREMENTS.

For a statement of the general regulations governing admission, including examinations, certificates, credentials, conditions, accredited schools, choosing of courses, and advanced standing; daily routine; University examinations; failure to do satisfactory work; and graduation; see pages 48 to 52 of this catalogue.

Special Statement

In the School of Mines there are two regular courses of study, viz.: Mining Engineering and Metallurgy; leading to the degree of Engineer to Mines (E. M.) and Metallurgical Engineer (Met. E.) respectively.

Candidates for advanced standing must pass a satisfactory examination for admission and also upon those studies which have been pursued by the class they propose to enter.

Students from other institutions will be admitted to such standing as their credentials or the examinations taken under the direction of the faculty of this school may entitle them.

Unclassed students are admitted to pursue, under the direction of the faculty, one or two lines of study selected from some regular course. Such students must be persons of mature years, and present preparation sufficient to admit them to the freshmen class. Persons of mature years who shall give satisfactory evidence of ability to do with credit the work applied for may be admitted by vote of the faculty.

Students in the college of science, literature and the arts, in the college of engineering and mechanic arts, and school of technical and applied chemistry, who contemplate taking a degree in this school after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they purpose to enter.

Fees—A registration fee of five dollars is required at the beginning of each term.

The various laboratory fees are as follows:

Chemical laboratory	per term, \$5.00
Mineralogical "	" 2.00
Assaying "	" 5.00
Physical "	" 2.00
Mechanical "	" 3.00
Electrical "	" 5.00
Ore testing "	" 5.00

The visits to the mines made by the sophomore and junior classes cost the student between fifty and sixty dollars.

Books cost about as follows:

Freshman year.....	\$12.00 to \$15.00
Sophomore "	5.00 to 8.00
Junior "	13.00 to 25.00
Senior "	10.00 to 30.00

A number of books are recommended to the student, but the purchase of them is optional. The lower estimates given will cover the cost of books that must be purchased.

A set of draughting instruments must be purchased by the freshman class. The necessary instruments will cost about eight dollars.

SUMMARY OF EXPENSES.

FRESHMAN YEAR.

Matriculation fee.....	\$15.00
Chemical laboratory fee.....	15.00
Mineralogical laboratory fee.....	4.00
Physical laboratory fee.....	2.00
Assaying laboratory fee.....	5.00
Books.....	13.00
Draughting instruments.....	8.00
Note books and supplies.....	2.00
	<hr/>
	\$64.00

SOPHOMORE YEAR.

Matriculation fee.....	\$15.00
Chemical laboratory fee.....	15.00
Physical laboratory fee.....	6.00
Visit to the mines.....	60.00
Books.....	7.00
Note books and supplies.....	2.00
	<hr/>
	105.00

JUNIOR YEAR.

Matriculation fee.....	\$15.00
Visit to the mines.....	60.00
Books.....	20.00
Note books and supplies.....	2.00
Chemical laboratory fees.....	15.00
	<hr/>
	\$112.00

SENIOR YEAR.

Matriculation fee.....	\$15.00
Electrical laboratory fee.....	5.00
Ore testing laboratory fee.....	10.00
Mechanical laboratory fee.....	3.00
Books.....	20.00
Note books and supplies.....	2.00
	<hr/>
	\$55.00

Good board can be obtained at a cost varying from \$2.50 to \$4.00 per week.

Room rent varies from \$5.00 to \$10.00 per month.

With two occupying one room the rent per student would be considerably lower.

Organization. The organization of the School of Mines dates back to 1889 when the general faculty of the University recommended to the Board of Regents its establishment. In 1891 the Legislature of the State of Minnesota voted an appropriation for establishing and equipping the school. Two annual appropriations have since been made for its support.

Location. The University of Minnesota is located in the city of Minneapolis on the east bank of the Mississippi river, and the School of Mines has its buildings and laboratories on the same ground. Students of the School of Mines have therefore all the opportunities afforded by a large university.

Minneapolis is surrounded by and is in direct communication with several important mining and smelting districts. As the city is a railroad center transportation at special rates is readily obtained.

Field work is conducted at the iron mines in the northern part of this state, in the copper and iron regions of Michigan, in the mines and smelters of Montana and in the coal mines of Pennsylvania.

At least two of these districts will be visited by each class, affording splendid opportunities for study and observation.

Library. The library consists of about six hundred volumes. This number represents only those works that treat directly of mining and metallurgical subjects.

This school has a complete set of the leading mining and metallurgical journals, and other similar books of reference. The students have also access to a very complete private library, as well as the Minneapolis Public Library, which contains an exceptionally large and valuable set of publications on subjects relating to mining and metallurgy. The leading periodicals are accessible to all. Constant references in lectures compel the student to keep himself well informed as to the latest methods, machinery and changes in practice going on in his special line of work.

In addition to the above, many thousand volumes on chemistry, mineralogy and geology complete a most valuable working and reference library. A card index is kept of all articles of value and interest appearing in the leading periodicals.

Photography. Photographs of surface and underground appliances, metallurgical plants, copies of drawings and other photographs are indispensable to the study of mining and metallurgy. With the report of his field work every student is expected to present photographs, as well as sketches, of various objects under consideration. There is also a very complete set of lantern slides illustrating the principal methods of underground workings and metallurgical plants, at home and abroad. Several hundred slides have been made in the department's laboratory which bear directly on the work done in Minnesota and the neighboring northwest. Many valuable photographs are constantly being made. Blue prints of these are given students as illustrations. Much time is thus saved usually spent in making sketches and diagrams.

The work falls under the following subdivisions, supplemented by thorough courses in physics, chemistry, mineralogy and geology:

(a) *Assaying*—to determine if ore has value for treatment. (b) *Mining engineering*—to furnish material for treatment. (c) *Ore testing*—to determine best method of treatment. (d) *Ore dressing*—furnishing products for metallurgical treatment. (e) *Metallurgy*—smelting and refining of ores and ore dressing products; reduction to metals.

DEPARTMENT OF MINING ENGINEERING.

Mining engineering is divided among the sophomore, junior and senior years, and the subjects given, together with the sequence necessary, are stated in the accompanying outline of the course.

Until the second term of the junior year the course consists of lectures and recitations only. In the subsequent work, text-books are used in connection with lectures.

In the senior year, problems in pumping, ventilation and similar subjects become an important part of the work.

Field work in mining. At the close of the sophomore year the students are required to spend four weeks in some of the neighboring mining regions studying the work performed by the miners.

At the close of the junior year a second visit to the mining regions is made for the purpose of making mine and geological surveys and studying mining methods.

Conditioned students are not allowed to take field work, until conditions are removed.

Designs and specifications. The student makes working drawings of mine cars, skips and other parts of a mine's equipment that are usually designed and made at the mine.

Mine surveying. The work in surveying is designed solely for mining engineers. In the freshman year, third term, the work consists of the elements of plane surveying with special reference to the computations necessary.

Field work in surveying—Course X. The month of June, following the close of the freshman year, is spent in practicing plane surveying. About one hour per day is given to lectures or recitations and the remainder of the day to field work.

The students are divided into squads of two and each is required to complete the following exercises and surveys.

1. Ranging.
2. Chaining.
3. Compass reading.
4. Determination of length of pace.
5. Survey of a large area by pacing and hand compass.
6. Adjustment of hand levels and practice in leveling.
7. Adjustment and use of wye levels.

8. Adjustment of mining transit.
9. Reading angles.
10. Traverse with steel tape.
11. Azimuth traverse with stadia.
12. Observation on polaris for meridian.
13. Survey of a mining claim according to the regulations of the U. S. Government.
14. Measurement of earthwork.
15. Laying out railroad tangents, curves and crossings.

Each squad must provide itself with a 25-foot steel tape graduated to tenths.

This course is open only to those who have taken course ix or its equivalent.

During the first term of the junior year mine mapping is studied and practiced, and in the third term of this year the higher theoretical work in plane and mine surveying is studied. During the visit to the mines which closes the work of the junior year a survey of some mine or part of a mine is actually made and the survey platted.

Surveying instruments of the latest and best makes are furnished students for making these surveys.

Ore dressing. The lectures and recitations in ore dressing extend through the first and second terms of the junior year, and comprise the detailed study of ore dressing and concentrating machinery, together with the study of typical combinations of dressing machines as found in the several mining districts of the United States.

In connection with the theoretical work the ore dressing and testing plant of the school is utilized for practical illustrations.

During the coming year experimental work in ore concentration will be conducted.

COURSES IN MINING AND METALLURGY.

FRESHMAN YEAR.

FIRST TERM.

Algebra (Mathematics I)—3 hours, Professor Haynes.

Chemistry (Chemistry I)—4² hours, Professor Frankforter.

Drawing (Drawing I)—4² hours, Professor Kirchner.

Mineralogy (Geology and Mineralogy, Mineralogy I) 4² hours, Professor Hall and Dr. Berkey.

Plane trigonometry (Mathematics II)—2 hours, Professor Haynes.

SECOND TERM.

Algebra (Mathematics I)—3 hours, Professor Haynes.

Assaying (Metallurgy I)—2 hours, Professor Appleby.

Assaying (Metallurgy I)—2² hours, Professor Appleby and Mr. Christianson.

Chemistry (Chemistry II)—4² hours, Professor Nicholson.

Constructive geometry (Drawing II)—5² hours, Professor Kirchner.

Mineralogy (Geology and Mineralogy II)—4² hours, Professor Hall and Dr. Berkey.

Trigonometry (Mathematics I)—2 hours, Professor Haynes.

THIRD TERM.

- Analytical geometry* (Mathematics IV)—2 hours, Professor Haynes.
Assaying (Metallurgy I)—2 hours, Professor Appleby.
Assaying laboratory (Metallurgy I)—4² hours, Professor Appleby and Mr. Christianson.
Chemistry (Chemistry III)—4² hours, Professor Nicholson.
Descriptive geometry (Drawing III)—4 hours, Professor Kirchner.
Spherical trigonometry (Mathematics III)—2 hours, Professor Haynes.
Surveying (Mining IX)—3 hours, Mr. Mills.

SUMMER WORK—MONTH OF JUNE.

- Surveying* (Mining X)—4 weeks, Professor van Barneveld and Mr. Mills.

SOPHOMORE YEAR.

FIRST TERM.

- Analytical geometry* (Mathematics IV)—5 hours, Professor Haynes.
Chemistry (Chemistry IV)—4² hours, Professor Sidener.
Descriptive geometry (Drawing IV)—2² hours, Professor Kirchner.
Elementary mechanics (Physics I)—4 hours, Professor Jones.
Mining (Mining I)—1 hour, Professor van Barneveld.
Topographic drawing (Drawing VII)—2² hours, Professor Kirchner.

SECOND TERM.

- Chemistry* (Chemistry V)—4² hours, Professor Sidener.
Differential calculus (Mathematics V)—5 hours, Professor Haynes.
Mining (Mining I)—1 hour, Professor van Barneveld.
Physics (Physics II)—4 hours, Professor Jones.
Working drawings (Drawing V)—4² hours, Professor Kirchner.

THIRD TERM.

- Chemistry* (Chemistry VI)—4² hours, Professor Sidener.
Integral calculus (Mathematics VI and VII)—5 hours, Professor Haynes.
Machine drawing (Drawing VI)—2² hours, Professor Kirchner.
Mining (Mining I)—2 hours, Professor van Barneveld.
Physics (Physics III)—4 hours, Professor Jones.

SUMMER WORK—MONTH OF MAY.

- Mining* (Mining II) }
Metallurgy (Metallurgy XII) } —4 weeks, { Professor van Barneveld, Professor Apple-
 by, Mr. Christianson and Mr. Mills.

JUNIOR YEAR.

FIRST TERM.

- Chemistry* (Chemistry XVI)—4² hours, Professor Frankforter.
Geology { *Geology and Mineralogy*, }
 { *Geology II*, } —4 hours, Professor Hall.
Mechanics (Mechanics I)—5 hours, Mr. Groat.
Metallurgy (Metallurgy V)—3 hours, Professor Appleby.
Mine mapping (Mining XI)—2² hours, Professor van Barneveld.
Mining (Mining III)—4 hours, Professor van Barneveld.
Ore dressing (Mining VII)—3 hours, Professor van Barneveld and Mr. Mills.

SECOND TERM.

- Chemistry* (Chemistry XXIII)—4² hours, Professor Sidener.
Geology { *Geology and Mineralogy* } —2 hours, Professor Hall.
 Geology II.
Materials of engineering (Mechanical Eng. XXVI)—2² hours, Professor Smith.
Mechanics (Mechanics II)—5 hours, Mr. Groat.
Metallurgy (Metallurgy VI)—3 hours, Professor Appleby.
Mining (Mining III)—4 hours, Professor van Barneveld.
Ore dressing (Mining VII)—3 hours, Professor van Barneveld and Mr. Mills.
Petrology { *Geology and Mineralogy,* } —2² hours, Professor Hall and Dr. Berkey.
 Geology III.

THIRD TERM.

- Applied geology* (*Geology and Mineralogy, Geology V*)—4 hours, Professor Hall.
Chemistry (Chemistry XXVII)—4² hours, Professor Sidener.
Machine design (Mechanical Engineering X)—4 hours, Professor Smith.
Mathematical crystallography { *Geology and Mineralogy,* } —2 hours, Professor Hall.
 Mineralogy IV.
Mechanics (Mechanics III)—5 hours, Mr. Groat.
Metallurgy (Metallurgy VII)—3 hours, Professor Appleby.
Mining (Mining IV)—4 hours, Professor van Barneveld.
Mine surveying (Mining XII)—3 hours, Professor van Barneveld and Mr. Mills.

FIELD WORK—MONTH OF MAY.

- Mining* (Mining V) } —4 weeks, { Professor van Barneveld, Professor Appleby,
Metallurgy (Metallurgy XII) } { Mr. Christianson and Mr. Mills.

SENIOR YEAR.

FIRST TERM.

- Electric power* (Electrical Engineering III)—5² hours, Mr. Springer.
Metallurgy (Metallurgy VIII)—4 hours, Professor Appleby.
Mining (Mining VI)—5 hours, Professor van Barneveld.
Ore testing (Metallurgy III)—3 hours, Professor Appleby.
Ore testing laboratory (Metallurgy III)—4² hours, Professor Appleby and Mr. Christianson.
Thermodynamics (Thermodynamics and Prime Movers I)—5 hours, Mr. Groat.

SECOND TERM.

- **Economic geology* { *Geology and Mineralogy* } —4 hours, Professor Hall.
 Geology VIII.
Metallurgy (Metallurgy IX)—4 hours, Professor Appleby.
Mining (Mining VI)—5 hours, Professor van Barneveld.
Ore testing (Metallurgy III)—2 hours, Professor Appleby.
Ore testing laboratory (Metallurgy III)—4² hours, Professor Appleby and Mr. Christianson.
Prime movers (Thermodynamics and Prime Movers, II)—3 hours, Mr. Groat.
Thesis—4 hours.

THIRD TERM.

- Designs and specifications* (Mining VIII)—4² hours, Professor van Barneveld.
 **Geology* { *Geology and Mineralogy,* } —4² hours, Professor Hall.
 Geology VI.
Mechanical laboratory (Mechanical Engineering XXXI)—4² hours, Professor Smith.
Metallurgy (Metallurgy X)—4 hours, Professor Appleby.
Mining (Mining VI)—5 hours, Professor van Barneveld.
Thesis—4 hours.

*Students in the metallurgical course will pursue the subject Electro-metallurgy (metallurgy XI)—4 hours with Mr. Christianson, instead of the Geology which is required of students in the mining course for these two terms.

DEPARTMENT OF METALLURGY.

ASSAYING.

The lectures treat of and describe apparatus, reagents, assay furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags are shown, and instruction is given as to nature and quantity of fluxes. Special and rapid methods of testing slags and metallurgical products as employed in western smelting works are emphasized.

The laboratory courses include preparing and testing reagents, making cupels, etc., and assaying samples of ore, furnace and mill products; different charges are tried and practical conclusions drawn. Assay of bullion for fineness.

Great importance is attached to the work in the laboratory. A large, well ventilated furnace room, in which are located muffle and crucible furnaces and another room of similar dimensions equipped with desks, pulp and bead balances, afford accommodations to a large number of students. Ores of various metals of known value are given the students, who are required to make up the necessary charges and submit their reports in detail. This work is offered to students completing the necessary courses in mineralogy and chemistry.

The assay laboratories are located in Pillsbury Hall, and consist of—

1. *Preparation room.* Where the samples and re-agents are weighed. This operation is conducted in a room entirely apart from the furnace room. This separation of the laboratory from the furnace room is of the greatest importance to the student. The preparation of ore is effected by a Forster crusher, Fraser & Chalmers sample pulverizer, and Bridgman ore sampler. The machines are run by an electric motor. Much time is thereby saved to the student for extended or advanced work in special lines.

2. *Furnace room.* After the sample has been placed in suitable vessels for fusion, it is taken to the furnace room, which communicates directly with the preparation room. This room is well equipped with crucible and muffle furnaces and all the appurtenances necessary for carrying on the reduction of the metals from their ores by fire methods.

3. *Balance room.* In this room are various balances for accurately weighing the gold and silver beads, and bullion.

A course in field assaying is prepared for men of mature years who desire to become acquainted with representative ores and methods of assaying without taking the courses leading to a degree.

Special work in mineralogy is a necessity and must be taken with assaying.

Work can be begun Oct. 1st, Jan. 1st and March 1st. This course consists of eight weeks, three days per week, seven hours per day.

Fee for course including mineralogy and matriculation fee \$19.00.

ORE TESTING.

The lectures treat of the use and purposes of all the machinery connected with the subject, supplemented with detail drawings.

There are complete testing works connected with the department where the student may see the working of and handle for himself, crushers, rolls, Huntington mill, concentrating machinery, such as vanners, buddles, jigs, pans for amalgamation, settlers, reverberatory furnaces for oxidizing and oxidizing-chloridizing roasts, leaching and chlorination plants, as well as sizing apparatus and hydraulic separators. Sufficiently large amounts of ore are given to make the necessary tests upon the different machines, and the students report the best method of treatment. Two terms, eleven hours per week in senior year, are devoted to instruction and laboratory work, and are required of students both in mining and metallurgy.

The ore testing works meet educational as well as commercial needs.

Educational. The ore testing plant acquaints the student with the construction and manipulation of the principal typical machines used in the leading ore dressing establishments of the country. It is here that students in mining and metallurgical engineering, get the requisite practical experience. They handle all machines and operate on sufficiently large amounts of material to determine the method best suited to a given ore to extract the largest amount of metal, with the least possible loss.

Commercial. Ore testing works are an important factor in mining and metallurgical projects. The commercial object is to determine the best method of treating a given ore so as to yield the largest percentage of the metal it contains at the least possible cost. Samples varying from 500 pounds to car load lots can be treated by various methods.

The ore testing works are located on the east bank of the Mississippi between the Great Northern and Northern Pacific railroads. Located at this point on the University campus, it offers the very best of facilities for both educational and commercial purposes.

As the funds appropriated for the erection of such a plant were sufficient to purchase only the necessary machinery, the business men of Minneapolis generously provided a suitable building. This building, 94x66 feet, is built of brick and stone.

Machinery. The plant contains all the machinery necessary to illustrate the various processes of ore testing, viz: a Bridgman mechanical sampler, size B; a link belt bucket elevator; a pulley feeder complete; a pair of 12½x12 geared rolls complete; a four compartment spitzkasten; a three compartment Hartz jig, a Collum jig, complete with cone for driving; a three and a-half foot Huntington mill complete; a three stamp mill, 275-pound stamps; a five stamp mill, 850-pound stamps; a Challenge automatic feeder for five-stamp battery; a suspended Challenge feeder for three-stamp battery; a Tulloch feeder for Huntington mill; a single deck buddle, twelve feet in diameter; a four-foot plain belt Frue vanner; a three-foot amalgamating pan; a five-foot settler; a Bruckner roasting furnace, with fire box on

wheels; a chlorination barrel; a battery tightener; a two horse-power vertical boiler; a steam drying pan; three trommels, with driving arrangement and gears, a one thousand pound Reedy elevator, complete with worm gear; two overhead crawls, each with eighty foot track; a one-ton pulley block; a quarter-ton pulley block; a scoop car, with flat wheels; two twenty horse power electric motors; three MacDermott automatic samplers, etc.

METALLURGY.

This subject is well illustrated with representative ores of all the most important metals, drawings of furnaces, models and samples of all the different furnace products. The lectures treat all the principal methods now in use.

The practical work consists in visits to smelting and refining works, which are accessible. The work in metallurgy extends through two years.

COURSES OF INSTRUCTION.

COURSES IN CHEMISTRY.

- Course I. Qualitative analysis.* *Freshman i*, 96 hours.
Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation. 3 hours lectures, 5 hours laboratory.
- Course II. Qualitative analysis.* *Freshman ii*, 96 hours.
Lectures and laboratory work. A continuation of course i. Open to those who completed course i.
- Course III. Qualitative analysis.* *Freshman iii*, 96 hours.
Lectures and laboratory work. The course includes a study of the acids, their detection and separation. Open to those who have completed course ii.
- Course IV. Quantitative analysis.* *Sophomore i*, 96 hours.
Lectures and laboratory work. The course includes an introduction to volumetric and a beginning of gravimetric analysis. Open to those who have completed course iii.
- Course V. Quantitative analysis.* *Sophomore ii*, 96 hours.
Lectures and laboratory work. A continuation of course iv.
- Course VI. Volumetric analysis.* *Sophomore iii*, 96 hours.
Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. Open to those who have completed course v.
- Course XVI. Special problems.* *Junior i*, 48 hours or more.
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems. Open to those who have completed course vi.
- Course XIX. Electro-chemical analysis.* *Senior ii*, 48 hours or more.
Lectures and laboratory work. The course includes the qualitative and quantitative separation of metals by electrolysis. Open to those who have completed course vi.

Course XXIII. Iron and steel analysis. *Junior ii, 48 hours or more.*
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods, as well as the determination of associated elements, sulphur, phosphorus, silicon, manganese, carbon and others. Open to those who have completed course vii.

Course XXVIII. Special problems. *Junior iii, 48 hours or more.*
Laboratory work. This course includes work on ores of base metals, limestone, slags, etc.

COURSES IN DRAWING.

Course I. Freehand. *Freshman i, [4].*
Lettering, geometric forms and engineering details in outline, including the elements of perspective.

Course II. Mechanical. *Freshman ii, [4].*
Constructive geometry of lines, points, circles, conics, roulettes, spirals and miscellaneous curves, conventional methods, freehand working drawings, and standard sizes and shapes.

Course III. Descriptive geometry. *Freshman iii, [4].*
Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments. Recitations and lectures.

Course IV. Descriptive geometry. *Sophomore i, [2].*
Orthographic, isometric, horizontal, oblique, and perspective projections; shades, and shadows, line shading and brush tinting. Open to students who have completed course iii.

Course V. Working drawings. *Sophomore ii, [4].*
Engineering details, assembly drawings, mechanical movements, tracing and blue printing.

Course VI. Machine drawing. *Sophomore iii, [2].*
Detail and construction drawings of mining machinery, head frames, cars, skips and other mining appliances.

Course VII. Topographic drawing. *Sophomore i, [2].*
Plans, sections, timbering, mine conventions, and topographic maps.

COURSE IN ELECTRICAL ENGINEERING.

Course III. Electric power. *Senior i, [5].*
Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. 33 lectures and 44 hours laboratory.

COURSES IN GEOLOGY AND MINERALOGY.

MINERALOGY.

Course I. General mineralogy. *Freshman i.*
The morphology of minerals, consisting of the elements of crystallography and the projection and construction of figures of crystals; the physical and chemical characters of minerals with demonstrations; a study of the native elements, and the ores and economic minerals with their crystal forms, physical properties and chemical composition together with their occurrence and association.
Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analysis to the determination of species.

Course II. Descriptive mineralogy. *Freshman ii.*
The rock-making minerals are described as another most important group of minerals not included under the foregoing descriptions. Minerals are also discussed in their genetic relationships and distribution.
Laboratory practice continues in the determination of species and introduces the methods of quantitative blowpipe analysis; special topics are taken up by individual students; reference reading and discussions.

Course IV. The morphology of minerals.*Junior iii.*

A study of crystallography, embracing projection and geometric relations of crystal planes. Twice a week.

Or geology course vi petrography.

GEOLOGY.

Course I. Physical geology.*Junior i.*

1, Geodynamics discussing the atmosphere, water, terrestrial heat, plants and animals, as geological agents; 2, structural geology, explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relations to the arrangement of material in the earth; 3, physiographic geology pointing out the more prominent earth features and discussing their origin, significance and the agencies affecting them; 4, an enumeration of the common rock making minerals in their formation, occurrence and alterations.

Course II. Historical geology.*Junior ii.*

A study of the strata of the earth. An outline of the salient features of the earth's history, discussing its several eras with their faunas and floras. The special purpose of the course is to outline the geographical history of the North American continent. Lectures and reading, twice a week.

Course III. Petrographical geology.*Junior ii.*

General considerations on the origin and occurrence of rocks, i. e. Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the crystalline rocks with a view to their general description. Kemps Handbook of Rocks. Reference reading and demonstrations. Twice a week.

Course V. Applied geology.*Junior iii.*

An outline of the economic relations of geology. The course comprises a discussion of the nature and distribution of the non-metallic materials of an economic value including coal, mineral oils and natural gas phosphates and other natural fertilizers, together with soils; the geologic conditions of water supply; abrasives and fictile materials; natural and artificial building stones; mortars and cements for construction, road-making, followed by a brief summary of the nature and distribution of ore deposits of the less and more important metals. Williams Applied Geology and reference reading.

Course VI. Petrography.*Junior iii.*

An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their crystalline habit, mineral composition and genetic relations. The course extends into an examination of some Minnesota groups of crystalline rocks. Practically a continuation of course iii. Laboratory, with lectures and reference reading. An elective for students of mineralogy. See mineralogy, course iv.

Course VIII. Economic geology.*Senior ii.*

History of mineral discovery and development in the Americas; a discussion of the origin and distribution of ore deposits, embracing the chemical process involved in their formation and subsequent alterations; a description of the geology and mineralogy of ore bodies, particularly those yielding gold, silver, copper, iron, lead and zinc.

Course X. Special problems.*Senior iii.*

The investigation by individual students of particular problems, involving the field work of an investigation of some particular formation and with the laboratory investigation and reading incident to the study of the material collected. The methods of systematically recording and interpreting geological and mineralogical data as observed in the field; the keeping of notebooks, preparation of geological maps, profiles and sections will be taught.

COURSES IN MATHEMATICS.

- Course I. Higher algebra.* *Freshman i, ii, 66 hours.*
Advanced work in equations containing radicals, simple and quadratic equations, proportion, variation, progressions, special series, binomial theorem, indeterminate coefficients, logarithms, the logarithmic series, Taylor's formula and the treatment of higher equations, including Cardan's rule for cubics, etc.
- Course II. Plane trigonometry.* *Freshman i, ii, 44 hours.*
Trigonometric functions of acute angles, of angles in general, application of logarithms, solution of right triangles, general properties of triangles. Solution of oblique triangles; practical applications, including the trigonometric solution of cubic equations having real and unequal roots.
- Course III. Spherical trigonometry.* *Freshman iii, 22 hours.*
Review of some truths of solid and spherical geometry. Napier's rules, solution of right spherical triangles, general properties of spherical triangles, Napier's analogies, the solution of oblique triangles and the application of spherical trigonometry to the solution of practical problems.
- Course IV. Analytical geometry.* *Freshman iii, 22 hours. Sophomore i, 55 hours.*
Coordinate systems, transformation of coordinates, algebraic equations of different degrees produced and discussed by the aid of these systems, transcendental equations and loci; three dimensions; the point, plane line, surfaces and solids.
- Course V. Differential calculus.* *Sophomore ii, 55 hours.*
The differentiation of algebraic and transcendental functions, successive differentiation, series, derivatives, maxima and minima, tangents, subtangents, normals, subnormals, illusory forms, asymptotes, direction and rate of curvature, radius of curvature, evolutes, envelopes, singular points and curve tracing.
- Course VI. Integral calculus.* *Sophomore iii, 40 hours.*
The integration of various algebraic and transcendental differentials, rectification of plane curves, quadrature of plane surfaces and surfaces of revolution, cubature of volumes of revolution and the production of the equations of loci by integrating certain conditional differentials.
- Course VII. Some practical applications of the calculus to mechanics and physics.* *Sophomore iii, 15 hours.*
Maxima and minima, center of gravity, center of hydrostatic pressure and moment of inertia.

COURSES IN MECHANICS.

- Course I. Statics and dynamics.* *Junior i.*
Mathematical investigation of the equilibrium and motion of rigid bodies. Recitations and lectures. Numerous problems in work, power, energy and friction. Open to students having completed the seven courses in mathematics and course i in physics.
- Course II. Mechanics of materials,* *Junior ii.*
Mathematical investigation of the strength and elasticity of materials, in which are established the theoretical principles of designs for beams, shafts, boiler plates, riveting and other structural members. Open to students having completed course i, above.
- Course III. Hydromechanics.* *Junior iii.*
Equilibrium and flow of fluids. Hydraulic problems. Open to students having completed course ii.

COURSES IN MECHANICAL ENGINEERING.

- Course X. Principles of machine design.* *Junior iii, 44 hours.*
Principles and methods of design of machine members, with problems. Recitations and lectures. Open to those who have completed course ii of applied mechanics.
- Course XXVI. Materials of engineering. Strength of materials.* *Junior ii, 44 hours.*
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Open to students in course ii of applied mechanics.
- Course XXXI. Mechanical laboratory.* *Senior iii, 66 hours.*
Calibration of steam gauges, meters and other apparatus; calorimetry; tests of pumps, engines and boilers. Open to students who are taking or have completed course i.

COURSES IN METALLURGY.

- Course I. Assaying.* *Freshman ii and iii.*
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take courses i, ii, iii, chemistry, and have completed courses i, ii, mineralogy.
- Course II. Field assaying.*
Assaying of special ores. Conferences and laboratory work.
- Course III. Ore testing.* *Senior, iii.*
Determination of methods of ore treatment. Lectures and practical work. Open to those who have completed course i.
- Course IV. Mill work.* *Junior iii.*
Practical experience in handling ore-dressing machinery. Open to those completing course ii.
- Course V. General metallurgy.* *Junior i.*
Including the subjects of combustion, fuels, refractory materials and furnaces. Open to those who have completed course i.
- Course VI. Metallurgy of iron.* *Junior ii.*
Lectures and recitations. Open to those who have completed course v.
- Course VII. Metallurgy of wrought iron and steel.* *Junior iii.*
Lectures and recitations. Open to those who have completed course v.
- Course VIII. Metallurgy of the precious metals.* *Senior i.*
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course v.
- Course IX. Metallurgy of the base metals.* *Senior ii.*
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course vii.
- Course X. Metallurgy of other base metals.* *Senior iii.*
Comprising aluminum, zinc, tin, mercury. Lectures and recitations. Open to those who have completed course viii.
- Course XI. Electro-metallurgy.* *Senior iii.*
Lectures and recitations. Open to those who have completed course viii.
- Course XII. Field work metallurgy.*
Conferences and reports. Last four weeks *Sophomore iii and Junior iii.* Open to those who have completed course vi.
- Course XIII. Designs and specifications,* *Senior iii.*
Supplementing thesis.

COURSES IN MINING.

- Course I. Explosives, blasting, drilling machines, air compressors,*
Sophomore i, ii, 1 hour, Sophomore iii, 2 hours.
- Course II. Field work.*
Work in mines with note books. Open to those who have completed course i.
Sophomore iii, last four weeks of the term.
- Course III. Shaft sinking, drifting, stopping, timbering.* Junior i, 4 hours.
Open to those who have completed courses i and ii.
- Course IV. Mode of occurrence of ore bodies, prospecting, methods of mining, under-ground transportation.* Junior ii, iii, 4 hours.
Open to those who have completed courses i, iii.
- Course V. Field work.*
Practice in mine surveying and field geology, study in mines. Open to those who have completed courses ii, iii, iv and ix. Last four weeks of Junior iii.
- Course VI. Tunneling, mine ventilation, mining machinery, mining accounts, accidents in mines, problems. Electricity applied to mining.* Senior i, ii, iii, 5 hours.
Open to those who have completed courses i, iii and iv.
- Course VII. Ore dressing.* Junior i, ii, 3 hours.
Mechanical preparation of ore for market, for metallurgical treatment, etc.
- Course VII. Designs and specifications.* Senior iii, 8 hours.
Design of mine cars, skips, head frames, etc. Open to those who have completed course vi in Senior i and ii.
- Course IX. Plane surveying.* Freshman iii, 3 hours.
Computation, platting. With special reference to mine surveying.
- Course X. Field work.* Freshman.
Practice in plane surveying during the month of June with special reference to mine surveying.
- Course XI. Mine mapping.* Junior i, 2 hours.
Plans, sections, etc. Open to those who have completed course x.
- Course XII. Mine surveying.* Junior iii, 3 hours.
Computations, methods. Open to those who have completed courses x, xi.

COURSES IN PHYSICS.

- Course I. Mechanics.* Sophomore i.
Dynamics of solids, liquids and gases, with laboratory practice. Before entering upon this course, the mathematics of the freshman year must be completed.
- Course II. Heat and electricity.* Sophomore ii.
With laboratory practice.
- Course III. Electricity—continued.* Sophomore iii.

COURSE IN THERMODYNAMICS AND PRIME MOVERS.

- Course I. Thermodynamics..* Senior i.
Lectures and recitations on the mechanical theory of heat, during which are investigated the properties of steam with especial application to the steam engine. Considerable time is also devoted to gas, air and other heat engines. Open to students having completed course iii in mechanics.
- Course II. Hydraulic motors.* Senior ii.
Theory of water turbines preceded and followed by some connected hydraulic problems. Open to students having completed course iii in mechanics.

THE
COLLEGE OF AGRICULTURE

THE
SCHOOL OF AGRICULTURE

THE
DAIRY SCHOOL

AND THE
EXPERIMENT STATION

The College of Agriculture.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

WILLIAM M. LIGGETT, *Dean.*

SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*

OTTO LUGGER, PH. D., *Professor of Entomology.*

HENRY W. BREWSTER, PH. D., *Professor of Mathematics.*

HARRY SNYDER, B. S., *Professor of Agricultural Chemistry.*

T. L. HAECKER, *Professor of Dairy Husbandry.*

M. H. REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*

WILLET M. HAYS, M. Agr., *Professor of Agriculture.*

THOMAS SHAW, *Professor of Animal Husbandry.*

NOTE—The instruction not given by the faculty of the college of agriculture is given by the faculty of the college of science, literature and the arts.

PURPOSE AND SCOPE.

The college course in agriculture is a thoroughly scientific course emphasizing the sciences of botany, chemistry, physics and zoology, and requiring during the freshman and sophomore years at least two terms' work in each.

The course naturally divides itself into two parts of two years each, the first part giving but little opportunity for the election of studies, and the latter part making all studies elective. Twelve terms of scientific work are required, in chemistry, physics, botany and zoology, during the freshman and sophomore years. A student may elect a six term course in either botany or zoology, or a three term course in each. In chemistry and physics the student takes a four term course in either, and a two term course in the other.

The technical agricultural subjects follow in the junior and senior years, throughout which the student elects as a specialty either one of his major sciences in some of its different forms or some technical agricultural subject with reference to which specialty all other studies are elected.

No classics are required, for the reason that the three modern languages, German, French and Scandinavian, are of more value to the student of scientific agriculture.

The elective studies in the last two years of the course give opportunity for liberal culture in art, literature and philosophy, and for becoming proficient in scientific research work in some of the many problems pressing for solution in the development of the state and national agricultural experiment stations.

REQUIREMENTS FOR ADMISSION.

Candidates for admission to the freshman class are required to show attainment equal to that represented by the certificate of graduation from the School of Agriculture. Graduates of the School of Agriculture who have completed the studies required for entrance to this college are admitted on presentation of their certificates; after 1901, all graduates before admission to this college are also required to present with their certificates testimonials showing that they have completed the fourth year's work as required in the School of Agriculture. Graduates from high schools may be admitted to the freshman class after spending a year in the School of Agriculture, pursuing such studies as the faculty may require. Before graduation, however, all of the required work in the School of Agriculture must be completed.

REQUIREMENTS FOR GRADUATION.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, students will be recommended for graduation with the degree of bachelor of agriculture.

COURSE OF STUDY.

FRESHMAN YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Solid Geometry, 4.	Trigonometry, 4.	Chemistry, 4.
German, 4.	German, 4.	German, 4.
Drawing, 4.	Drawing, 4.	Rhetoric, 4.
Botany or Zoology, 4.	Botany or Zoology, 4.	Botany or Zoology, 4.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.

SOPHOMORE YEAR.

Physics, 4.	Physics, 4.	Physics or Geology, 4.
Chemistry, 4.	Chemistry, 4.	Chemistry, 4.
Botany or Zoology, 4.	Botany or Zoology, 4.	Botany or Zoology, 4.
German, 4.	German, 4.	German, 4.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.

JUNIOR YEAR.

FIRST TERM.
Breeding Crops, 4.
Veterinary Science, 4.
Agricultural Chemistry, 4.
Dairy Stock, 4.
Forestry, 4.
Entomology, 4.
Animal Breeding, 4.

SECOND TERM.
Veterinary Science, 4.
Agricultural Chemistry, 4.
Farm Dairying, 2.
Dairy Feeding, 2.

THIRD TERM.
Horticulture, 4.
Animal Feeding, 4.
Agricultural Chemistry, 4.
Veterinary Science, 4.
Field Crops and Seeds, 4.
Dairy Feeding, 2.

SENIOR YEAR.

Agricultural Engineering, 4.
Horticulture, 4.
Agricultural Chemistry, 4.

Farm Economics, 4.
Dairy Factory Course, 4.
Agricultural Chemistry, 4.
Veterinary Science, 4.

Entomology, 4.
Forestry, 4.
Veterinary Science, 4.

In the junior and senior years students are required to elect twelve of the above subjects. They are also required to elect an equivalent amount of work from the following list given in the college of science, literature and arts; animal biology, physics, botany, mathematics, English, English literature, geology, mineralogy, political economy, history, astronomy, pedagogy, psychology, history of philosophy, social philosophy, French, German, Scandinavian. The elective work is subject to the approval of the faculty. Students are advised to continue at least one of the lines of work offered, through the junior and senior years.

COURSES OF INSTRUCTION.

AGRICULTURE.

A portion of the work in agriculture is in the form of lectures. The writing of papers on special subjects is made a feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The courses of study are arranged for at such times of the year as will best suit the students in the department. The aim is to have students get experience in field agriculture, both practical and experimental and in demonstration instruction. The work is a continuation of the agricultural studies in the school of agriculture, each subject being here treated from the more technical standpoint.

Course I. Field crops and seeds.

In this course are considered the botany, cultivation place in the rotation and the utilization of the various cereal, forage, root, fiber, sugar, and miscellaneous crops. Special attention is given to the subjects of permanent, rotation, annual, and shift pastures; to permanent and rotation meadows, and to the production of all kinds of dry-cured and ensilaged forage.

Course II. Crop breeding.

Heredity, variation, extensive selection; field crop nursery management; producing new qualities by crossing and by change of environment; outcrossing versus inbreeding and self fertilization; originating varieties and improving standard varieties; choice of foundation stocks, methods of selecting, crossing followed by selection; increasing newly originated stocks; testing new kinds by comparing them with standard varieties; methods of disseminating new varieties.

Course III. Agricultural Engineering.

Selecting farms, deciding upon systems of farming, planning farms, subduing new soils, farm buildings, fences, roads, tillage, irrigation, implements and machinery.

Course IV. Farm economics.

Field management, rotation, weeds, labor, prices, purchases and sales, farm finances, the permanent farm investment, agricultural pedagogics.

Additional courses in special lines may be arranged for upon application.

The University experiment farm consisting of two hundred and fifty acres of valuable land, is located between St. Paul and Minneapolis three miles from the campus of the University, and adjoins the state fair grounds. It contains a large variety of soils and exposures and is well adapted to the work of the experiment station and the instruction in agriculture. The farm buildings and the fields are well arranged for experiments and instruction in the various technical agricultural subjects.

AGRICULTURAL CHEMISTRY.

Either two or four terms of chemistry are required, and after completing this required work any of the special courses in agricultural chemistry may be elected.

Course I.

In the spring term of the freshman year the subject of general chemistry is pursued.

This work is a continuation of the first term's work in chemistry, as given in the school of agriculture. The work consists of lectures and recitations. Remsen's advanced course in chemistry is used as a text-book. Particular attention is given to the study of those elements and compounds which are of the most importance in agriculture.

Course II.

In the fall term of the sophomore year the student begins the subject of qualitative analysis. This course is arranged to meet the special wants of agricultural students and is completed the second term of this year. The qualitative analysis of insoluble substances is emphasized. The student spends three two hour periods each week in the laboratory, and one period is devoted to a lecture and a recitation. The students are required to write all of the chemical reactions, and to explain the separations involved.

Course III.

In the spring term of the sophomore year an elementary course in quantitative analysis is given. This work includes the gravimetric determination of iron, the determination of iron by the bichromate method, the determination of sulphuric anhydrid acidimetry, alkalimetry, the determination of phosphoric anhydrid, and of calcium oxide.

Course IV. The chemistry of farm products.

Lectures, one term, 4 hours per week. (Given in 1900-1.)

This course relates to the chemistry of production and use of farm products. The ash elements, their importance and functions, and the extent to which they are present in agricultural plants; the organic compounds, found in plants and animals, their functions and uses for food purposes; the chemistry of fermentation, germination, and the factors which influence the growth and composition of farm crops; the composition of human food stuffs, and special topics relating to the chemistry and economy of human foods; and the chemistry of animal nutrition are some of the more important topics which are considered.

Course V. The chemistry of soils and fertilizers.

Lectures, one term, 4 hours. (Given in 1900-1.)

This course consists of lectures treating of the various sources of plant food, the forms of food which are the most valuable to growing crops, the amount of food which crops require, and the power which crops possess for obtaining their food from the soil. The subject of soil exhaustion and soil improvement is the basis of this term's work. The size of the soil particles, and their relation to crop production, the composition and characteristics of farm manures, and commercial fertilizers, the subject of nitrification and the laws which govern the increase and decrease of the soil nitrogen, the organic compounds of the soil and the part which they take in soil fertility are some of the topics which are studied.

Course VI. The analysis of agricultural products.

The course consists mainly of laboratory practice, and includes the separation and determination of the various compounds found in plants and animals. Ample facilities are offered in the practical lines of this work inasmuch as numerous chemical analyses are always in progress in the experiment station laboratory. The work includes the analysis of milk, butter, cheese, fodders, grains, milled products, roots, and tubers, including sugar-beets. The work begins with the determination of the nitrogen, and includes the pentosans, starches, fats and other organic compounds. After making these various determinations the student is required to make a complete proximate analysis of some food material. The adulteration of agricultural products, and the methods employed to detect adulteration forms a prominent part of the work. The analysis of water for household, stock, and irrigation purposes is taken up. This course extends through three terms, 4 laboratory periods per week, and is open to all students who have completed the required work in quantitative analysis.

Course VII. The analysis of soils and fertilizers.

This course extends through two terms, and includes the study of the methods employed in soil investigations. The chemical analysis of soils and the separation and determination of the various sized soil particles, as sand, fine sand, silt, fine silt, and clay form an important part of the work. Practice is also given in the methods of fertilizer analysis.

Courses VI and VII are intended for those students who wish to make a speciality of agricultural chemistry.

ANIMAL HUSBANDRY.

Course I. Animal breeding.

Under this head lectures are given on the laws which govern breeding. The principles are considered upon which a standard of excellence is based and various standards are compared. Heredity in its various features is discussed, not only with reference to characteristics that are normal, but also with reference to those that are abnormal and acquired. Careful consideration is given to the heredity of diseases. The law of correlation is dwelt upon. Prepotency is discussed especially from the standpoint of practical utility. The good and evil that may result from in-and-in-breeding and line breeding are pointed out. Fecundity and the influences which affect it are examined. The relative influence of parents, the influence of a previous impregnation, intra-uterine influences and those that affect the determination of sex are discussed. The many and far-reaching influences of nutrition are dwelt upon and quality in live stock, the coat and influences which affect it, and the out-come of artificial conditions generally are gone over with much care. Early maturity, pedigree and animal form as an index of qualities are defined and their great practical value is shown. The art of selection receives special attention. Cross-breeding, grading, the formation of breeds, and the influences of environment are carefully examined.

Course II. Feeding animals.

The question of feeding is considered from both the scientific and the practical standpoints. The foundation for succeeding lectures is laid by first considering some important principles which govern feeding. Feeding rations and nutritive ratios are next discussed and these are followed by lectures on feeding stuffs and the different methods of preparing foods for feeding. Then follows the feeding and management of cattle treated chiefly from the practical standpoint. Lectures are given on rearing calves during the milk period and store animals from the weaning to the finishing period; on finishing for the block on grass, also in the stall; on the selection and care of both males and females of the best breeds, and on stabling suitable for cattle. Similarly the feeding and management of sheep and swine are considered. Careful attention is given to the discussion of wool and its properties and to sheep for wool production, for mutton production, and for both uses combined.

Course III. Pasturing live stock.

Lectures are given with reference to the production of pasture other than grass suitable for the various classes of domestic animals kept on the farm. The most approved methods of pasturing these are also discussed. In these lectures every opportunity available is embraced of illustration by direct reference to living animals and an examination of the various kinds of food more commonly used in feeding them.

DAIRY HUSBANDRY.

Course I. Dairy stock and dairy farm management.

Lectures, one term, three hours per week. Practice work, one term, one hour per week. This course is given during the fall term of the junior year. The lectures cover the breeding, rearing, and management of dairy stock, the points and characteristics essential in animals intended for the dairy, practice work in judging dairy stock, the management of the dairy farm.

Course II. Dairy feeding.

Lectures, two terms, two hours per week.

This course consists of lectures covering both the scientific and practical questions underlying the principles of feeding. Practice work is given in compounding rations, estimating comparative value of food stuffs and other problems connected with the subject. (Given in years, beginning with even numbers.)

Course III. Farm dairying.

Lectures and practice work, one term, two hours per week.

In this course the student receives lectures on milk, its care, the various methods of creaming it, care of the cream, and the manufacture of butter, and sweet curd cheese. A student taking this course devotes the greater portion of his time to practice work in the "Farm Dairy Room." (Given in years, beginning with odd numbers. One-half credit.)

Course IV. Factory course in butter and cheese.

This course is offered in January of each year. The work comprises two lectures a day, one in butter and one in cheese, and practice work two afternoons a week in butter-making and two afternoons in cheese making. Any student may take either part of this course and obtain a half credit.

Course V. Dairy laboratory work.

The work in this course will not be offered during the year 1899 1900.

ENTOMOLOGY.

The study of entomology will be of a practical nature and only sufficient work will be given in dissecting and classifying insects to enable the students to recognize them as being useful, injurious or indifferent to agriculture and horticulture. The various artificial remedies and insecticides, known to be of benefit will be discussed, as well as natural remedies based upon the life-history of the insects. Injurious and beneficial insects found in Minnesota will be considered, with a view of fighting the former and protecting the latter. The relationship existing between insects and man, between insects and insects, and between insects and plants will be studied in detail. Students wishing to make a special study of economic entomology can find work in the laboratory during the summer, providing they show aptitude for such work and already possess the preliminary training.

HORTICULTURE.

Course I. Fruit growing.

Lectures one term. The study of the geography of fruit growing, outlook for fruit growing, planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits, spraying; harvesting and marketing of fruit; varieties of fruits.

Course II. Vegetable growing.

Lectures one term. Geography of vegetable growing, tilling and fertilizing vegetable lands; irrigation and rotation of crops; seed growing and seed testing; vegetables under glass, pollination; diseases and insects injurious to vegetables and their prevention; harvesting and marketing; varieties of vegetables.

Course III. Greenhouses and their management.

Lectures and laboratory work; greenhouse instruction and management; temperature, soil, watering, benches; propagation by seeds, cuttings, layers and graftage; diseases and insects injurious to vegetables and their prevention; rest and growth periods of plants; plants for greenhouse cultivation.

Course IV. Nursery work.

Lectures and laboratory work. Seedage; layerage; cuttage; graftage; planting; pruning; thinning; storage of nursery stock; tillage of nursery lands; insects, diseases injurious to the nurseries and their prevention.

Course V. Plant breeding.

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants; origination of domestic varieties.

FORESTRY.

Course I. Lectures.

The forestry situation in this country and its literature; lumbering in Minnesota; forest influences; forest supplies; forest management; prairie forestry.

Course II. Lectures and field work.

Characteristics of forest and ornamental trees that are hardy in Minnesota; their value for timber and other purposes and methods of propagation.

MATHEMATICS.

Mathematics, as pursued in the college of agriculture, aims primarily at mental discipline and only secondarily at application to lines of practical work.

Geometry, as a discipline for clear perception, accurate statement and logical reference is required, both plane and solid.

Trigonometry is required, both as a mental discipline and for application to practical work in surveying.

VETERINARY MEDICINE AND SURGERY.

The work in this department extends over three terms in the junior year and one term in the senior year. Instruction is given by text-book, lectures, collateral reading and by clinical work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal in actual practice. Anatomy of the digestive organs and the higher physiology of digestion are given prominence in this work.

Theory and practice of medicine are carried further than in the school of agriculture course. Infectious diseases of domestic animals are studied with special reference to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration.

Course I.

This is a continuation of the last term's work in the school of agriculture and includes an advanced study of the veterinary physiology of digestion, taking up the digestive fluids; digestion of grains and fodders; absorption in general and nervous mechanism of digestion. It also includes a study of body nutrition, body incomes and expenditures, including sources of heat supply and heat loss, and metabolism.

Course II.

The muscular system, including general results of contraction, muscle currents, muscle fatigue and laws of muscular work.

The nervous system, including irritability of nerves, electric phenomena of nerves, reflex action, cranial nerves and sympathetic nervous system.

This course also includes the physiology of the skin and nitrogen excreting appara-

tus, and a study of the locomotor apparatus, including shoeing, diagnosis and treatment of common forms of lameness.

Veterinary Physiology by F. Smith is used as text book and guide for this work in courses one and two; but students are required to do collateral reading and original investigation.

Course III.

This course includes symptoms and recognition of common diseases, common medicines in their doses, uses, dangers and methods of administration. During this course Veterinary Therapeutics and Pharmacology by Wallace Hoare and Veterinary Medicines by Finlay Dunn are used as text-books and guides.

Course IV.

This course includes a study of common diseases of farm stock, as to causes, prevention, diagnosis and treatment.

EQUIPMENT.

LIBRARY.

The library of the college of agriculture contains about four thousand bound volumes, and nearly four thousand pamphlets. The separate libraries of the school of agriculture, experiment station and college of agriculture have all been consolidated, and the consolidated library now forms a part of the general University library, though located at University Farm. The reports of the various State Boards of Agriculture, and Experiment Stations are all kept on file, as well as many of the more important periodicals relating to agriculture. The library is being equipped with the view of making it a reference library for agricultural work. A complete file of some of the more important foreign agricultural periodicals as *Versuchs-Statione*, *Biedermann's Centralblatt*, *Annales d l'Societe agronomique*, and the *Journal of the Royal Agricultural Society of England*.

MUSEUM.

The general museum is at present chiefly an agricultural one, containing collections of animals and plants arranged in such a manner as to show their economic relations to the farmer and fruit grower. It is rapidly growing and of great value to the students. The entomological collections of the museum, and Dr. Lugger's private collections, are very valuable and contain a very large number of insects of all orders, and all are available for the use of advanced students.

The School of Agriculture.

FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
HENRY WEBB BREWSTER, Ph. D., *Principal, Mathematic*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
OTTO LUGGER, Ph. D., *Zoology, Entomology.*
CHARLES R. ALDRICH, *Drawing, Farm Buildings.*
WILLIAM ROBERTSON, B. S., *Physics, Botany.*
J. A. VYE, *Penmanship, Accounts.*
HARRY SNYDER, B. S., *Chemistry.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Physiology, Veterinary Science.*
WILLET M. HAYS, M. S., *Agriculture.*
THOMAS SHAW, *Animal Industry.*
J. M. DREW, *Blacksmithing, Poultry.*
ANDREW BOSS, *Dressing and Curing Meats, Farm Machinery.*
WILLIAM BOSS, *Carpentry, Power Machinery.*
HARRY A. LEONHAEUSER, *Lieutenant U. S. A., Military Drill.*
E. W. MAHOOD, M. A., *Arithmetic, Civics, English and Director of Gymnasium.*
JUNIATA L. SHEPPERD, M. A., *Cooking, Laundering.*
MARGARET BLAIR, *Sewing.*
VIRGINIA C. MEREDITH, *Preceptress.*
CHAS. F. KEYES, A. B., *Language and Music.*
LOUISE GILMAN KIEHLE, *Physical Culture.*

When applying for admission or information, address Dr. Henry W Brewster, Principal, St. Anthony Park, Minn.

OPENING.

The coming year will open October 2d, 1899, and close March 23, 1900. The fall term closes Friday, December 22d, and the winter term begins Tuesday, January 2d, giving a vacation of ten days. Owing to the shortness of the school year, it is very desirable that students be on hand the first day of the term, that registration may be completed and work begun promptly. Students registered in the fall term will not be received after the first three days of the winter term, unless they shall present a reasonable excuse for such delay.

ADMISSION.

Applicants who have completed a common school course in English grammar, arithmetic, history of the United States and geography, as prescribed by the state department of public instruction, will be admitted to the regular course without examination.

Students will be credited without examination in subjects for which they can furnish the certificates of high schools.

Applicants who can not complete the common branches at their home district may be admitted to a preparatory class, if they can pass examinations in reading, letter writing, and arithmetic through fractions, or bring third grade certificates from their county superintendents. But all students who can complete the common branches in their home schools before coming, should do so.

Applicants for admission after the opening of the term will, in addition to the regular entrance examinations, be required to show proficiency in the work done by the class up to the time of their application. All who can not enter by the middle of November should wait until the beginning of the winter term.

Students of mature age, who have but little time for study and who have special needs in the lines of agriculture, stock, and farm engineering, will be registered for special work during the winter term as indicated in the daily program. Such students will be required to pay a registration fee of \$5 and to board themselves outside of the institution. It is better for such students to buy the few books they may need than to rent them.

EXPENSES.

The cost to the students, for board and washing, is the actual cost of maintaining the table and caring for the house. This does not exceed \$3.00 per week. A month's board is assessed in advance for the purchase of provisions at cash prices. At the end of the month the exact cost is calculated and the proper deduction made from the next assessment. The culinary department is managed by an experienced matron, and all the buildings are under the supervision of the principal. The buildings are illuminated with electric lights, and warmed by steam; the sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, and table.

Each student furnishes four sheets, one pair of blankets, one quilt, one bedspread, one pillow, three pillow cases, two bath towels, comb and brush.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they will be allowed half rates, if they arrange with the matron before leaving.

An assignment of rooms will be made on the day before commencement and will hold good only until and including the second day of the following term when the student's presence will be necessary to make good his claim.

Students wishing to retain their rooms after vacation, must be on hand when the second term opens, or pay one-half the price of board and room

for the time they are late. Students who do not engage rooms in advance, may be forced to find sleeping rooms elsewhere at an additional cost of fifty cents per week.

Text books are furnished, at an annual rental of \$2, to students who do not desire to purchase.

Drawing tools may be had at a rental of twenty-five cents per term, or may be purchased for about \$3. Drawing materials and mimeograph lectures are furnished to students at cost.

Military drill uniform. All students taking military drill are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers, and cap and is as neat and economical a dress as the student can obtain. The suit complete, to measure, will be furnished under special contract for about \$10.00.

Fees—Students pay an incidental fee of \$1.25 per term, and also pay for breakages of apparatus used in practical work. In chemistry there is a small fee, about 50 cents, to cover the cost of material used.

Deposit—In addition to the assessment of \$12 for board, at the beginning of the term, a deposit of \$5 is required of each student as a guaranty for the return of all books, tools and other articles borrowed.

The total expenses for the year need not exceed \$85 to each student.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in deportment.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University Farm or elsewhere, as shall appear in reports received from responsible sources.

The following year's work is offered and required of students desiring to enter the college of agriculture:

FIRST TERM.

*Algebra, [5].
*Geometry, [5].
English, [5].
Elective, [5].

SECOND TERM

Algebra, [5].
Geometry, [5].
English, [5].
Civics, [5].

*Recitations in geometry begin at Book III, Wentworth, and in algebra at highest common divisor.

THE HOME.

The first building erected upon the campus has been remodeled and furnished for a home for the young men. It contains on the first floor the library; a large reading room supplied with good reading, and parlor games; a general sitting room; also a parlor in which students receive visits from friends. In the basement are rooms specially adapted for change from recitation rooms into dining rooms for class parties, which enables students to learn the art of receiving and entertaining company.

The building for young women contains a large sitting room for general use; a parlor for more special use; rooms for the preceptress; and thirty suites of rooms for sixty students, each suite consisting of a study room for two with two alcove sleeping rooms adjoining.

This gives each student a separate sleeping room, a study room for herself and one room-mate, the free use of sitting room and parlor in the girls' home, and the benefit of class parties in the Home Building.

In the large sitting room there are papers, magazines, books, and a piano, which afford pleasant recreation.

STUDENTS' DEBATING SOCIETIES.

Societies for the purpose of improvement in elocution and debate, and for obtaining instruction, in the form of lectures, give excellent opportunities for entertainment and culture.

STUDENTS' CHRISTIAN ASSOCIATION.

This society has for its objects the study of moral and religious subjects, and the holding of regular weekly prayer meetings and conference meetings. All students, regardless of creeds, are welcomed to membership; no sectarian differences are allowed to be discussed in the meetings or in the reading rooms.

The Young Men's Christian Association of the school will station several of its members at the depots to meet and direct incoming students on the arrival of the trains, Monday and Tuesday, October 2 and 3. A member bearing a badge lettered, "Y. M. C. A., S. A. U. M.," will be at each of the following depots: Great Northern, in St. Anthony Park; Union, in St. Paul; Milwaukee, in Merriam Park; and Union, Milwaukee and St. Louis, in Minneapolis. Trunks will be transferred the first and last weeks of the term without expense to students. At other times a fee of 25c will be charged.

ATHLETIC ASSOCIATION.

The students have a well organized athletic association and a well equipped gymnasium. A competent instructor is in charge each evening. An opportunity is thus given for healthful amusement and for needed physical exercise.

LIBRARY.

The library contains five thousand books of reference, besides nearly five thousand pamphlets, including reports, bulletins, etc.

The library is supplied with a card catalogue from the United States Department of Agriculture of all reports and bulletins issued by the different experiment stations. This enables one to find some reference on nearly every agricultural subject. In connection with the library is the reading room where all the leading agricultural papers, as well as other leading periodicals, are kept on file for the use of the students.

Quite a number of the instructors have written text books in their own lines of work, and are using them in the lecture rooms.

COURSE OF STUDY.

FIRST YEAR.

FIRST TERM.

Botany [5].

*Drawing [2].

*Music or Gymnasium Work [1].

English [5].

*Blacksmithing [1].
 *Carpentry [2].
 Carpentry Lecture [1].
 *Military Drill [1].
 Agriculture [3].

or

*Laundering [2].
 *Physical Culture [1].
 *Sewing [3].
 Social Culture [1].
 Field Agriculture [3].

SECOND TERM.

Botany [5].

*Farm Accounts [2½].

*Music or Gymnasium Work [1].

Physiology [5].

Study of Breeds [3].

*Carpentry [2].
 Carpentry Lecture [1].
 *Drawing (farm buildings) [2].
 *Blacksmithing [1].
 *Military Drill [1].

or

*Cooking [3].
 *Drawing (farm houses) [2].
 Home Management [1].
 *Physical Culture [1].

SECOND YEAR.

FIRST TERM.

Dairy Chemistry [2].

*Dairy Husbandry [2½].

Fruit Growing [3].

*Music or Gymnasium Work [1].

Algebra [5].

Breeding [2½].
 *Military Drill [1].
 Physics [5].

or

*Cooking [3].
 Household Art [1].
 *Physical Culture [1].
 *Sewing [3].

COURSE OF STUDY—*Continued.*

SECOND YEAR.

SECOND TERM.

Agricultural Chemistry [5].

*Dairy Husbandry [2½].

*Music or Gymnasium Work [1].

Physics [5].

Vegetable Gardening [3].

Poultry [1].

Field Crops [5].	}	or	}	*Cooking [3].
*Military Drill [1].				Home Economy [1].
				*Physical Culture [1].

THIRD YEAR.

FIRST TERM.

*Agricultural Chemistry [5].

Forestry [3].

*Music or Gymnasium Work [1].

Entomology and Zoology [5].

Handling Grain and Machinery [1].	}	or	}	*Cooking [2].
*Veterinary Science [2½].				*Sewing [4].

SECOND TERM.

Civics or Geometry [4].

*Dressing and Curing Meats [1].

Plant Propagation [3].

Feeding [3].	}	or	}	*Cooking [4].
Soils and Fertilizers [5].				Domestic Chemistry [3].
*Veterinary Science [2½].				Domestic Hygiene [1].
				*Sewing [4].

* Figures in brackets indicate the number of hours per week in which the subject is pursued; all work in subjects marked thus * extend through double time in the daily program.

One essay and one declamation are required of each student in each term of the first two years. Those taking the regular work in the literary societies will be excused from the declamation.

SCHOOL OF AGRICULTURE—PROGRAM FALL TERM 1899.

INSTRUCTOR	8:15-9:00	9:05-9:50	9:55-10:40	10:45-11:30	11:40	1:15-2:00	2:05-2:50	2:55-3:40	3:45-4:30	4:35
Aldrich						C. I. Drawing, 4 Pds.		C. II. Drawing, 4 Pds.		
Blair						{ B. Sewing, 2, 4. C. Sewing, 1, 3, 5.		B. Sewing 2. A. Sewing 1, 3, 4, 5.		
Boss, A							A Handling Grain and Machinery, 3. Pds.			
Boss, W		A. Power Machinery, o.				C. I. Carpentry, 5 Pds.		C. II. Carpentry, 5 Pds.		
Brewster	B. Algebra.	G. Geometry.	G. Algebra.							
Drew						C. II. Blacksmithing, 2 Pds.		C. I. Blacksmithing, 2 Pds		
Green			B. Fruit Cul. 1, 2, 3.		C	A. Forestry, 1, 2, 3.				
Hæcker					H	{ B. Farm Dairying 1, 5.	B. I. Home Dairying, 1. B. II. Home Dairying, 3. B. III. Home Dairying, 5.	3 Pds.		
Hays		C. Agricul. 1, 2, 3.	C. Field Agri. 1, 2, 3.		A			Music at 6:15 to 7:00 P. M.		
Keyes		P. I. Lang.	P. II Lang.	C. Language.						
Kiehle		C. Physical Culture, 2, 4.		B. Physical Culture, 2, 4.	P					
Leonhæuser										Mil. Drill, 2 Pds.
Lugger	A. Entomol'y and Zoology				E					
Mahood		P. II. Arith.	P. I. Arith.	G. English.				Gymnastic Work at 8:30 P. M.		
Meredith		C. Social Culture, 5.			L		B. Household Art, 1.			
Reynolds	(C. Physi'gy)							A. Veterinary Science, 5 Pds, 2, 4		
Robertson	C. I. Botany.	C. II. Botany		B. Physics.						
Shaw			C. Study of Breeds, 4, 5			B. Breeding 2,3,4, 2½ Pds.		C. Study of Breeds, 3.		
Shepperd						B. Cooking, 3. A. Cooking, 4, 5.		C. Laundering, 1, 2. B. Cooking, 3, 4. Laboratory.		
Snyder		A. Agri. Chemistry.	B Dairy Chem. 4, 5.	Lab. 1, 2, 3, 4. A. I Ag. Chm				A. II Agricul. Chem., 1, 3		
Vye	P. Penn'n's'p							(C. Accounts, 5 Pds. 3, 4, 5.)		
Wilson							P. Reading I,	P. Reading II		

SCHOOL OF AGRICULTURE—PROGRAM WINTER TERM 1900.

INSTRUCTOR.	8:15-9:00	9:05-9:50	9:55-10:40	10:45-11:30	11:40	1:15-2:00	2:05-2:50	2:55-3:40	3:45-4:30	4:35
Aldrich			Special Drawing, 3.			C. I. Drawing, 4 Pds.	C. II. Drawing, 4 Pds.			
Blair							A. Sewing, 1, 4.	A. Sewing, 2, 3.		
Boss, A			{ Sp. Carp. O. Sp. Power M., 1, 2.				A. Dressing and C. Meats, 2 Pds.			
Boss, W						C. I. Carpentry, 5 Pds.	C. II. Carpentry, 5 Pds.			
Brewster		{ A. Geom. 2, 3, 4, 5.	G. Geometry.	G. Algebra.						
Drew			Sp. Blacksmithing, 4, 5.							
Green			B. Poultry, 1.			C. II. Blacksmithing.	C. I. Blacksmithing.			
			B. Veg. Gard. 2, 3, 4.		C	{ A. Plant Prop., 1, 4.		A. Plant Prop., 5.		
Haecker					H	{ B. Dairy Stock 1, 5.	B. I. Home Dairying, 1.	B. II. Home Dairying, 3.		
Hays	{ B. Field Crops.	(C. Agr. 1, 2, 4.)			A		B. III. Home Dairying, 5.			
Keyes	P. I. Lang.	(C. Lang.)	P. II. Lang.			Music from 6:15 to 7:00 p. m.				
Kiehle		{ C. Phys. Cult. 2, 4.	B. Phys. Cult. 2, 4.		P					
Leonhæuser					E					{ Mil. Drill, 2 Pds.
Mahood	G. English.	{ A. Civics, 2, 3, 4, 5.	P. I. Arith.	P. II. Arith.			Gymnasium Work at 8:30 p. m.			
Meredith			A. I. A. Dor. Hygiene, 1.		L	{ B. Home Econ., 2.	C. Home Managm't, 5.			
Reynolds				C. Physi- ology.			A. Vety. Science, 2, 4.			
Robertson	C. Botany.		C. Botany.	B. Physics.						
Shaw	Sp. Stock.	{ C. Study of Breeds, 3, 5.)				{ A. Feeding 2, 3, 5.		{ C. Study of Breeds, 3.		
Shepperd							C. Cooking, 1, 4.	A. Cooking, 4.		
Snyder	{ A. Dom. Chem. 3,4,5.	B. Agr. Chem.	A. Soils and Fert.			{ A. Cooking, 2, 3, 5.	B. Cooking, 2, 3, 5.			
Vye	Penmanship.							C. Accounts, 2, 4, 5, 2½ Pds.		
Wilson		{ Sp. Lang. 3,4,5 Sp. Arith., 1,2					P. History.			

SPECIAL ELECTIVE WORK.

Graduates and others of equal attainments, are offered the opportunity of entering as special students in mathematics, English composition, farm buildings, and such lines of practical work as they can individually arrange to prosecute with the instructors in charge of such lines.

Each special student is expected to elect at least three lines of work and to do an amount of work in these lines that shall be satisfactory to the instructors in charge.

Any contemplating this elective work should make application to the principal before coming, and should state what lines of work they desire to pursue.

SPECIAL STUDENTS.

Special students, who do not find a sufficient amount of work in the various lines of lectures and practice work in either the fall or winter term, will be assigned by the registration committee to class work in agriculture. Such work may be assigned in agriculture for the first period, and in stock for the second period.

CHARACTER OF INSTRUCTION.

AGRICULTURE.

The instruction in agriculture continues through the course and is outlined as follows:

The selection and general management of farms; soils and soil formation; drainage; tillage; road making and fence building are taught. The production of grains and grasses, clovers and other forage plants; the management of grass lands; the rotation of crops and the management of fields in relation to fertility, to weeds, to live stock and to profits, are considered. Many special subjects, such as breeding field crops, stacking grains, handling machinery, and exterminating noxious weeds, are dealt with. Green manuring, management of farm manures and the place of commercial fertilizers in field management in various parts of the state, are discussed.

University Experiment Farm is conducted partly with reference to instruction. A number of students are engaged each summer to assist in the experimental work with field crops and field management, also the preservation of crops in silos and other ways. Many conveniences on the farm serve as models of their kind. A museum of a limited number of the best modern farm machines is maintained.

AGRICULTURAL CHEMISTRY.

The first term is devoted to the study of the general principles of the science of chemistry, particular attention being given to those elements and compounds which are the food of plants and animals. This work is illustrated by the many chemical changes which take place on the farm; the student spends a part of his time in the laboratory performing experiments which relate to the subjects which are studied in the class-room.

In the second term the chemistry of farm products is begun. The composition of human and animal food stuffs forms an important part of this term's work. The chemical changes which take place during the growth of crops are studied, as well as the various factors which influence the food value of agricultural products. During this term one period each day is given to a class-room exercise, and one period is spent in laboratory work. In the laboratory, the student separates the various compounds of which food stuffs are composed, and he also studies the various types of food materials.

One term is given to the chemistry of soils and fertilizers. The requirements of the various farm crops in the way of food, and the best ways of satisfying these demands are considered. The various forms of plant food which exist in the soil, the chemical changes which the plant food undergoes, and the power of crops to make use of the various compounds of the soil, form important parts of this work. In the study of soils and fertilizers, it is the aim to study the principles which govern the maintenance of the fertility of the soil.

In the chemistry of dairying, instruction is given in the chemical and allied changes which take place in the handling of milk and in its manufacture into butter and cheese.

ALGEBRA.

Algebra is required during the first term of the second year. This work covers Wentworth's elements to highest common factor. Special attention is given to literal notation, negative numbers, the equation and factoring.

The work in the additional fourth year covers Wentworth's elements to logarithms.

ANIMAL INDUSTRY.

The talks on animal industry are most practical. The characteristics of the leading pedigreed breeds that have special adaption to northwestern conditions, are discussed. The points of good and inferior animals in beef-cattle, sheep, and swine are so taught that the student may learn to choose wisely when selecting foundation animals from which to breed, or animals to prepare for the block. The fundamental principles that govern breeding, are pointed out in the simplest manner possible. The feeding of animals is discussed, special prominence is given to the choice of foods for live stock at the different stages of their development and to the preparation of the same for breeding. The general principles which relate to the care and management of cattle, sheep and swine are made clear. And, as far as practicable, these talks are illustrated by the presence of the living specimens of the various animals under discussion.

ARITHMETIC.

Students entering the preparatory class in arithmetic are required to understand arithmetic through fractions, both common and decimal. The

course gives special attention to denominate numbers, percentage in its various forms, interest, discount, evolution, and mensuration. The aim is to secure both accuracy and facility in the most practical operations.

BLACKSMITHING.

The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffletree-irons, tongs, cold-chisels, punches; in short, to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

BOTANY.

This study is taught with special reference to its bearing upon the everyday problems that present themselves to the farmer and gardener. It is profusely illustrated with flowers and plants from the greenhouse and nursery. Some instruction is given in the use of the compound microscope; students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general principles of plant structure and vegetable physiology.

CARPENTRY.

Instruction is given by means of text-books, lectures, and work in the shop and drawing room, in the care and use of tools, including setting and filing saws, filing bits, grinding plane-irons, chisels and other tools; also in laying out work and framing buildings. Methods of construction are illustrated by models and drawings. Various articles for use about the farm are manufactured by the students.

CIVICS.

During the last term of the course, students receive instruction in this science, and graduate with a good understanding of the origin, necessity, nature, and various forms of government, and the machinery employed to carry on public works, establish justice, and provide for the common defense; of the organization and management of local institutions, the town, the village, the city, and the county; the manner in which states are created and their affairs administered; the three departments, legislative, judicial and executive, and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the state to the general government; the constitution and the powers it confers, and the provisions for amendments are taught.

The more important principles of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

COOKING.

The course in cooking extends through five terms of the curriculum as given below, with the subjects covered in each term.

Second term, C year—Kitchen management; care of cooking utensils, glass, china and silverware; measuring and invoicing; cooking vegetables, cereals and breads.

First term, B year—Canning, preserving, pickling and jelly making; soups, eggs and meats.

Second term, B year—Marketing, care of foods, and cold storage; fruits, salads, hashes, croquettes, "save all" dishes, and lunch baskets; equipment of dining room and table service.

First term, A year—Mixed soups, desserts of various fruits harmoniously combined; proper combination of flavors and colors in garnishing food; mixing and seasoning foods; carving and serving meats.

Second term, A year—Food rations, dietaries and bills of fare; invalid cooking, beverages, frozen dishes, pastry and cake; food economics, table duties of host and hostess and essays on housekeeping.

DAIRY HUSBANDRY.

Dairy Stock—During the last month of the first term, students receive instructions in regard to characteristics of the various breeds of dairy cattle, their origin and comparative adaptability for the dairy. During the last term instruction is given in breeding, rearing, feeding and handling dairy stock with practice work in judging stock and formulating rations.

Farm Dairying—During the first term a course of lectures is given in farm dairying, giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy. Students also receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

DOMESTIC CHEMISTRY.

In domestic chemistry instruction is given in the chemistry and economy of human foods. Simple tests for the detection of the adulteration of foods are given. The chemistry of cleaning material, and the composition of various household articles are considered. The instruction is given in the form of laboratory practice.

DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, out-buildings, and machinery. As practical subjects for their designs, students are requested to bring from home data for plans of buildings needed on their farm. Estimates are made of the amounts of materials required and cost of construction.

Special students are offered advanced work in designing, including style, stability, convenience and economy in arrangement of buildings and machinery for various purposes.

DRESSING AND CURING MEATS.

Instruction is given in a course of lectures and demonstrations.

Two weeks' practice work in dressing, curing, and cutting up beef, pork, mutton, veal, and poultry is required of each student before graduation.

ENTOMOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects, sufficient to enable the student to distinguish between useful and injurious insects and to apply remedies intelligently, as the remedies must be selected according to the kind of insect to be combatted.

Insecticides and their application; the most approved methods of using arsenical poisons, kerosene emulsions, pyrethrum, and other preparations are taught.

Natural remedies and nature's methods of preventing increase of injurious insects receive due attention so as to enable the student to apply their teachings. The relation of other animals to insects is also taught, so that the student may know both his friends and his foes. Special attention is given to injurious and useful insects of Minnesota.

GEOMETRY.

Geometry is offered in the second term of the third year, as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Wentworth's Plane Geometry.

The work in the additional year covers Wentworth's Plane and Solid Geometry.

HANDLING GRAIN AND MACHINERY.

During the fall term of the third year a course of lectures on the use and selection of farm machinery is given and the principles governing the proper methods of shocking and stacking grain are taught by means of demonstrations and practice work.

HOME ECONOMY.

This work is taught as the just proportion between income and expenditure; the distinction of economy, frugality, and parsimony are considered with reference to a definite proportion in the expenditures which are made for existence, comfort, culture, and philanthropy. A study is made of the sources of income, especially of the income from the farm in the form of house, food, and luxuries. The purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and forms of investment, a bank account and the use of a check book. Each student in this class is required to submit at the close of the term a paper setting forth in detail the use of a certain named income for one year, embracing not only every item of necessary home expense but also an outlay made for travel, luxuries, accident, sickness and other emergencies. The habit of keeping a household account is calculated to strengthen the judgment in making a wise use of money, therefore an analysis and study of expenditures as here indicated serves to bring clearly before the student's mind the relative importance of the different things which money will procure.

HOME MANAGEMENT.

This includes both housekeeping and home making, and the teaching of the subject naturally falls into three divisions, household work, sanitation and family life. The instruction is based upon the belief that housekeeping is as important as it is difficult,—and that home making is the noblest form of human endeavor. The points in detail in the preparation of food, the making of clothing, the care of the house and household belongings, and the ordering of the family life are considered in their relation to an adequate plan for home management. To start the student in the correct way of becoming mistress of the business of housekeeping is the end sought. It is believed that for one who knows the reason for the doing there is no drudgery, therefore students are taught the specific danger that lurks in dust and dirt, in order that they may understand the dignity of the unceasing war which the housekeeper makes upon these forces. The practical benefit to be derived from the knowledge students have gained in the cooking, sewing, laundering and dairy classes is emphasized and shown its relation to an adequate plan for the daily program for the home. While the science of family life has not been formulated, yet some of its fundamental principles are recognized and may be taught.

HORTICULTURE AND FORESTRY.

Fruit growing is taught with reference to raising fruit for market.

Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects, and the growing of various vegetable crops.

Plant propagation—In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by seed, cuttings, grafting, and budding.

Forestry includes the consideration of the formation and care of wind breaks and shelter belts, the laying out and planting of home grounds; discussion of the hardiness, habits, and value of our native and introduced trees; and the methods of propagating them.

The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens, and greenhouses on the grounds of the experiment station and by visits to commercial nurseries and greenhouses near by.

HOUSEHOLD ART.

This is taught by a series of lectures treating of the adornment of the house and grounds, noting the distinctive character of the country home, and opportunity for embellishment found in the surroundings. The intention is to show that thought and energy can accomplish as much or more than money in making a farm home attractive; also to show the importance of acquiring correct knowledge and correct taste in order to secure every possible convenience, combined with harmonious forms, colors and styles in walls, draperies, and furniture. The true relation of beauty, use and influence of surroundings upon life and character are considered in connection with the possibilities for improvement that may be found in simple and inexpensive methods.

HYGIENE.

Hygiene as a special study for women, considers the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits, as well as upon heredity. The aim is to show how a correct knowledge of the laws of nature is essential not only to the restoration but to the preservation of health.

Several lectures by a physician will be given upon maidenhood, maternity, motherhood, infancy, and related subjects. These special lectures will be supplemented by the regular lectures in class, thus extending and simplifying the subjects in plain and easily understood terms.

LANGUAGE.

The work in language aims to secure the use of proper words and correct forms of expression in conversation, letter-writing, and the more extended forms of composition. The student is led to think, to analyze and define his thought, to choose words that will accurately express it, and to arrange these words in harmony with the rules of grammar, the forms of correspondence, and the elementary principles of rhetoric. Attention is given to the sounds of letters as indicated by their markings; the meaning of prefixes, root syllables, and suffixes; classification, inflection and the syntax of simple, complex and compound sentences; the nature and correction of common errors; practice in letter-writing and descriptive composition.

One essay of about five hundred words is written, submitted for criticism, corrected, and re-written during the first two months, of each term of the first two years of the course.

This analytic method naturally leads to the study of not only the dictionary, the grammar, and the rhetoric, but also of authors speakers, periodicals, and all good authorities on language.

LAUNDERING.

In the first term of C year several lectures are given and practice work is provided in washing, ironing, starching, polishing, cleaning, and pressing clothing.

MUSIC AND PHYSICAL CULTURE.

Classes in music and physical culture will be organized for students desiring training in these branches.

PENMANSHIP AND ACCOUNTS.

In this department the student is taught to write a plain hand with rapidity and ease. The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is so taught to keep his accounts that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

Attention is given to the different kinds of negotiable paper; the various forms of endorsements and their effect; business forms and correspondence. Everything is made plain and practical, and students can learn to keep accurately and neatly the accounts of an ordinary business.

PHYSICAL CULTURE.

The work in this department is particularly directed to the improvement of nutrition and the correction of faulty habits of carriage and posture, frequently the result of exercise taken in the performance of household tasks which have a tendency to produce overdevelopment of certain muscles, while leaving others almost unused. The course of study includes free gymnastics, and the use of light apparatus, supplemented by movements taken from the Delsarte system of expression.

There are two classes, one for elementary, and the other for advanced work.

PHYSICS.

The general principles of the science are taught, special stress being laid upon those which to the greatest extent enter into the business of the farmer. About half the time is devoted to experimental work, which includes capillarity of soil; diffusion and osmosis of gases and liquids; heating, lighting, and ventilation; farm machinery in particular, pumps, eveners, —especially three and four horse,—pulleys, milk-testers, centrifugals, incubators, wind-mills, steam, and gasoline engines; friction and lubricants; ten-

sile strength of wire and binding twine of different grades; lightning, and lightning protection. The foregoing indicates the character of the work, the attempt being to give the student an acquaintance with the laws of nature that he may act with reason and work to advantage.

PHYSIOLOGY.

During the first year the students take a high school course in human physiology and hygiene. In this course they study the general plan and structure of the body and the tissues of which the body is composed; then the skeleton, muscles, and body nutrition. Body nutrition includes a study of foods, digestive organs and fluids, and processes of digestion.

The class then studies in succession, circulation and respiration, including ventilation, respiratory apparatus, kidneys, skin, nervous system, senses, voice, and narcotics including alcohol, opium, morphine, chloral, cocaine, and tobacco.

This class work is illustrated by means of large charts, skeletons, manikins, and dissections. Important points of difference between human and animal physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

POULTRY.

In the introduction in this subject, the following will be considered: history and characteristics of the leading breeds of poultry; breeding, feeding, and management of fowls for eggs, and for the market; planning, building, and arrangement of poultry houses, managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, workroom, etc., has been provided, where experimental work and practical instruction are carried on.

POWER MACHINERY.

Special students of mature years who desire to become proficient in the management and care of stationary engines and boilers, or threshing engines either steam or gasoline, will be given a chance to pursue special work in the care and management of such machinery. Instruction will be given by means of lectures and practical work in the engine room. Boilers, engines, injectors, pipe fitting, wind mills, well pumps, hydraulic rams, etc., will receive special attention.

SEWING.

During the first year students receive instruction in the elements of sewing; different stitches, such as basting, seaming, hemming, darning, button-holing and patching are taught; and practice is given in the use of all the implements belonging to the sewing basket.

The second year's work consists of cutting and making plain garments, such as underwear, children's clothing, shirt waists and cotton dresses.

In the third year, the more difficult work of dressmaking is taken up. The cutting and fitting of dresses and jackets are taught by a very simple system; careful attention is given to quality of materials and harmony of colors. The course is designed to make each graduate capable of doing all kinds of sewing needed in the home.

SOCIAL CULTURE.

A course of lectures is given on the usages of good society, including manners, behavior, the voice, conversation, forms of address, invitations, etc. Attention is directed to the fact that all approved etiquette rests upon the great law of kindness. The importance is shown of personal fitness for society through attention to the laws of health and to personal habits, as well as through the refinement of a cultivated mind and sympathetic spirit. Suggestions are made in reference to reading, literary taste and the choice of books. Especial stress is put on the thought that the family life ought to be the highest expression of good society, and therefore the manners and conversation in the home should be the very best of which one is capable. Next in importance to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness, and consequently any study or practice intended to cultivate the social nature deserves earnest attention. Some instruction is given in the elementary principles of parliamentary usage.

VETERINARY SCIENCE.

During the A year the students take up a course of study in veterinary medicine, the purpose of which is to fit them for intelligent care of their farm stock but not to make them in any sense professional veterinarians. In this course the teaching is done by means of lectures, distribution of mimeographed lecture notes after each lecture, reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of charts, manikin of horse, skeleton of horse, and various other appliances.

The lecture course consists of a series on each of the following subjects: elementary anatomy, elementary pathology, causes and prevention of diseases, diagnosis and treatment of common diseases, and a final short course on common medicines, studying their effects, uses, and doses. At the hospital clinics, students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

ZOOLOGY.

Chiefly Minnesota animals are considered: (1) their classification; (2) their habits and food; (3) their relation to the farmer. To assist the students in their work, a museum has been started in which is shown the relation of Minnesota animals, birds, reptiles, etc., to agriculture. Soils, minerals, fossils, plants,—both useful and injurious,—are also on exhibition.

Dairy School.

THE FACULTY.

- CYRUS NORTROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
T. L. HAECKER, *Professor of Dairy Husbandry, in charge of School.*
HARRY SNYDER, B. S., *Dairy Chemistry.*
OTTO LUGGER, Ph. D., *Bacteria in Dairy Products.*
W. M. HAYS, M. S., *Forage and Pastures.*
M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*
J. A. VYE, *Creamery Records and Accounts.*
WM. ROBERTSON, B. S., *Care of Boiler and Engine.*
C. R. ALDRICH, *Dairy Buildings.*
J. M. DREW, *Silo and Stable Conveniences.*
B. D. WHITE, *Instructor in Butter Making.*
A. J. GLOVER, *Instructor in Cheese Making.*
WM. BOSS, *Instructor in Practical Engineering.*
E. W. MAJOR, *Instructor in Sweet Curd Cheese Work.*
N. H. FULTON, *Assistant in Creamery.*
L. R. HOBART, *Assistant in Creamery.*
H. C. HAECKER, *Instructor in Dairy Laboratory.*

The next session of the Dairy School will begin January 2, 1900, and continue four weeks.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese, or who purpose to take up this work, an opportunity to become more skilled in their work, and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for a corresponding enlargement of the work in dairy instruction. To meet this want, the dairy hall has been more than doubled in capacity and equipped with all apparatus necessary to give instruction in the various lines of dairy work.)

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical

instruction are arranged with special reference to giving the greatest amount of training and practice possible, in a four weeks' session. Large additions have been made to the equipment of the dairy hall in both butter and cheese departments; in fact, it has everything needed for conducting the work by the most approved methods.

Instruction is divided into six courses:

- 1st. Lectures covering the entire field of dairy husbandry.
- 2d. Practical work daily in the butter room.
- 3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam, and Gouda cheese will be carried on.
- 4th. Practice work in the laboratory, examining milks, making daily composite tests, and the pasteurization of milk and cream.
- 5th. Practical engineering, steam-fitting and plumbing.
- 6th. Practical work in factory bookkeeping.

I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, management of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; the proper acidity of cream to secure best flavor, how to churn, wash, and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market, are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score-card.

III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet; investigate new methods; make experiments on doubtful points; compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

IV.—MILK TESTING.

The recent invention of the milk-test has revolutionized the methods of declaring dividends in co-operative dairying. It has been found that the value of milk for both butter and cheese is measured by the per cent of fat content, and nearly all factories and creameries now pay on the "relative value plan." It is therefore necessary for every factoryman to familiarize himself with the best methods of milk testing. The chemist gives a general outline of the work; but in order that each student may have practice in milk testing, daily exercise is given. Steam, turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, a milk and cream pasteurizing apparatus has been manufactured specially for our dairy school, and a few advanced students will be given instruction in the process.

V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room is provided an eight horse power, simple, slide-valve engine, three types of boiler feed pumps, two types of deep well pumps, one injector, two milk pumps, and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbitting bearings, soldering, etc.

It is the aim to make this work as practicable as possible. Questions of interest on the subject are freely discussed.

VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have at least one season's experience before coming to the school. No entrance examination is required.

EXPENSE.

A registration fee of \$15 is required of each student. Students can board in either city and reach the school by street car, or board can be

secured near the school for from \$3.50 to \$4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about \$1 each.

DAIRY CERTIFICATES.

The Regents will grant Dairy Certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by one year's work in a factory that they are skilled in the art of butter or cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis take the Como Interurban Harriet street car and get off at Dooley avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, Minn.

The Agricultural Experiment Station.

OFFICERS OF THE STATION:

WM. M. LIGGETT, *Director.*
WILLET M. HAYS, M. Agr., *Agriculturist.*
SAMUEL B. GREEN, B. S., *Horticulturist.*
OTTO LUGGER, PH. D., *Entomologist and Botanist.*
HARRY SNYDER, B. S., *Chemist.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinarian.*
THOS. SHAW, *Animal Husbandry.*
T. A. HOVERSTAD, B. Agr., *Sup't of Sub-Station, Crookston.*
HERMAN H. CHAPMAN, B. S., *Sup't of Sub-Station, Grand Rapids.*
ANDREW BOSS, *Asst. in Agr., Univ. Farm.*
R. S. MACKINTOSH, *Asst. in Hort., Univ. Farm.*
J. A. VYE, *Secretary.*

The purpose of the Agricultural Experiment Station of the University of Minnesota is to bring home to the farmers of this State the importance of the practical application of agricultural science and to discover facts and processes that will be of permanent value to the rural husbandry of Minnesota. This station was established in 1887, under a law by the U. S. Government appropriating funds for experimental work in each state, and since then has published 61 general and 9 press bulletins that embrace a wide range of agricultural subjects included under the heads of dairying, animal husbandry, entomology, botany, horticulture, forestry, chemistry and general agriculture. These bulletins are issued for gratuitous distribution to the citizens of this State, and of each general bulletin fifteen thousand copies are printed. The station is located at University Farm, St. Anthony Park, Minn. Most of its officers are also employed in the school and college of agriculture. Its equipment consists of 250 acres of land embracing a variety of soils and exposures; a large general purpose and stock barn; a good sheep barn; piggery and hennery; a collection of various breeds and kinds of animals; nurseries; forest and small fruit plantations; orchards; gardens; greenhouses and museum. The offices, laboratories and work rooms of the school of agriculture are also used for the work of the experiment station, which has become widely and favorably known in this State. Several of the

railroads in the State make a point of encouraging the farmers along their lines in visiting the station by giving reduced rates for this purpose. The work at University Farm is supplemented by the Sub-Station located at Grand Rapids, on land that is characteristic of the northeastern part of the State; and by the Sub-Station located at Crookston, on land that represents the soil of the Red River valley. Each of these farms is equipped with buildings and machinery, and is in charge of a competent superintendent. Experiments are also carried on at the farm of Sup't. O. C. Greeg, in Lyon Co. (Coteau Farm), which is typical of the agricultural lands of that section.

PUBLICATIONS OF THE AGRICULTURAL DEPARTMENT.

BULLETINS OF THE EXPERIMENT STATION FOR 1898.

Bulletin 56—Sugar Beets. Summary and Investigation from 1888 to 1898. Report for 1897. Proposed Experiments for 1898.

Bulletin 57—Fattening Lambs in Winter. 1—Fattening Minnesota Lambs. 2—Fattening Range Lambs. 3—Fattening Range Lambs.

Bulletin 58—Fattening Steers in Winter. 1—Fattening Minnesota Steers. 2—Fattening Range Steers.

Bulletin 59—Fattening Lambs and Wethers in Winter. 1—Fattening Home-Grown Lambs. 2—Fattening Home-Grown Lambs. 3—Potatoes and Field Roots for Fattening Lambs. 4—Fattening Range Wethers. 5—Fattening Range Wethers.

Bulletin 60—Beef Cattle and Swine. 1—Growing Beef in Minnesota. 2—Fattening Range Steers in Winter. 3—Feeding Pigs of Different Grades.

Bulletin 61—Butterflies and Moths Injurious to Our Fruit-Producing Plants.

THE FARM STUDENTS' REVIEW.

The Alumni Association of the School of Agriculture is publishing an agricultural paper, the Farm Students' Review, which is now in its fourth year. This is proving a most important agency in the development of the department and of agriculture in Minnesota.

The College of Law

FACULTY.

- CYRUS NORTHPROP, LL. D., *President.*
WILLIAM S. PATTEE, LL. D., *Dean, Department of Contracts and Equity Jurisprudence.*
A. C. HICKMAN, A. M., LL. B., *Department of Pleading and Practice.*
JAMES PAIGE, A. M., LL. M., *Department of Torts and Criminal Law.*
ROBERT S. KOLLINER, LL. B., *Department of Personal Property.*
HENRY J. FLETCHER, ESQ., *Department of Real Property.*
HOWARD S. ABBOTT, B. L., *Department of Corporation Law.*

LECTURERS.

- HON. CUSHMAN K. DAVIS, M. A., St. Paul, (U. S. Senator,) *Special Lecturer on International Law.*
GEORGE B. YOUNG, LL. B., St. Paul, (Ex-Associate Justice of the State of Minnesota,) *Conflict of Laws.*
CHARLES A. WILLARD, LL. B., Minneapolis, *Bailments.*
HON. JAMES O. PIERCE, Minneapolis, (Ex-Judge of the Circuit Court of Memphis, Tenn.) *Constitutional Jurisprudence and History.*
HON. C. D. O'BRIEN, St. Paul, *Criminal Procedure.*
CHARLES B. ELLIOT, Ph. D., LL. D., Minneapolis, (Judge of District Court of Hennepin County,) *International Law.*
HON. JOHN DAY SMITH, LL. M., Minneapolis, *American Constitutional Law.*
T. DWIGHT MERWIN, A. B., St. Paul, *Law of Patents.*
HERBERT R. SPENCER, Duluth, *Admiralty Law.*
A. D. KEYES, Faribault, *Insolvency.*
JOHN COCHRANE SWEET, LL. M., Minneapolis, *Mortgage Foreclosure.*
FREDERICK V. BROWN, Minneapolis, *Chattel Mortgages.*
RANSOM J. POWELL, LL. B., *Instructor in Justice Practice.*
JARED HOW, LL. B., St. Paul, *Landlord and Tenant.*

ORGANIZATION.

The work of the college is divided into six departments, with a member of the faculty at the head of each, who has the special charge of and responsibility for the work under his direction.

FIRST.

William S. Pattee, LL. D., Dean, is at the head of the department of contracts and equity jurisprudence.

SECOND.

A. C. Hickman, LL. B., has charge of the department of pleading and practice. This is regarded as one of the most important departments in the college, and greater attention is to be given it in the future than even in the past. The practice in the Justice, District and Supreme Court is specially emphasized.

THIRD.

James Paige, LL. M., has charge of the department of torts and criminal Law.

FOURTH.

Robert S. Kolliner, LL. B., of the Minneapolis bar, is at the head of the department of personal property, and lectures on torts to the evening class.

FIFTH.

Henry J. Fletcher, Esq., of the Minneapolis bar, is at the head of the department of real property and insurance.

SIXTH.

Howard S. Abbott, B. L., of the Minneapolis bar, will have charge of the subject of corporations, both public and private.

REQUIREMENTS FOR ADMISSION.

Any person of good moral character will be allowed to matriculate in this department. If, however, the person applying for admission intends to be a candidate for a degree at the end of his course, he must be not less than eighteen years of age.

Graduates of universities or colleges, and students who have graduated from any normal school or State high school of Minnesota, or from similar institutions of equal grade in other states, are admitted without examination upon presentation of their diplomas.

All other applicants must pass an examination in the studies required for admission to the freshman class of the literary course of the college of science, literature and the arts, except the foreign languages; including English grammar, English composition, algebra—elementary and higher, geometry—plane and solid, history of the United States, history of Greece and Rome, English history, physiology, physics.

But substantial equivalents may be substituted to a certain extent, and a business education and experience as well as experience in teaching will be considered in determining the qualifications of applicants for admission.

SPECIAL STUDENTS.

Persons who are not candidates for a degree may enter the college at any time as special students without examination, and may pursue whatever subjects they desire, provided they possess such knowledge and ability as will, in the opinion of the faculty, enable them to pursue the subjects of law with profit to themselves. And all such students will be entitled to a certificate upon a satisfactory examination in the subjects pursued by them, stating the time they have been members of the college and the subjects in which they have passed a creditable examination.

Such students, however, if they elect studies in both the day and evening courses, pursuing both at the same time, will be charged ten dollars per term additional tuition.

SENIOR ELECTIVES.

Students in the senior class of the college of science, literature and the arts, are permitted to elect, as senior studies in said college, the commentaries of Blackstone, the elements of contracts and of torts, and the principles of criminal law; a satisfactory completion of these subjects in the college of law will admit such students to the middle year in either the day or evening class in said college. No such student will be allowed to take more than one lecture daily without permission of the general faculty.

Students in the day or evening class, will not be permitted to attend more than two courses of lectures daily, unless in exceptional cases, and then a card of admission must be procured from the faculty and ten dollars per term additional tuition must be paid.

Students who are regular members of one class, either day or evening, will not be permitted to pursue studies in any class in advance of that to which they belong, unless there are special circumstances requiring it, and only upon special permission granted by the faculty.

ADVANCED STANDING.

Should any person desire to enter the middle or senior class for a degree he must be at least nineteen years of age, must pass the required preliminary examination upon the subjects of the preceding year or years, or their equivalents, but no person will be allowed to receive his degree who has not spent one full year in this department. Attorneys at law, however, who have been admitted to practice in the state of Minnesota, may enter the senior class without examination upon presentation of their certificates of admission, and shall be entitled to their degree upon a satisfactory showing at the final examination of the year.

Applicants who have diplomas entitling them to admission without examination, should present them to the registrar of the university, who upon the payment to him of the matriculation fee and the first term's tuition will register them as students of the college.

Those who are to take examinations or enter as special students, should present themselves to the Dean of the college of law, who will, upon proof of their qualification for admission, refer them to the registrar, where they can pay the matriculation fee and the first term's tuition, and receive their cards of admission.

FOUR COURSES OF STUDY.

FIRST.

THREE YEAR'S DAY COURSE.

FIRST YEAR—JUNIOR.

Contracts, including the statute of frauds; domestic relations; agency; commercial paper and partnership; torts; real property, (Blackstone second book); criminal law. (Seniors from the academic department are entitled to only one lecture daily, without special permission.)

SECOND YEAR—MIDDLE.

Real property continued (land, estates, titles); personal property, including sales; pleading; bailments; corporations—private and public; mortgages; suretyship; liens; carriers and insolvency law; wills and administrations; landlord and tenant.

THIRD YEAR—SENIOR.

Evidence; equity jurisprudence; real property continued; taxation; practice in United States Courts; American constitutional law; medical jurisprudence; international law; extraordinary legal remedies; conflict of laws; conveyancing; trusts; personal property; patent law; moot court work.

The subjects as above arranged are not necessarily taken up in the order they are mentioned, but the topics of the first, second and third years will be considered during those years in the order named, subject, however to such rearrangement as may best subserve the interests of the students and the convenience of the lecturers and instructors.

SECOND.

THREE YEARS' EVENING COURSE.

To accommodate those who cannot attend the lectures during the day, there is offered an evening course comprising the same subjects as those above enumerated, extending over a period of three years, of nine months each. The students in this course pursue the same subjects as those in the day department, and, in the same order, except that the senior and middle classes are united, and the work of those two years is arranged to meet the demands of such a union.

THIRD.

SPECIAL COURSE.

For the benefit of those who do not care to pursue an extended course of legal instruction leading to the degree of Bachelor of Law, (LL. B.), but desire such a knowledge of law as is of inestimable value to them in a business career, there is offered a special course.

This course extends over one year, and for the accommodation of business men the lectures are delivered in the evening.

The course embraces the following subjects: contracts, including statute of frauds; agency; commercial paper; partnership; Minnesota insolvency law; liens; bailment; master and servant; insurance; sales.

The studies in this course may be varied upon consultation with the faculty, and other subjects in place may be substituted by those whose business life or whose preference render it desirable.

Those who complete the course and pass a satisfactory examination receive a certificate of proficiency.

FOURTH.

GRADUATE COURSE.

FIRST.

For the benefit of those students who wish to pursue their legal studies further than they are able to do in the undergraduate years, two graduate courses are offered, the first leading to the degree of Master of Law (LL. M.), the second to the degree of Doctor of Civil Law (D. C. L.)

The courses of lectures offered in the first year of graduate work are as follows:

International law.

Political science.

Constitutional jurisprudence and history.

Taxation.

Philosophic basis of jurisprudence.

And for the benefit of those who desire to make a special study of the subject there is a thorough and critical course of lectures upon Minnesota practice.

This subject, Minnesota practice, is designed especially to familiarize those who are to follow their profession in Minnesota, with the practice in the district and supreme courts of this State.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws, from this or some other law school having a threeyear course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws. Any person who possesses the requisite legal learning may, however, enter this course as a special student and pursue any or all of the studies offered.

SECOND.

Students who have received the degree of LL. B., from this or some other law school requiring three years of study of law for said degree, and who have also received the degree of LL. M., from this, or some other school after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin is required, and special proficiency in Roman history is necessary to entitle a student to entrance for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted from them. But no further entrances will be permitted in this course until September, 1900.

None of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student and the thesis for the doctor's degree must be one evincing original investigation and special excellence.

TUITION.

UNDERGRADUATE STUDENTS.

A matriculation fee of ten dollars must be paid by every student entering the college. The tuition fee is fifty dollars a year payable in advance as follows: Twenty dollars at the time the student first enrolls each year and fifteen dollars at the time he enrolls for each subsequent term of that year. A diploma fee of ten dollars is due from each student upon receiving his diploma.

GRADUATE STUDENTS.

The tuition fee for graduate students is thirty dollars payable in advance as follows: Ten dollars each term. In addition a matriculation fee of ten dollars is due from each student entering upon the course who has not previously matriculated in the college. A diploma fee of ten dollars is due from each student upon receiving his diploma.

FREE CASE BOOKS.

In order to protect the College, Bar Associations and State Libraries from the special injury incident to continual use and to facilitate the class work of the college, the Board of Regents have decided to furnish for the use of the students free case books.

LIBRARIES.

The college has a good library containing those English and American reports most frequently cited, digests, dictionaries, and a full and excellent

selection of standard text-books. To this collection additions are being constantly made.

Further facilities are afforded the college by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its extensive and ample library located in Temple Court. It contains all the American reports, State and national, and also the English text-books and reports, so necessary for the student in his study of fundamental jurisprudence.

Beside the University and Bar Association libraries, the State library, containing all books which a student would have occasion to consult, is located at the capitol, in St. Paul, and is thus within easy reach of the students.

The general library of the University contains about fifty thousand bound volumes, besides many thousand volumes of pamphlets, magazines, reports, etc. About one hundred and twenty periodicals are received regularly by the library, not inclusive of technical magazines and newspapers in English and other languages.

Besides the general library of the University, there are several special libraries, consisting mainly of books of reference and current periodicals relating to technical subjects in connection with the several departments of engineering, biology and botany. These libraries are open during the entire day, and the University library is open also in the evening.

METHODS OF INSTRUCTION.

The sessions of the junior, middle and senior day classes will begin respectively at 9:00 and 10:45 o'clock a. m., and 2:00 o'clock p. m.; and those of the evening classes will begin at 7:20 o'clock p. m.

The method of instruction is not confined to either lectures or recitations but such a combination of both is adopted as is best calculated to interest the student and secure for him a thorough, accurate and comprehensive knowledge of the principles and rules of law. And in addition thereto such a use of the reports is made as will familiarize the student with the leading cases upon the various subjects upon which he receives instruction.

EXAMINATIONS FOR PROMOTIONS.

Written examinations will be held at the close of each subject during the middle and junior years, and no student who fails to pass a satisfactory examination in any of his studies will be advanced to the next higher class.

A student thus failing, however, may have another examination during the first week of the next year upon those subjects wherein he failed, and if it proves satisfactory he shall be advanced accordingly. Such student may, however, enter the advance class if he has not been conditioned in more than two subjects, and provided he makes up those subjects by taking them in the regular classes where they are taught.

STATE AND UNITED STATES COURTS.

The department is located within easy reach of both the federal and state courts. The United States courts are in session in St. Paul and Minneapolis during the greater part of the school year. The supreme court of Minnesota, the district courts of Ramsey and Hennepin counties, and the municipal courts of St. Paul and Minneapolis are open and in session almost constantly, and afford all the opportunity for witnessing the trial of actual cases which the student will have either time or desire to improve.

COLLEGE COURTS.

As fast as the student becomes acquainted with the primary rights of persons, cases are prepared for his consideration, whereby he may apply the principles of law with which he has become familiar.

There is also established in the senior year a system of college courts corresponding to the justice, the district and the supreme courts of Minnesota, wherein the student may become familiar with the practice and the rules of the courts respectively.

It is the aim of the department to acquaint the student with the practice as well as the theory of law, and to this end the subjects of pleading, evidence, rules of practice adopted by our state courts, methods of securing provisional remedies, appeals from one court to another, the writs of habeas corpus, certiorari, and others of frequent use, conveyancing, drawing contracts and other like practices which comprise the daily work of the general practitioner, will, during the senior year, receive special and careful attention.

Some member of the faculty will preside over each of these courts, associating with him such members of the class as he shall from time to time select. Briefs will be prepared and other steps taken so far as possible, which practice requires in the actual conduct of cases.

THE LECTURERS.

All the lecturers in the college are lawyers actively engaged in the practice of their profession. They come to the class-room direct from the bar, bringing with them fresh experiences and the spirit of actual contest. They all possess a high ideal of what a lawyer should be and do, and the student who enters here is expected to come with the fixed purpose of attaining a high degree of excellence in the legal acquirements, and to respond in earnestness and with fidelity to the faithful efforts of his instructors in his behalf.

THE LITERARY SOCIETIES.

The students of the college have joined in organizing two literary societies for the purpose of general improvement and for cultivation in the practice of extemporaneous speaking. They hold weekly meetings and derive great benefit from their exercises.

ELECTIVES FROM OTHER DEPARTMENTS.

Students of this college will be admitted, under proper regulations, to exercises in other departments or colleges of this University, without extra charge, and so far as it does not interfere with their law studies, they are urged to avail themselves of this opportunity to attend lectures and recitations in the other departments. Such elections should be made only after consultation with the faculty. The following subjects are suggested as being particularly suitable: international law, constitutional history and political science. Students who elect work such must complete it in a satisfactory manner before they shall be entitled to receive their law degrees.

DEGREES.

The degree of bachelor of laws will be conferred upon students of good moral character who pursue the full course in this college and pass an approved examination, and the degree will also be conferred upon those who, having attended another law school for the period of one year, shall also attend two years in this college and pass a like examination.

ADMISSION TO THE BAR.

The legislature of Minnesota in the year 1881, recognized the college of law of the University of Minnesota in the following enactment, whereby students graduating therefrom are entitled to admission to the bar without further examination.

AN ACT to establish a uniform standard of admission to the bar of this State and to punish persons violating the provisions of this act.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. As soon as possible after the passage and approval of this act the Justices of the Supreme Court of this State shall appoint from the members of the bar of Minnesota learned in law, one person from each congressional district now or hereafter created, to constitute a state board of examiners in law.

SEC. 2. The term of office of said board shall be as follows:

Three shall be appointed for one year, two shall be appointed for two years, and two shall be appointed for three years, and their successors shall receive their appointment in like manner for terms of three years each; but in case of a vacancy occurring by death or otherwise, there shall be appointed in a like manner a person to serve through the unexpired term of the member to whose place he is appointed.

SEC. 3. That said board shall elect a president, secretary and treasurer; shall have its headquarters at the Capitol of the State; shall have a common seal; and the president and secretary shall have the power to administer oaths; the said board shall at least three times in each year hold public examinations for admission to the bar of the State, which examinations shall be both written and oral, in such place in this State as the Supreme Court shall direct, and at such times as the said board shall determine; the said board shall keep a record of all its proceedings, and also a record of all applications for admission to the bar, and shall enroll in a book kept for that purpose, the name of each person admitted as an attorney at law.

SEC. 4. The said board shall, as soon as practicable thereafter, report the result of all examinations to the Supreme Court, with such recommendations as to said board shall seem just, and the Supreme Court shall, after considering said report and said recommendations, enter an order in each case authorizing or directing said board to reject such applicant or to issue to him a certificate of admission to the bar.

SEC. 5. The said board shall receive from each person applying for examination the sum of five dollars (\$5.00) as a fee therefor, and all fees received by said board shall be

deposited with the treasurer of said board and applied towards the expenses and compensation of the respective members of said board.

SEC. 6. There shall be paid out of the treasury of said board to each examiner appointed as aforesaid, a compensation not exceeding ten dollars (\$10.00) per day and his actual necessary expenses in going to, holding and returning from any such examinations.

SEC. 7. No person shall hereafter be admitted to practice as an attorney and counselor at law; or commence, conduct or defend any action or proceeding in any of the courts of record of this State, in which he is not a party concerned, either by using or subscribing his own or the name or names of any other person or persons, unless he has complied with and been admitted under and pursuant to such rules as the Supreme Court of this State shall prescribe; provided that the provisions of this act shall not apply to or affect persons admitted to the bar of this State under pre-existing laws.

Provided, THAT THE GRADUATES FROM THE LAW DEPARTMENT OF THE UNIVERSITY OF MINNESOTA SHALL, UPON PRESENTATION OF THEIR DIPLOMA FROM SAID UNIVERSITY TO THE SUPREME COURT, OR ANY DISTRICT COURT OF THIS STATE, AT ANY TIME WITHIN TWO (2) YEARS FROM THE DATE OF SUCH DIPLOMA, BE ENTITLED TO A CERTIFICATE OF ADMISSION TO THE BAR WITHOUT ANY EXAMINATION OR FEE WHATSOEVER, AND SUCH COURT SHALL THEREUPON ENTER AN ORDER AUTHORIZING AND DIRECTING THE CLERK OF SAID COURT TO ISSUE TO SUCH GRADUATE A CERTIFICATE OF ADMISSION TO THE BAR, UPON PROOF SATISFACTORY TO SAID COURT THAT SUCH GRADUATE IS A CITIZEN OF THE UNITED STATES, A CITIZEN AND RESIDENT OF THE STATE OF MINNESOTA; THAT HE IS TWENTY-ONE (21) YEARS OF AGE, OF GOOD MORAL CHARACTER, AND UPON HIS SUBSCRIBING SUCH OATH AS IS NOW PROVIDED BY STATUTE FOR PERSONS UPON THEIR ADMISSION TO THE BAR.

SEC. 8. Any person who shall appear as an attorney or counsellor at law in any action or proceeding in any court of record in this state to maintain or defend the same, except in his own behalf when a party thereto, unless he has been admitted to the bar of this State, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than fifty dollars (\$50) nor more than one hundred dollars (\$100), and it shall be the duty of the respective county attorneys in this State to prosecute violations of this act; but the District Courts of this State shall have sole original jurisdiction of this offense.

Provided, that any attorney or counsellor residing in any of the other States or Territories wherein he has been admitted to practice law, and who shall attend any term of the Supreme or District Courts of this State for the purpose of trying or participating in the trial or proceedings in such action or proceeding therein pending, may be permitted to try or participate in the trial or proceedings in such action or proceeding without being subject to the provisions of this act

SEC. 9. Chapter ninety-three (93) of the general laws of one thousand eight hundred and eighty-nine (1889) and section three (3), four (4) and eight (8) of chapter eighty-eight (88) of the general statutes of one thousand eight hundred and seventy-eight (1878), and chapter one hundred and four (104) of the general laws of one thousand eight hundred and eighty-three (1883) are hereby repealed.

SEC. 10. This act shall take effect and be in force from and after its passage.

LAW BOOKS.

Students will be expected to furnish themselves with such text-books as the faculty shall adopt for use in the recitation room. In all cases they will be such books as will be found necessary in the student's practice.

In addition to these, should any of the students desire to have at hand other standard works upon the subject taught, a judicious selection could be made from the following list, and the faculty would be glad to aid them in making such a selection.

Contracts—Parsons, Anson, Metcalf, Pollock, Bishop.
 Bailments—Schouler, Edwards, Story.
 Sales—Benjamin Blackburn.

Domestic Relations—Schouler or Reeves on Domestic Relations; Schouler on Husband and Wife; Bishop on Marriage and Divorce; Bishop on Married Women; Cord on Married Women; Macdonnel on Master and Servant; Simpson on Infants.

Corporations—Elliott, Angel and Ames, Field, Morawitz and Taylor on Private Corporations; Dillon on Municipal Corporations; Thompson on Liability of Stockholders; Beach on Corporations.

Bills and Notes—Byles; Chalmers; Parsons; Daniels on Negotiable Instruments; Edwards on Bills and Notes; Bigelow's Leading Cases; Ames' Leading Cases.

Torts—Cooley, Bigelow, Addison; Wharton on Negligence.

Evidence—Greenleaf on Evidence; Best's Principles of Evidence; Stephen's Digest of Law of Evidence; Wharton or Starkie on Evidence; Rogers on Expert Testimony; Roscoe's Criminal Evidence.

Real Property—Williams, Washburn Tiedeman, Boone, Willard.

Partnership—Lindley, Parsons, Bates, Pollock.

Wills and Administration of Estates—Redfield on Wills; Jarman on Wills (Randolph & Talcott's or Bigelow's edition); Hawkins on Construction of Wills; Schouler on Wills; Williams on Executors.

Common Carriers—Hutchinson on Carriers; Thompson on Passenger Carriers; Redfield or Pierce on Railways.

Equity—Pomeroy's or Story's Equity Jurisprudence; Snell's, Bispham's or Adams' Equity.

Criminal Law—Harris, Bishop, Wharton, May, Washburn, Stephen's Digest of the Criminal Law; Stephen's History of the Criminal Law.

Pleadings—Gould, Stevens, Chitty, Hurd, Bliss on Code Pleadings; Story's Equity Pleading; Pomeroy on Remedial Rights.

Agency—Evans, Story, Wharton.

Damages—Sutherland, Sedgwick.

Mortgages—Jones, Thomas.

Insurance—May on Insurance; Wood on Fire Insurance; Bliss on Fire Insurance; Arnold on Marine Insurance.

Shipping and Admiralty—Abbott, Conkling, Desty.

Easements—Goddard, Washburn.

Taxation—Cooley, Burroughs, Desty.

Medical Jurisprudence—Ewell, Wharton and Stille, Beck.

Constitutional History—Hallam's Constitutional History of England (1485-1770); May's Constitutional History of England (1760-1860); Yonge's Constitutional History of England (1760-1860); Stubb's Constitutional History of England; Bagehot's English Constitution; Gheist's English Constitutional History; Curtis' History of the Constitution of the United States; Bancroft's History of the United States; Von Holst's Constitutional History of the United States.

Constitutional and State Law—Pomeroy's Introduction to the Constitutional Law of the United States; Von Holst's Constitutional Law of the United States; Cooley's Principles of Constitutional Law; Cooley's Constitutional Limitations; Story's Commentaries on the Constitution of the United States; Sedgwick on Constitutional and Statutory Law; Jameson's Constitutional Conventions; Bishop's Written Law; Maxwell on the Interpretation of the Statutes; Farrar's Manual of the Constitution of the United States; Stearn's Concordance to the Constitution of the United States.

Jurisprudence—Holland's Elements of Jurisprudence; Austin's Lectures on Jurisprudence; Lorimer's Principles of Jurisprudence; Amos on the Science of Law.

International Law—Wheaton's Elements of International Law; Hall's International Law; Davis' International Law; Story's Conflict of Laws.

Roman Law—Morey's Outlines on Roman Law; Haley's Introduction to Roman Law; Mackenzie's Roman Law; Moyle's Justinian; Roby's Introduction to the Digest; Muirhead's Roman Law.

EXPENSES.

These depend largely upon the tastes and habits of the individual. Students find no difficulty in obtaining board among the people of the City. Good board can be obtained for \$4 per week. Students board in clubs at less expense.

For further particulars write to the Dean, W. S. Pattee, and all information necessary for the student will be furnished promptly. The dean will be pleased to correspond with any one who is thinking of pursuing a course of legal study, and he will gladly aid any student in selecting the proper books. Letters addressed to him at Minneapolis, Minnesota, will receive prompt attention.

The Department of Medicine

THE DEPARTMENT OF MEDICINE INCLUDES THE FOLLOWING NAMED COLLEGES.

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

Each college is distinct in the government of its internal affairs, has its own faculty and an independent curriculum, excepting in the studies of anatomy, physiology, chemistry, histology and embryology. These studies, so far as they are required in each course, are pursued by all the students of the department in common.

BUILDINGS AND EQUIPMENT.

The department is resident in three buildings situated upon the University campus, viz: medical hall, the laboratory of medical sciences and the laboratory of chemistry.

Medical hall contains the offices of the deans of the college of medicine and surgery, of the college of homeopathic medicine and surgery and of the college of dentistry; the large amphitheatre and lecture rooms of the several colleges; the library and reading-room of the department; the dissecting-rooms and laboratories of anatomy; the operating-rooms and laboratories of dentistry; and the dental infirmary.

The laboratory of medical sciences is a building especially designed for laboratory uses. One wing of the building is occupied by the college of pharmacy and the department of physiology. It contains the office and private laboratory of the dean of the college of pharmacy, the pharmaceutical and botanical laboratories, the laboratory of organic chemistry, with preparation and stock rooms. The office of the secretary of the college of medicine and surgery, a large lecture amphitheatre, especially arranged for demonstrative work, the laboratories of physiology, physiological chemistry, practical dietetics, and operative surgery are also situated in this wing.

The center and opposite wing are occupied by the departments of histology and embryology, pathology and bacteriology. Each of these branches has its well-lighted laboratories, preparation-rooms and private study rooms.

Upon the basement floor are the laboratory stock-rooms and the animal rooms devoted to physiological and bacteriological purposes.

A large laboratory upon the first floor is assigned to the bacteriological work of the State Board of Health.

The laboratory of chemistry is a one story brick building devoted entirely to the uses of this department. It is equipped with laboratories, preparation-rooms, store-rooms, and the private offices of the professor and demonstrator of chemistry.

The department of medicine is in intimate relationship, through its several faculties, with the hospitals, infirmaries and dispensaries of the cities of Minneapolis and St. Paul. Through these agencies it utilizes, for the benefit of its students, the clinical material of these two large centers of population. The location of the University near the interurban car line enhances the value and convenience of these clinical opportunities.

A medical library, containing some two thousand volumes and supplied with current periodicals, is open to all the students of the department. The collection has been chosen with special regard to the need for reference work and collateral reading. The general library of the University and the public libraries of Minneapolis and St. Paul are also open to the students of this department.

The legislature has provided for two new buildings in this department, which will be built during the ensuing summer. The anatomic laboratory building is to be one of these. It will be a two story and basement structure, 35 by 60 feet. In the basement will be provided a morgue, injecting room, cold storage vaults and engine and apparatus for an anhydrous ammonia freezing plant. On the first floor will be an amphitheatre, seating one hundred students, the private offices of the professors and instructors, a private dissecting room and a small laboratory for research work. The entire second floor will be devoted to laboratories for practical work in anatomy.

A clinical building will also be put up and equipped during the season and will be open for the session of 1899-1900. It will be situated in a part of the city most favorable to the development of an outdoor service. It will be of two stories and will cover 40 by 115 feet. It will afford ample floor space for amphitheatres, waiting rooms, pharmacy and class rooms for each of the clinical branches. Wards and laboratories, in which section work in medical and surgical diagnosis can be conducted, will be equipped.

RULES AND REGULATIONS OF THE DEPARTMENT.

COLLEGE YEAR.

The twelfth annual course of study in this department will begin on September 19th, 1899, and will continue eight and one-half months, closing upon the first Thursday in June, 1900. The college of dentistry, in this department, will begin work September 5th and the college of pharmacy October 3rd.

The college year is divided into semesters; the first semester ending January 27th, 1900. The succeeding week will be devoted to mid-year ex-

aminations which will be conducted in many of the departments. The second semester will begin February 6th, 1900, and will close May 19th, 1900, when the final examinations of the year will begin. Commencement exercises will occur in common with the other departments of the University, during the week ending June 8th, 1900.

ENROLLMENT.

It is desirable that students matriculate before September 12th.

Students will be assigned seats in the order of and at the time of their matriculation. Such matriculation and assignment of seats will be had in the office of the registrar of the University. Students will then present themselves for entrance examination, or for the approval of their evidences of preliminary qualification, to a committee of the college of science, literature and the arts appointed for this purpose. Having received an entrance certificate from this committee they will report to the dean of the college which they desire to enter, for admission and classification. They will then be furnished with a record of their standing and of the studies to be taken and they will be required to present this record to the professors in charge of such studies within the first week of the term.

ENTRANCE EXAMINATIONS.

In accordance with an agreement between the University of Minnesota and Hamline University, the requirements for admission to their medical departments, which represent all the medical schools of the state, are uniform.

Candidates who present a diploma of a reputable college, or of a high school of the first grade, or of the advanced course of a Minnesota State Normal School, or of the preparatory departments of either Hamline University or Carleton College, or of Pillsbury Academy, or of the Minneapolis Academy, will be admitted without examination. The diploma must, however, in every case, represent at least one year of latin.

Candidates who do not possess such qualifications will be required to pass an entrance examination which will be conducted by an examining board, consisting of three members of the faculty of the college of science, literature and the arts, appointed by the president of the University.

For the ensuing year the requirements of this examination will be:

1. An English composition of not less than two hundred words, upon a subject to be announced at the time of examination.
2. Elementary algebra.
3. Physics.
4. Latin: grammar and easy prose; three books of Cæsar.
5. United States history.
6. Physiology.
7. Plane geometry.

In 1900, the examination will be that for admission to the freshman class of the college of science, literature and the arts. Its requirements, as unified by the president of the two universities, will be as follows:

1. English composition and rhetoric.
2. United States history.
3. History of Greece and Rome.
4. Physiology.
5. Physics.
6. Algebra.
7. Geometry.
8. Latin grammar; Cæsar, four books; Cicero, four orations; Vergil, four books;
or
9. German or French, in lieu of Cicero and Vergil.

CONDITIONS.

Examinations of conditioned students and of applicants for advanced standing, in the common studies of the first and second years, will be held in these branches, upon the following dates:

September 20, 9 a. m. Anatomy, first year; Physiology, second year.

September 21, 2 p. m. Histology, first year; Chemistry, second year.

September 21, 9 a. m. Physiology, first year; Anatomy, second year.

September 21, 2 p. m. Chemistry, first year; Histology, second year.

Conditions may also be removed at the close of each semester.

Candidates for graduation who carry conditions in studies of previous years must remove these conditions at the end of the first semester in order to be eligible for final examination.

Students will not be permitted to take examinations in the second year's work in any branch until they have removed conditions in the first year's work in that branch.

Standings in third and fourth year branches will be withheld until all conditions in the first and second years have been removed.

Students who carry conditions into a succeeding year may find a resultant conflict of study hours. In that event they will give preference to the unfinished studies of the lower or conflicting course.

CLASSIFICATION.

September 23rd and 25th will be devoted to the classification of students. The opening lectures of the course will be delivered at 8 p. m., September 25th.

STANDING.

The standing of students is determined by the results of recitations, written examinations and laboratory work. It is indicated by the terms "passed with excellence," "passed" or "conditioned." "Conditions" may be removed as indicated above. Incomplete work must be made up before the final examinations of the following year.

Students must pass a majority of the studies of their year, in order to classify in the next succeeding year.

In the studies of the first and second years, the classes will recite in sections during hours regularly assigned for this purpose.

Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

ADVANCED STANDING.

Applicants for advanced standing must pass the entrance examinations, or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies and must present themselves at the above dates and pass the examinations of all departments in which they wish to be exempt, if such examination is deemed necessary by the professors in charge of the various departments.

No conditions of advanced standing will entitle the student to take the two years of any graded study coincidently.

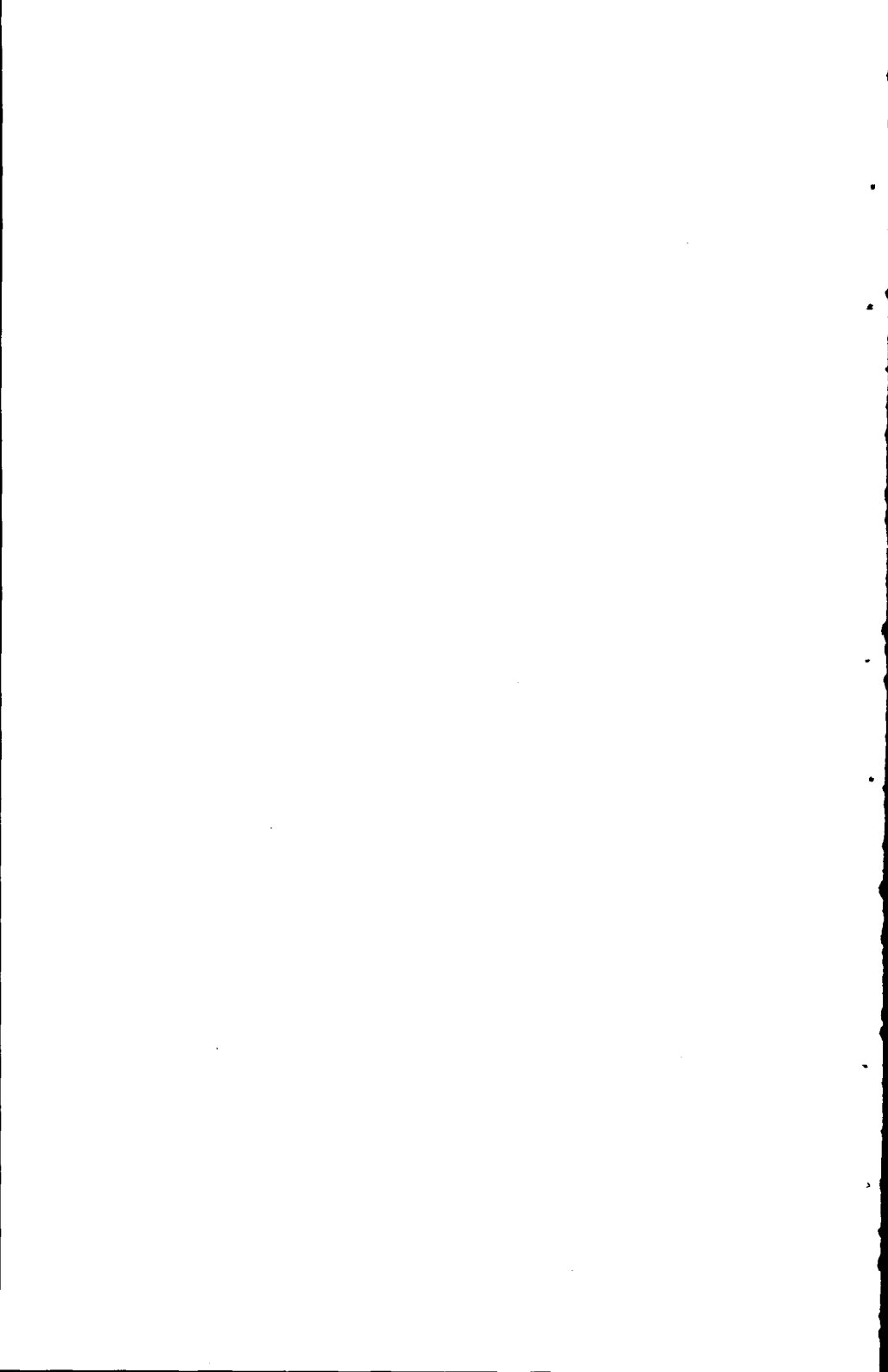
Students will not be permitted to substitute private work in any branch for the regular college course work, excepting in the case of actual laboratory exercises done under the direct supervision of an instructor appointed by the chair and approved by the faculty. Examinations in such private laboratory work will be conducted by the chair. This rule does not apply to conditioned students.

Seniors in the college of science, literature and the arts who contemplate entering the department of medicine are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this department in lieu of similar science courses in the college of science, literature and the arts. This election will be contributive toward the degrees given in both colleges. Reciprocally the college of medicine and surgery will accept full courses, taken in the college of science, literature and the arts, in histology, physiology and chemistry in lieu of its first year's work in these branches.

For a statement of fees, either charged or credited in these elected studies, see page 218.

ATTENDANCE.

Students are required to attend four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered, invariably, during the first week in which they begin.



The College of Medicine and Surgery

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
PARKS RITCHIE, M. D., *Dean and Professor of Obstetrics.*
THOMAS G. LEE, B. S., M. D., *Professor of Histology and Embryology.*
GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*
RICHARD OLDING BEARD, M. D., *Secretary and Professor of Physiology.*
CHARLES JOHN BELL, B. A., *Professor of Chemistry.*
HENRY MARTYN BRACKEN, M. D., L. R. C. S., Edin., *Professor of Materia Medica, Therapeutics and Clinical Medicine.*
CHARLES H. HUNTER, A. M., M. D., *Professor of the Theory and Practice of Medicine.*
EVERTON J. ABBOTT, A. B., M. D., *Associate Professor of Practice and Professor of Clinical Medicine.*
J. W. BELL, M. D., *Professor of Physical Diagnosis and Clinical Medicine.*
ALBERT E. SENKLER, M. D., *Professor of Clinical Medicine.*
CHARLES A. WHEATON, M. D., *Professor of Clinical Surgery.*
FREDERICK A. DUNSMOOR, M. D., *Professor of Operative and Clinical Surgery.*
JAMES H. DUNN, M. D., *Professor of Practice of Surgery and Genito-Urinary Diseases.*
JAMES E. MOORE, M. D., *Professor of Clinical Surgery.*
JUSTUS OHAGE, M. D., *Professor of Clinical Surgery.*
ARTHUR J. GILLETTE, M. D., *Professor of Orthopedia.*
A. B. CATES, A. M., M. D., *Clinical Professor of Obstetrics.*
FRANK FAIRCHILD WESBROOK, M. A., M. D., C. M., *Professor of Pathology and Bacteriology.*
J. CLARK STEWART, B. S., M. D., *Professor of Surgical and Clinical Pathology.*
ALEX J. STONE, M. D., LL. D., *Professor of Diseases of Women.*
AMOS W. ABBOTT, M. D., *Clinical Professor of Diseases of Women.*
A. McLAREN, A. B., M. D., *Clinical Professor of Diseases of Women.*
JOHN F. FULTON, Ph. D., M. D., *Professor of Ophthalmology and Otology and Hygiene.*
FRANK C. TODD, M. D., *Clinical Professor of Ophthalmology and Otology.*
C. EUGENE RIGGS, A. M., M. D., *Professor of Nervous and Mental Diseases.*
W. A. JONES, M. D., *Clinical Professor of Nervous and Mental Diseases.*
H. B. SWEETSER, M. D., *Clinical Professor of Diseases of Children.*
MAX P. VANDERHORCK, M. D., *Professor of Diseases of the Skin.*
W. S. LATON, M. D., *Professor of Diseases of the Nose and Throat.*
CHARLES LYMAN GREENE, M. D., *Clinical Professor of Medicine and of Physical Diagnosis.*
HENRY L. STAPLES, A. M., M. D., *Professor of Clinical Medicine.*
ARTHUR SWEENEY, M. D., *Professor of Medical Jurisprudence.*
CHARLES ERDMANN, M. D., *Assistant Professor and Demonstrator of Anatomy.*

CORPS OF CLINICAL PROFESSORS AND INSTRUCTORS.

- J. E. SCHADLE, M. D., *Clinical Professor of Diseases of the Nose and Throat.*
BURNSIDE FOSTER, M. A., M. D., *Clinical Professor of Diseases of the Skin and Lecturer upon History of Medicine.*

- C. NOTHNAGEL, M. D., *Clinical Professor of Medicine.*
 JOHN T. ROGERS, M. D., *Clinical Instructor in Surgery.*
 HERBERT W. DAVIS, M. D., *Clinical Instructor in Obstetrics.*
 GEORGE L. COON, M. D., *Clinical Instructor in Genito-Urinary Diseases.*
 JAMES T. CHRISTISON, M. D., *Clinical Instructor in Diseases of Children.*
 L. A. NIPPERT, M. D., *Clinical Instructor in Medicine.*
 J. L. ROTHROCK, M. D., *Clinical Instructor in Pathology.*
 L. B. WILSON, M. D., *Senior Demonstrator of Pathology.*
 S. M. WHITE, B. S., M. D., *Junior Demonstrator of Pathology.*
 GEORGE D. HEAD, B. S., M. D., *Instructor in Pathology and Clinical Microscopy.*
 H. C. CAREL, B. S., *Assistant Professor of Chemistry.*
 WINFIELD S. NICKERSON, SC. D., *Assistant Professor of Histology.*
 M. RUSSEL WILCOX, M. D., *Demonstrator of Physiology.*
 J. WARREN LITTLE, M. D., *Demonstrator of Operative Surgery.*
 GEO. SENKLER, M. D., *Clinical Instructor in Physical Diagnosis.*
 A. W. DUNNING, M. D., *Clinical Instructor in Nervous and Mental Diseases.*
 R. E. CUTTS, B. S., M. D., *Clinical Instructor in Obstetrics.*
 MARGARET L. NICKERSON, M. A., *Instructor in Histology.*
 C. W. HACK, M. D., *Assistant Demonstrator and Prosector in Anatomy.*
 F. A. KIEHLE, B. S., *Instructor in Medical Latin.*

CLINICAL AND LABORATORY ASSISTANTS.

- A. E. BENJAMIN, M. D., *Assistant in Gynecology.*
 ANDREW HENDERSON, M. D., *Assistant in Clinical Medicine.*
 LESTER N. DAY, M. D., *Assistant in Clinical Medicine.*
 F. P. WRIGHT, M. D., *Assistant in Surgery and Dermatology.*
 G. EDMUND SMITH, *Assistant in Surgery.*
 R. A. CAMPBELL, M. D., *Assistant in Diseases of the Nose and Throat.*
 CHARLES R. BALL, M. D., *Assistant in Nervous and Mental Diseases.*
 HARRY P. RITCHIE, Ph. B., M. D., *Assistant in Gynecology.*
 A. C. HEATH, M. D., *Assistant in Diseases of the Nose and Throat.*

UNIVERSITY SCHOLARS.

GIVING INSTRUCTION AND ASSISTING IN LABORATORIES.

- In Anatomy*—A. W. Shaw, H. K. Read, N. O. Ramsted, A. E. Booth.
In Histology and Embryology—Herbert W. Jones, James C. Ferguson.
In Bacteriology and Pathology—W. H. Condit, B. S., Fred Huxley.
In Dispensary—J. H. Burgan.
In Materia Medica—H. H. Hazletine.
In Physiology—Laura A. Linton, B. S., L. H. Fligman, Marion G. Holloway.
In Surgical Pathology—A. W. Shaw.

CURRICULUM.

The course in the college of medicine and surgery leads to the degree of doctor of medicine. It covers a period of four years of collegiate study, each year representing eight and one-half months in actual residence.

The studies are graded, so far as practicable, throughout the four years and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other.

The work of the first two years deals with the so-called scientific or laboratory branches; while that of the last two years includes the principles and practice of medicine and surgery, their associated specialties and the application of scientific or laboratory methods to clinical experience.

TERMS OF TUITION.

The college of medicine and surgery has adopted a system of annual fees, in which are included all charges for matriculation, lecture courses, laboratory courses, dissections and graduation, excepting a rental fee for microscopes.* These fees are \$100. per annum for the full courses.†

One-half of the annual fee will be payable when the student matriculates. The registrar's receipt for this portion of the fee will entitle the holder to take the entrance examinations and to classify. The second half will be payable at the opening of the second semester, February 6th, 1900. If the applicant fails to pass the entrance examinations, his fees will be returned by the registrar. Absence or failure to continue study will not entitle the student to return of fees, excepting in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will receive only a credit of five dollars upon his annual fee per semester of each laboratory course from which he may be exempt.

Senior students in the academic department of this University who elect first year studies in this college, during their senior academic year, will be admitted to each of such studies upon payment of a fee of fifteen dollars.

Students who are conditioned and fail to remove their conditions within one year will be charged an extra examination fee.

Senior conditioned students who re-enter for work in any succeeding year will be charged a matriculation fee of ten dollars.

BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him and must be paid for before he can receive credits for his course or take his annual examinations.

*In each semester a fee of \$2.00 will be charged for the rental of a microscope in each course in which its use is required, provided the student is not supplied with a satisfactory instrument of his own. It is an advantage for the student to possess a microscope.

†Students who have matriculated during or prior to the session of 1897-98 will pay, according to the old schedule of fees, \$80.00 in the third and fourth years.

A statement of these charges will be submitted to the registrar and such breakage and loss fees will be payable to him.

SPECIAL STUDENTS.

Special students will pay to the registrar a fee of twenty dollars per year for each study they elect to pursue.

They will be charged fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission fee of ten dollars which will entitle them to attend any lectures they may desire in regular courses.

GRADED SYSTEM OF STUDY.

FIRST YEAR.

Histology and embryology, anatomy, physiology, chemistry.

SECOND YEAR.

Histology and embryology, anatomy, physiology, chemistry, materia medica.

THIRD YEAR.

Surgical anatomy, pathology, bacteriology, clinical microscopy, surgical pathology, operative surgery, practice of surgery, practice of medicine, obstetrics, physical diagnosis, therapeutics.

FOURTH YEAR.

Practice of surgery, operative surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, therapeutics, nervous and mental diseases, gynecology, ophthalmology and otology, diseases of children, genito-urinary diseases, orthopædia, diseases of the skin, diseases of the nose and throat, medical jurisprudence, hygiene, dietetics, history of medicine, case-taking and life insurance.

COURSES OF INSTRUCTION.

HISTOLOGY AND EMBRYOLOGY.

The laboratory of histology and embryology occupies most of the first floor and portions of the third floor and basement of the laboratory of medical sciences.

The general laboratory, 44x72 feet, extends across the north wing and is abundantly lighted by large windows on three sides and part of the fourth. Study tables accommodating seventy students are placed directly under the windows. A second tier of desks provides for twenty other students. Each student is furnished with a separate locker for the storage of apparatus and material. The special laboratory, 24x35 feet, for research work by advanced students, adjoins the general laboratory. The next apartment, the library of the laboratory, contains a reference library consisting of a small but carefully selected collection of related literature, both standard and periodical. In addition to the laboratory library, the other libraries of the University, together with the public libraries of Minneap-

olis and St. Paul, afford the student access to the best publications among current periodicals and monographs. The rooms across the hall are devoted to the office and private laboratories of the professor and his assistant. On the third floor are located a preparation room, a small laboratory for special students, a dark room, a room for copying and enlarging, and a laboratory for photomicrography and projection. In the museum on this floor are several cases containing series of embryos and histologic specimens. In the well-lighted basement are found a preparation room, 20x25 feet, for the hardening of tissues, &c., an experimental laboratory and store room, 26x36 feet.

These laboratories are equipped with seventy-five Leitz' microscopes, each fitted with nosepiece and Abbé condenser, various forms of microtomes, such as freezing, Thoma, Minot, Schanze, &c., injection apparatus, aquaria, thermostats, incubators, water baths, chemical hoods, a great variety of technical glassware, Grüber's stains, a set of His' wax models, photomicrographic and reconstruction apparatus, charts, reference cabinets containing carefully selected slides, a large collection of hardened histological and embryological material with an abundant supply of fresh tissues.

The courses are made as practical as possible, beginning with the technique of the microscope, followed by the preparation of permanent specimens. Collections of typical specimens, also, will be loaned to the students for study. During the two years course the student will acquire a valuable collection of slides of his own preparation illustrating the structure and development of the human body.

The course is illustrated by charts and lantern-slides of histological and embryological specimens. Demonstrations are given under the microscope of typical sections of tissues and organs, accompanied by camera lucida drawings, or photo-micrographs, with explanatory text.

All students are recommended to purchase a microscope at the beginning of their medical course. This instrument is an indispensable part of the outfit of a well-trained physician. Suitable microscopes can be purchased at from \$50 to \$80, which may be fitted at any time with such other parts as may be desired.

Students not owning microscopes will be furnished with instruments at a rental of \$2 per semester for each course requiring the use of a microscope.

Course I. General morphology and histology.

Lectures, demonstrations and laboratory work. The course includes the structure and manipulation of the microscope, the structure and properties of protoplasm; the cell, its structure; cell division and reproduction. A detailed study of the structure and life history of certain typical unicellular animal and plant forms, and of certain multicellular forms, leading to the consideration of the elements of structure in the vertebrata. A comparative study of the histology of the blood, of the epithelial, connective, muscular and nervous tissues and of the vascular and lymphatic systems. Lectures, etc., 2 hours a week. Laboratory work, 6 hours a week, 1st semester, 1st year.

PROFESSOR LEE, DR. W. S., AND M. L. NICKERSON.

Course II. Elements of embryology and histogenesis.

Lectures, demonstrations and laboratory work. A comparative study of reproduction; the ovum, the spermatozoon, fertilization, cleavage, formation of blastodermic layers, the formation of the embryo, foetal envelopes, etc., with practical work on chick, frog and mammalian embryos. The differentiation and histogenesis of the tissues, etc. Lectures, etc., 2 hours a week; laboratory work 6 hours a week, 2d semester, 1st year. Open to those who have completed course i.

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Course III. Advanced histology and embryology.

Lectures, demonstrations and laboratory work. Advanced methods of histological and embryological technique, with practical laboratory work. The comparative

study of the minute structure, origin and development of the various organs of the integumentary, alimentary, respiratory and uro-genital systems; the central and sympathetic nervous systems, the organs of special sense, etc. Lectures, etc., 2 hours a week; laboratory work, 3 hours a week. 1st and 2d semesters, 2d year. Open to those who have completed the courses of 1st year in histology and embryology.

PROFESSOR LEE, DR. W. S., AND M. L. NICKERSON.

Courses III and VIII in animal biology in the college of science, literature and the arts are accepted in lieu of first year histology and embryology in the department of medicine.

See statement of fees, page 17.

The following courses are open to properly qualified students and will consist of practical work in the laboratory, a prescribed course of reading, with reports of work, and of lectures and demonstrations to be given from time to time.

Course IV. Methods of microscopical work.

The preparation and use of the various solutions employed in fixing, hardening and staining; methods of embedding, sectioning, reconstruction, etc.

Course V. (a) Comparative histology and histogenesis of the tissues.

The animal cell, the epithelial, connective, muscular and nervous tissues, blood, etc.

(b) *Comparative histology and embryology of the viscera.* The epidermal, digestive, respiratory and uro-genital systems of organs.

(c) *Comparative histology and histogenesis of the nervous system and sense organs.* Central nervous system, etc., after the methods of Weigert, Golgi, etc.

Course VI. Comparative embryology of vertebrates.

A detailed study of the various stages in the development of vertebrate types, as acanthias, petromyzon, trout, amblystoma, frog, chick, rat, pig and human embryos.

Research work in histology and embryology.

Opportunity will be offered for those desiring to pursue original investigations.

ANATOMY.

The department of anatomy occupies rooms in medical hall. These include two large student's dissecting rooms, the general laboratories of anatomy, a bone laboratory for research work, the offices of the professor and demonstrator of anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

The bones of the human skeleton are furnished to the student for purposes of study and recitations from the specimen are conducted by the demonstrator of anatomy.

A series of lectures upon syndesmology follows, accompanied by recitations, which are illustrated by human preparations and by fresh and preserved sections of joints.

A course of descriptive lectures in myology is then given, with demonstrations upon the cadaver.

Lectures and a brief course of dissections of the abdominal and thoracic viscera of the lower animal complete the work of the first year in this branch.

In the second year, the student takes lectures, recitations and demonstrations of the vascular system, the alimentary canal, the respiratory tract, the genito-urinary system and the inguinal and perineal structures. He then pursues a course in regional anatomy, embracing a study of the surgical regions of the entire body; a course in the anatomy of the eye and ear and of the brain, spinal cord and ganglionic system, illustrated by fresh and permanent preparations, models and diagrams.

He dissects, during the year, the entire human body; recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the demonstrator of anatomy.

In the third year, the student takes up the study of the human body from a topographical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in the relations, structure and distribution of the nervous system.

Course I. Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; three hours each week, for 10 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, in sections, 2 hours each section, for 10 weeks, first semester. Required of all first year students.

Course II. Syndesmology.

Lectures, recitations and laboratory demonstrations. 3 hours each week, for 4 weeks, first semester. Open to those who have taken course i.

Course III. Myology.

Lectures and recitations, covering the entire muscular system of the human body, with supplementary study of comparative myology; 3 hours each week, 16 weeks. Laboratory work consists of identifying the muscles of the human body on dissected preparations and showing their actions. Class, in sections, 4 hours each week, for 5 weeks. Open to those who have taken course ii.

Course IV. Splanchnology.

Lectures on the thoracic, abdominal and pelvic viscera; 2 hours each week, for 10 weeks. Open to those who have taken course iii. Laboratory work, demonstrating and dissecting the thoracic, abdominal and pelvic organs of the human subject or of the dog or sheep.

Semi-weekly recitations upon the subjects of the first year's course, conducted in sections. PROFESSORS HENDRICKS AND ERDMANN.

Course V. Splanchnology.

Descriptive and topographical anatomy of the thoracic viscera, the alimentary and urino-genital organs. Lectures and recitations, 3 hours each week, for 10 weeks. Required of second year students.

Course VI. Descriptive and surgical anatomy.

Head, neck, trunk and extremities. Lectures and recitations, 3 hours each week, for 12 weeks. Open to those who have completed course v.

Course VII. The nervous system.

Cerebro-spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system; and the special sense organs. Lectures and recitations, 3 hours each week, for 8 weeks. Open to those who have completed course iv.

PROFESSOR HENDRICKS.

Course VIII. Dissecting.

The work extends over 2 periods of 6 weeks each, requiring 5 afternoons of each week. The method of work follows that laid down in Holden's Manual of Dissections.

PROFESSOR ERDMANN and DR. HACK.

The second year lecture and dissecting courses are open to those having completed the first year's work in anatomy and histology.

Weekly recitations upon the subjects of the second year's course, conducted in sections.

Course IX. Surgical anatomy.

The instruction consists of dissections, demonstrating the relations of structures composing the surgical regions of the body; demonstrations upon the living subject, showing the anatomical and surgical landmarks, and their applications; also the location, by surface tracings, of the viscera contained in the various cavities and of the important arteries, veins and nerves. 1 hour a week, second semester. Required of third year students.

PROFESSOR HENDRICKS and DR. ERDMANN.

Course X. Applied anatomy of the nervous system.

Elective.

Opportunity is afforded for advanced work in practical anatomy at any time during the college year.

PHYSIOLOGY.

The department of physiology occupies a suite of rooms in the laboratory of medical sciences, including the laboratory of experimental physiology, the laboratory of physiological chemistry and practical dietetics, a demonstration and recitation room, the laboratory library and the office of the professor in this branch. A large amphitheater, adapted to the demonstration of major experiments, immediately adjoins the physiological laboratories and is used, also, for lecture purposes by this and other chairs.

In the basement of the laboratory of medical sciences, the chair maintains large and well equipped animal-rooms, which are furnished with a large aquarium, frog tanks, animal enclosures and breeding cages. From this animal room are furnished supplies of material and animals for the work in experimental physiology, physiological chemistry, histology, embryology, pathology and bacteriology. The hygienic conditions of the room are studied carefully, with a view to maintaining the physiological and structural integrity of its animal occupants as perfectly as possible. Stock required for bacteriological purposes is removed and placed in an isolated department at a distance from this room.

The physiological laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, and with materials, glassware, digesters, water baths, ventilating hoods, etc., for the work in physiological chemistry. Their outfit includes sets of vivisection instruments, an artificial respiratory machine, batteries; Du Bois-Reymond coils, galvanometers, rheostats, moist muscle chambers, recording drums, Ludwig's kymograph, spring myograph, Burdon-Sanderson's stethometer, Dudgeon's sphymographs, Runnes' chronographs, Roy's tonometer, Gaskell's clamp, oncometers, hœmometers, hæmoglobino-meters, plethysmograph, etc., etc. They are furnished with motor power for the operation of recording apparatus and for the manufacture of apparatus in the laboratory workshop.

The course in physiology is graded in the first and second years. In the first year, the student hears lectures, recites and attends demonstrations in general physiology. These embrace the discussion and, so far as possible, the observation of the physiological ingredients of the animal body: the study of the physiology of cell-life, of the fundamental properties of the cell; of the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues, the connective tissues, and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, respiration and excretion.

In the second year, the work is made as practical as possible and includes the study of such advanced topics as metabolism, nutrition, dietetics, reproduction; the physiology of foetal life, of infancy, of maturity and of old age; and the functions of the brain, spinal cord and ganglionic system. Three hours each week, during the first semester, are occupied in laboratory work in physiological chemistry. This course affords the student a practical knowledge of the tissues and fluids of the body from a chemical standpoint. It embraces studies in the several classes of proteids, in fats, carbohydrates, bone, muscle, blood, milk, the digestive fluids, glycogen, etc.

A similar number of hours during the second semester are devoted to experimental physiology. For this work the class is divided into sections and the instruction is individualized so far as possible. The student is familiarized with physiological apparatus and its uses; with forms of electrical stimulation and with methods of experimentation; while his knowledge of physiological principles is strengthened by the observation of functional facts. The courses are illustrated by means of a series of charts, in oil and water colors, which picture the physiological anatomy, the mechanical relations and the biologic-chemical changes of the tissues.

In the fourth year, an optional course in practical dietetics is conducted during the first semester. It deals with the analysis of foods, with the general principles of food preparation and with the selection of a suitable dietary for the several periods of life.

A laboratory reference library is in process of collection, to which the advanced student will have access for collateral reading.

Course 1. General physiology.

Lectures, recitations and demonstrations, dealing with the physiological chemistry of the human body; the physiological properties of the cell; the nutritive media;

nervous mechanisms in general; the muscular tissues, the connective tissues and the epithelial tissues, as the structural bases of the animal body. Two hours a week, first semester, first year.

PROFESSOR BEARD.

Course II. Systemic physiology.

Lectures, recitations and demonstrations. This course includes the physiology of the vascular system; the digestive system; the respiratory system; the secretory and excretory systems. Four hours a week, second semester, first year. Open to those who have completed course i.

PROFESSOR BEARD.

Semi-weekly recitations upon the subjects of the first year are conducted in sections of the class.

Course III. Advanced physiology.

Lectures, recitations and demonstrations. This course includes the discussion of the phenomena of metabolism; of nutrition; of temperature production, regulation and loss; of reproduction; of the physiological changes incident to successive periods of life; and of the functions of the nervous system. Two hours a week, first semester; three hours a week, second semester, second year. Open to those who have completed the courses in physiology of the first year.

PROFESSOR BEARD.

Semi-weekly recitations upon the subjects of this course are conducted in sections of the class.

Course IV. Physiological chemistry and microscopy.

Laboratory work. A practical study of the several classes of proteids; of carbohydrates, fats, bone, muscle and blood; of gastric juice, saliva, pancreatic juice, and bile in their respective digestions; of milk; of glycogen; and extractives. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiological emulsions of fat; of the crystalline waste products; and of the physiological conditions of the blood-cells and the process of fibrin formation. Practical instruction is given during this course in the enumeration of the blood-cells, in the estimation of hemoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood and in the use of the polariscope. Nine hours a week, first semester, second year. This does not represent the actual number of hours of work done by each student, since during a part of the session, the class is divided into sections for practical exercises. Open to those who have completed courses i and ii.

PROFESSOR BEARD AND DR. WILCOX

Course V. Experimental physiology.

Laboratory work and demonstrations. A study of physiological apparatus, electrical stimuli and methods of experimentation; the demonstration of experiments which illustrate physiological function in the muscular, nervous, vascular, respiratory and glandular systems. Three hours a week, second semester, second year. Open to those who have completed course iv.

PROFESSOR BEARD AND DR. WILCOX.

Course VI. Practical dietetics. (Optional.)

Lectures and laboratory exercises. A study of food analysis, food preparation and of the general principles of food selection. Two hours a week, first semester, fourth year.

PROFESSOR BEARD AND DR. WILCOX.

Opportunity will be afforded, in the laboratories of physiology and physiological chemistry, for the pursuance of special courses of study, in both experimental and chemical physiology, under the direction of the chair.

Courses i and iv in animal biology in the college of science, literature and the arts will be accepted in lieu of first year physiology in the department of medicine.

See statement of fees, page 17.

CHEMISTRY.

The work in this subject is carried on in a building especially arranged for this work. The qualitative laboratory has a floor space of about 2300 square feet and accommodates 100 students at a time. It is used for instruction in general chemistry and analysis. It is well supplied with the usual apparatus. The quantitative laboratory has a floor space of about 1500 square feet, and accommodates 68 students at one time. It is used for instruction in the analysis of the urine, quantitative analysis and organic chemistry. The chemical lecture room is situated in Medical Hall.

Course I. General inorganic chemistry, including qualitative analysis. Lectures and recitations. 3 hours a week, first semester; 2 hours a week, second semester, first year. PROFESSOR BELL.

Laboratory work; qualitative analysis. 6 hours a week, first year, from October 15th to May 8th. PROFESSOR BELL AND MR. CAREL.

Course II. Analysis of urine and toxicology; chemistry of carbon compounds. Lectures and recitations. 1 hour a week, first semester; 2 hours a week, second semester, second year. PROFESSOR BELL.

Laboratory work; analysis of the urine. 6 hours a week, second year, from October 15th to January 1st. PROFESSOR BELL AND MR. CAREL.

Courses I, II and III in chemistry in the school of technical and applied chemistry are accepted in lieu of first year chemistry in the department of medicine.

See statement of fees, page 17.

MATERIA MEDICA AND THERAPEUTICS.

The work in materia medica and therapeutics is graded to cover a period of three years. It consists of lectures and recitations and of demonstrations conducted in the laboratory of materia medica. This laboratory is in medical hall. It is supplied with crude drugs and botanical specimens. Samples of these the student is allowed to retain for private study. Pharmaceutical preparations are also placed before him and he is taught the methods of their manufacture and their most eligible forms.

Course I. Pharmacology.

This course includes the study of the general characteristics of drugs and of their physiological actions. Lectures, recitations and laboratory work. 3 hours a week, second year. PROFESSOR BRACKEN.

Course II. Therapeutics.

In this course drugs are studied in groups, as governed by their physiological action, and the therapeutic features of such groups are described. Other remedial measures than those dependent upon drugs, such as hydro-therapy, serum-therapy, dietetics, etc., are fully considered. Lectures and recitations. 2 hours a week, third year. PROFESSOR BRACKEN.

Course III. Therapeutics, continued.

In this course the treatment of individual diseases is studied and the application of therapeutic agents to them is discussed. Clinical instruction in therapeutics, conducted at St. Barnabas and Asbury hospitals, is added to the work of the class-room. Lectures and clinics; two hours a week, fourth year. PROFESSOR BRACKEN.

PATHOLOGY AND BACTERIOLOGY.

The laboratories of pathology and bacteriology occupy spacious quarters in the laboratory of medical sciences. A general laboratory, 44x70 feet, is well lighted by windows on three sides and a part of the fourth. Electric light for microscopic and general illuminating

purposes is also provided. The arrangement is such that three students are grouped so as to have a sink, with gas, water and waste connection, and ample desk space next the windows. Six lockers, arranged beneath the table and on the walls, provide for apparatus, microscopes, etc., and are given at the beginning of the course to each student. Immediately behind and accessible to each student, are sterilizers, incubators, blow-pipes, etc. Cupboards, drawers, a large incubator, sinks, fume chambers, demonstration and distribution tables, complete the arrangement of the room.

Two private rooms of the demonstrators flank it on either side. Adjoining one of these are the department library and the office and private laboratory of the professor of pathology and bacteriology. Adjoining this is the private laboratory of the professor of surgical and clinical pathology. Specimens illustrative of surgical pathology are here prepared and diagnostic work done.

In the basement of the building, the department has store rooms and a room where pathological animals are housed. Here too are equipped laboratories for bacteriology and experimental pathology, as well as a room in which all the culture media are made.

In the third story, immediately above and of the same size as the large laboratory, is a museum for the storage and exhibition of pathological specimens, while a preparation room for their reception and assorting adjoins it.

The hospitals of Minneapolis and St. Paul afford a large supply of material and frequent opportunities for post-mortem examinations.

MICROSCOPES.

An adequate equipment of microscopes with attachments, immersion lenses, etc., permits of the rental of an instrument to each student, at a cost of \$2.00 per semester, whenever he is unprovided with one suitable for his purposes.

Course I. (a) Bacteriology.

Lectures and demonstrations. This subject will be treated not only from the aspect of pathology, but in its relation to hygiene and public health. The general scope of bacteriology, the classification of the various bacterial forms, the composition and manufacture of culture media, the methods of isolation and culture, the testing of various bactericidal materials, conditions, etc., will be studied until a thorough knowledge of technique is acquired, (so far as may be possible with non-pathogenic bacteria). The special study and comparison of the various pathogenic micro-organisms will then be systematically taken up. 2 hours per week, first semester, third year.

PROFESSOR WESBROOK AND DR. WILSON.

(b) Bacteriology. Laboratory work, teaching the general principles of and familiarization with the making of culture media, the methods of culture isolation and the microscopic examination of stained and living bacteria, the testing of various antiseptics, etc.

The student will then be required to grow in the various media, for macroscopic and microscopic examination, all the important pathogenic bacteria, such as the pyogenic bacteria, B. anthracis, B. typhi abdominalis, B. coli commune, Vibrio cholerae, B. diptheriae, B. tuberculosis, etc. Materials and tissues from men and animals, containing these and other bacteria, will be provided for diagnosis, and the isolation of the bacteria in pure culture, where practicable. Parallel study of micro-organisms which might be mistaken for these, will also be pursued. Bacteriological diagnosis, in its relation to clinical diagnosis and public health, will be especially dwelt upon. Nine hours a week, for the first twelve weeks of the first semester, third year.

PROFESSOR WESBROOK, DR. WILSON AND DR. WHITE.

Course II. (a) General pathology.

Lectures, demonstrations and laboratory work on the general processes involved in disease. Bacteriology and its etiological relation is taught concurrently (see above). The general considerations of tumors will be omitted, since it is fully dealt with in the course on surgical pathology and special pathology.

- (b) *General pathology* 2 hours a week, first semester, third year.

Laboratory work, particularly on the history of inflammation, (largely experimental) degenerations, etc. Nine hours a week for four weeks at the end of first semester, third year. PROFESSOR WESBROOK, DR. WILSON AND DR. WHITE.

Course III (a) Special pathology.

Lectures and demonstrations. The special study of the pathological processes occurring in the blood, vascular and lymphatic systems, lungs, liver, kidneys, alimentary canal, etc., will be taught by the demonstrations of fresh tissues and preserved specimens from the pathological museum. Three hours a week, second semester, third year. PROFESSOR WESBROOK AND DR. WHITE.

- (b) *Special pathology.* Practical laboratory work, in which the students will be required to mount and examine under the microscope selected, fresh and stained specimens of morbid tissues, fluids, etc. The microscopic and chemical study of such materials as pathological blood, sputum, urine, contents of alimentary canal, etc., and the application of laboratory methods to clinical diagnosis will form an important part of this work, and will be taken up at the completion of the study of the morbid condition in each organ or system. The animal parasites will also receive attention. The histology of the various tumors will be fully given and students will be provided with specimens for staining, remounting and examination. Nine hours a week, second semester, third year.

PROFESSOR WESBROOK, DR. WILSON, DR. HEAD AND DR. WHITE.

- (c) *Special pathology.* Autopsies and post-mortem technique. Students will have an opportunity of personally taking part in this work, under the direction of the pathologist in charge, in the hospitals of Minneapolis and St. Paul. A knowledge of the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.

PROFESSOR STEWART AND DR. ROTHROCK.

Course IV, Surgical pathology.

(See principles of surgery). This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological bases of surgery. The lectures will be illustrated by charts and diagrams, by fresh and preserved specimens, and, so far as practicable, demonstrations will be given of the various processes and of the bacteria concerned. Especial attention will be given to inflammation and its complications, to the infectious diseases of surgical importance and to tumors. 2 hours a week, first semester, third year, and 3 hours a week, second semester, fourth year. PROFESSOR STEWART.

HYGIENE.

This course is optional and consists of lectures and recitations upon personal, domestic and public hygiene. It includes the study of the hygienic conditions of the earth, air and water, and of the cause of their contamination. It treats of food stuffs and their adulterations. It deals, especially, with the relations of the subject to bacteriology. 2 hours a week for 8 weeks, first semester, third year.

PROFESSOR FULTON.

PRACTICE OF MEDICINE.

The course in the principles and practice of medicine is graded in the third and fourth years. Examinations are held at the close of each of these years. The lectures and recitations are conducted by several members of the teaching staff and the dispensary and bedside clinics by a large corps of instructors.

- Course I, Infectious diseases* and the phenomena of infection; parasites; intoxicants; ptomaines. Lectures and recitations. 1 hour a week, third year.

PROFESSOR HUNTER.

Course II. Local diseases; nutritive disorders; the abdominal and thoracic viscera in disease. Lectures and recitations. 1 hour a week, third year.

PROFESSOR E. J. ABBOTT.

Course III. Contagious and infectious diseases; nutritive results of infection; the relations of temperament and diathesis; the laws of heredity; medical statistics; the principles of nursing. Lectures and recitations. One hour a week, fourth year.

PROFESSOR HUNTER.

Course IV. Diseases of nutrition, in general and in detail, including diabetes, rheumatism, gout, scurvy, lithæmia, Graves' and Hodgkins' diseases, etc. Lectures and recitations. One hour a week, fourth year.

PROFESSOR SENKLER.

Course V. Local diseases, continued; heart anomalies; disorders incident to injuries; the maladies of old age, etc. Lectures and recitations. One hour a week, first semester, fourth year.

PROFESSOR E. J. ABBOTT.

Course VI. Case-taking and examinations for life insurance. (*optional*). Lectures and recitations. Two hours a week, for ten weeks, second semester, fourth year.

PROFESSOR GREENE.

Course VII. Clinical exercises in general medicine, consisting of clinical instruction to sections of the third and fourth year classes, in the dispensaries, by the bedside and in the amphitheatres of the several hospitals of St. Paul and Minneapolis, as follows:

- (a) City Hospital, Minneapolis, two hours a week, both years. Professors J. W. Bell and H. L. Staples and C. Nothnagel.
- (b) St. Barnabas Hospital, Minneapolis, two hours a week, both years. Professors C. H. Hunter and H. M. Bracken and Dr. Geo. D. Head.
- (c) Asbury Hospital, Minneapolis, two hours a week, second semester, both years. Professors J. W. Bell and C. Nothnagel.
- (d) City and County Hospital, St. Paul; St. Joseph's Hospital and St. Luke's Hospital, St. Paul, three hours a week, both years. Professors A. E. Senkler and E. J. Abbott.
- (e) City and County Hospital, St. Paul, two hours a week, both years. Professor C. L. Greene.
- (f) Free Dispensary, St. Paul, two hours a week, both years. Professors C. L. Greene and Dr. George Senkler.
- (g) University Free Dispensary, Minneapolis, four hours a week, both years. Professors H. L. Staples, Dr. L. A. Nippert and Dr. R. E. Cutts.

PHYSICAL DIAGNOSIS.

Course I. The thorax: its topography, methods of examination, applied to the normal and abnormal chest; diseases of the respiratory organs; their physical signs and differential diagnosis.

PROFESSOR J. W. BELL.

Course II. The præcordial region: its topography, methods of examination, applied to the normal and abnormal heart; diseases of circulatory organs; their physical signs and differential diagnosis.

PROFESSOR J. W. BELL.

Course III. The abdomen; its topography; methods of examination under normal and abnormal conditions; diseases of this region; their physical signs and differential diagnosis. Lectures and recitations. One hour a week, third year.

PROFESSOR J. W. BELL.

Course IV. Clinical physical diagnosis.

Practical clinical instructions given to small sections of the classes. For this purpose the clinical material of the several hospitals and dispensaries in Minneapolis is utilized. 3 hours a week, third year.

PROFESSOR NOTHNAGEL.

Course V. Clinical physical diagnosis.

Practical clinical instruction given to small sections of the classes. For this purpose the clinical material of the several hospitals and dispensaries in Minneapolis is utilized. 2 hours a week, both semesters, fourth year. PROFESSOR J. W. BELL.

Course VI. Clinical physical diagnosis, continued.

The clinical material of the hospitals and dispensaries of the city of St. Paul is utilized in the form of clinics. 2 hours a week, both semesters, fourth year.

PROFESSOR GREENE AND DR. G. E. SENKLER.

SURGERY.

The course in surgery is graded in the third and fourth years. Examinations are held at the close of each of these years. Lectures and recitations are given by the teaching staff in surgery and clinics at the dispensaries and hospitals of Minneapolis and St. Paul by a large corps of instructors.

Course I. The principles of surgery.

Inflammation; traumatic fevers; suppurations; acute osteomyelitis, acute inflammations of joints; ulceration and fistula; gangrene; thrombosis and embolism; septicæmia; pyæmia; erysipelas; tetanus; tuberculosis in general. Lectures and recitations, 2 hours a week, first semester, third year. PROFESSOR STEWART.

Course II. Operative surgery.

Lectures upon the principles of operative procedures; the preparation of patient, operator and operating rooms; the principles of a sepsis, antisepsis and sterilization; anæsthesia and anæsthetics; hæmostasis; ligatures and sutures; dressings; bandages, and the treatment of wounds. 1 hour a week, first semester, third year. PROFESSOR DUNSMOOR.

Course III. The practice of surgery.

Fractures and dislocations; injuries of joints; injuries and surgical diseases of the skin; of the lymphatics, bloodvessels and nerves; of the tendons, fasciæ and bursæ; of the face, mouth, tongue, jaws, excepting the study of tumors and plastic surgery. Lectures and recitations. 2 hours a week, second semester, third year.

PROFESSOR DUNN.

Course IV. Practice of surgery.

Surgery of the head, neck, chest, back, breast, abdomen, including hernia, anus and rectum. Lectures and recitations. 2 hours a week, first semester, fourth year.

PROFESSOR DUNN.

Course V. Operative surgery.

Laboratory work, consisting of operations performed by sections of the class, under the supervision of the instructors, upon the cadaver and upon animals. 3 hours a week, first half of first semester, fourth year.

PROFESSOR DUNSMOOR AND DR. LITTLE.

Course VI. Orthopedic surgery: including diseases of bones, joints, synovia and bursæ, congenital and acquired deformities; dystrophies, with the principles of treatment. Lectures and recitations. 2 hours a week, eight weeks, first semester, fourth year.

PROFESSOR GILLETTE.

Course VII. Surgical Pathology.

Special tuberculosis; tumors: actinomycosis, anthrax; glanders; review of acute osteomyelitis and inflammation of joints; surgical diseases of the bones. Lectures and recitations. 2 hours a week, second semester, fourth year.

PROFESSOR STEWART.

Course VIII. Genito-urinary system; including diseases and injuries of the genito-urinary tract and principles of treatment. Lectures and recitations. 2 hours a week for 8 weeks, second semester, fourth year.

PROFESSOR DUNN.

Course IX. Bandaging and dressings.

A practical course of instruction, by means of demonstrations and drill, under the supervision of the chair of operative surgery. 2 hours a week for 8 weeks, first semester, fourth year.

PROFESSOR DUNSMOOR AND DR. LITTLE

Course X. Clinical surgery.

Courses of clinics at which operations, in the whole domain of surgery, are witnessed by the students of the third and fourth years. These clinics are held in the dispensaries and hospitals of the cities of Minneapolis and St. Paul upon Wednesdays and Saturdays throughout the year. The classes alternate at the two cities in their attendance upon these clinics. They are conducted as follows:

At the City and County Hospital, St. Joseph's Hospital, or St. Luke's Hospital, in St. Paul, weekly, by Professor C. A. Wheaton.

At the City and County Hospital, St. Joseph's Hospital, St. Luke's Hospital, or Free Dispensary, at St. Paul, with sections of the class, weekly, by Dr. John T. Rogers, Dr. G. M. Coon and Professor A. J. Gillette.

At the City and County Hospital, or at St. Joseph's Hospital, or at St. Luke's Hospital, St. Paul, weekly, by Professor Justus Ohage.

At the Asbury Hospital, or the City Hospital, Minneapolis, weekly, by Professor F. A. Dunsmoor.

At St. Mary's Hospital, or Asbury Hospital, Minneapolis, weekly, by Professor J. H. Dunn.

At St. Barnabas' Hospital, or the City Hospital, Minneapolis, weekly, by Professor J. E. Moore.

OBSTETRICS.

The subject of obstetrics is taught by lectures, recitations and demonstrations upon the manikin; by illustrative drawings and by attendance upon cases of labor. The didactic work is done in the third year; the clinical study is had in the fourth year. The entire obstetric service of the City Hospital in St. Paul and a large part of the service of the Minneapolis City Hospital is at the disposal of the chair of obstetrics.

Course I. The anatomy and physiology of the pelvic organs; the development of the embryo and appendages; pregnancy; symptoms and diseases; abortion. Lectures and recitations. 2 hours a week until January 1st, third year.

PROFESSOR CATES.

Course II. The theory and practice of obstetrics.

The mechanism and conduct of normal labor; operative obstetrics; the complications of labor and its sequelae. Lectures and recitations. 2 hours a week, after January 1st, third year.

PROFESSOR RITCHIE.

Course III. Course of demonstrations, by charts and upon the manikin, associated with the course lectures.

Course IV. Clinical obstetrics.

The study of and participation in one or more deliveries, in the fourth year, under the personal direction of Professors Ritchie and Cates, Dr. H. W. Davis and Dr. R. E. Cutts.

GYNECOLOGY.

The course in the diseases of women consists of lectures, recitations, clinical instruction and the witness of operations, upon the human subject, as they may offer.

Course I. Lectures and Recitations.

Two hours a week, second semester, third year. PROFESSORS STONE AND McLAREN.

Course II. Clinical course.

Observations and examinations of patients, methods of examination, diagnosis and treatment. Two operations at least, weekly, at which the student is required to assist.
 PROFESSORS A. W. ABBOTT AND A. McLAREN.

OPHTHALMOLOGY AND OTOTOLOGY.

Course I. Diseases of the eye and its appendages.

Lectures and recitations. One hour a week, sixteen weeks, fourth year.

PROFESSOR TODD.

Course II. Refraction and its errors. Diseases of the ear.

Lectures and recitations. One hour a week, sixteen weeks, fourth year.

PROFESSOR FULTON.

Course III. Clinical lectures will be given and operations performed at St. Joseph's Hospital, St. Paul, every Saturday. Fourth year.

Clinical lectures will be given every Wednesday at the St. Paul City Hospital during the months of January, February and March, and occasionally clinics will be given at St. Luke's Hospital. Fourth year.

PROFESSOR FULTON.

Course IV. Clinical lectures will be given and operations performed at Asbury Hospital, Minneapolis, every Wednesday. Fourth year.

Clinics will be given at the Minneapolis City Hospital occasionally during October, November, December, April and May. Fourth year.

PROFESSOR TODD.

Course V. Clinical instruction will be given at the University Free Dispensary in the diagnosis of diseases of the eye and ear; in the methods of examination; in the use of instruments and in the application of remedies, etc. Fourth year.

PROFESSORS FULTON AND TODD.

Other free dispensaries in St. Paul and Minneapolis are open daily in this branch, where students have the privilege of attendance.

NERVOUS AND MENTAL DISEASES.

The required course of lectures and recitations upon nervous and mental diseases will be given in the fourth year. A supplementary course will be given at the option of the student. Clinical instruction in this branch will be afforded in the fourth year. The lectures will be illustrated by charts, microscopical sections and fresh specimens.

Course I. The embryology, anatomy, histology and physiology of the nervous system; localization of functions.

Lectures, recitations and demonstrations. 2 hours a week, 7 weeks, fourth year.

PROFESSOR JONES.

Course II. Electro-physiology, electro-diagnosis, electro-therapeutics, diseases of the brain and cord. Peripheral and junctional neuroses, psychiatry.

Lectures, recitations and demonstrations. 2 hours a week, 10 weeks, fourth year.

PROFESSOR RIGGS.

Course III. Clinical Neurology.

(Optional.) 1 hour weekly, first semester, fourth year.

PROFESSOR JONES.

Course IV. Demonstrations in histology and pathology of the central nervous system.

Lectures, illustrated with stereopticon and microscopic slides. (Optional.) 1 hour weekly, second semester, fourth year.

PROFESSOR RIGGS.

Course VI. Clinical course.

Practical instruction will be given upon Wednesdays and Saturdays, fourth year.

Clinics will be conducted in St. Paul by Professor Riggs, at the City and County Hospital, St. Luke's Hospital, St. Joseph's Hospital and the Free Dispensary; and at Minneapolis, by Professor Jones, at the City Hospital, Asbury Hospital, St. Mary's Hospital and the University Free Dispensary.

DISEASES OF THE SKIN.

This subject is taught by lectures, recitations and clinical demonstrations.

Course I. The anatomy and physiology of the skin. Diseases of the skin and its appendages; venereal diseases. 2 hours a week, second semester, fourth year.

PROFESSOR VANDER HORCK.

Course II. Clinical lectures, in connection with the dispensaries and hospitals of Minneapolis and St. Paul. Weekly in the fourth year.

PROFESSORS VANDER HORCK AND BURNSIDE FOSTER.

DISEASES OF THE NOSE AND THROAT.

Course I. Anatomy and physiology of the nose and throat; pathology, diagnosis and treatment.

Lectures and recitations. 2 hours a week, eight weeks, fourth year.

PROFESSOR LATON.

Course II. Clinical instruction, given at the University Free Dispensary, in the diagnosis of diseases of the nose and throat; in the methods of examination; in the use of instruments, and in the application of remedies, etc. 5 hours a week, both semesters, fourth year.

PROFESSOR LATON.

Course III. Clinical instruction, given at the St. Paul Free Dispensary, in the diagnosis of diseases of the nose and throat; in the methods of examination; in the practical use of instruments and application of remedies; and in the applied anatomy of the nose and throat, illustrated by dry and wet preparations. 2 hours a week.

PROFESSOR SCHADLE.

DISEASES OF CHILDREN.

Lectures upon the diseases of infancy and childhood will be included in the courses on practice of medicine. Clinical instruction will be given in this branch in the hospitals and dispensaries of Minneapolis and St. Paul by Professor Sweetser and Dr. Christison.

MEDICAL JURISPRUDENCE.

A course of lectures and recitations, in the legal relations of medicine. 2 hours per week for eight weeks, fourth year.

PROFESSOR SWEENEY.

THE HISTORY OF MEDICINE.

An optional course of lectures is given in the history of medicine and of the medical profession from the earliest times, including accounts of the epoch-making discoveries in medicine and brief sketches of the lives of eminent physicians and an account of the great plagues of history. Two hours a week, for eight weeks, fourth year.

PROFESSOR BURNSIDE FOSTER.

TEXT-BOOKS AND COLLATERAL READING.

The following text-books are preferred by the faculty. Reference works are suggested, also, for collateral reading:

Medical Dictionaries.

Gould's Medical Dictionary.

Dunglison's Medical Dictionary.

Duane's Medical Dictionary.

Histology.

First year—

Wilson's The Cell.
 Piersol's Histology.
 Stöhrs Histology.
 Quain's Anatomy, 10th Ed. Vol. I, Pt. II.
 Schäfer's Histology.
 Parker's Biology.

Second year—

Piersol's Histology.
 Quain's Anatomy, Vol. III, Pts. I, III and IV.
 Collateral reading—Kölliker's Gewebelehre Pts. I and II; Duval's Précis d' Histologie; Ranvier's Traite d' Histologie; Böhm u Davidoff's Histologie; Behren's Kossel u Schiefferdecker's Gewebelehre; Klein's Histology; O. Hertwig's The Cell; Lee's Microtomist's Vade Mecum; Stirling's Practical Histology; Willey's Amphioxus, etc.; Thomson's Zoölogy; Huxley & Martin's Biology; Davenport's Experimental Morphology.

Embryology.

Minot's Embryology.
 Hertwig-Mark's Embryology.
 Marshall's Vertebrate Embryology.
 Collateral reading—Kölliker's Entwicklungsgeschichte; Prenant's Embryologie; Schenk's Embryologie; O. Schultze's Embryologie.

Anatomy.

First year—

Quain's Anatomy, 10th edition, Vol. II, Pts. I and II.
 Gray's Descriptive and Surgical Anatomy.

Second and third years—

Quain's Anatomy, 10th edition.
 Morris' Text-Book of Anatomy.
 Gray's Anatomy.
 Holden's Practical Anatomy.
 Hayne's Manual of Anatomy.
 Owen's Manual of Anatomy.
 Holden's Manual of Dissections.
 Treve's Applied Anatomy.
 Collateral reading—Flower's Osteology of Mammals; Gegenbauer's Elements of Comparative Anatomy; Chauveau's Comparative Anatomy; McClellan's Regional Anatomy; Ranney's Applied Anatomy of the Nervous System; Meynert's Psychiatry, Part I: anatomy, physiology and chemistry of the brain.

Physiology.

First and second years—

Foster's Physiology, sixth edition.
 Howell's American Text-Book of Physiology.
 Stirling's Practical Physiology.
 Burdon-Sanderson's Handbook of Physiological Laboratory.
 Waller's Human Physiology.
 Collateral reading—Landois and Stirling's Handbook of Physiology; Chapman's Physiology; Stewart's Practical Physiology; Yeo's Physiology, Martin's Human Body.

Chemistry.

Second year—

Tyson's Examination of Urine.
 Reese's Toxicology.

Materia medica and therapeutics.

Bracken's Outlines of Materia Medica and Pharmacology.

Collateral reading—The Pharmacopeia of the U. S.; The National Dispensatory; Sayre's Organic Materia Medica and Pharmacognosy; Culbreth's Materia Medica and Pharmacology; Foster's Practical Therapeutics; Hare's System of Practical Therapeutics; Allen's Handbook of Local Therapeutics; Thompson's Practical Dietetics.

Pathology.

Ziegler's General and Special Pathology.

Coats' Manual of Pathology.

Stangel's Text-book of Pathology.

Mallory and Wright's Pathological Technique.

Collateral reading—Hamilton's Text-book of Pathology; Delafield and Prudden's Handbook of Pathological Anatomy and Histology; Woodhead's Practical Pathology; von Kahlden's Pathological Histology; Thoma's Text-book of General Pathology; Lubarsch Ostertag, "Ergebnisse der Pathologie u Anatomie," Orth "Pathologische Anatomie;" Birch-Hirschfeld, "Pathologische Anatomie;" Clifford Albutt's System of Medicine, Vol. I; Leuckhart's "die Thierische Parasiten des Menschen."

Surgical pathology.

Tillman's Principles of Surgery and Surgical Pathology.

Collateral reading—Park's Surgery, Vol. I; Warren's Surgical Pathology; Senn's on Tumors; Bowlby's Surgical Pathology; Tillman's Principles of Surgery and Surgical Pathology; Watson Cheyne's Tuberculosis of Bones and Joints.

Clinical microscopy.

Von Jaksch's Clinical Diagnosis.

Simon's Clinical Diagnosis.

Cabot's Clinical Examination of the Blood.

Collateral reading—Lenhartz "Mikroskopie u Chemie am Krankenbett;" von Limbeck "Klinische Pathologie der Blutes."

Bacteriology.

Muir and Ritchie's Manual of Bacteriology.

Abbott's Principles of Bacteriology.

Collateral reading—Sternberg's Manual of Bacteriology; Fraenkel's Bacteriology; Woodhead's Bacteria and their Products; Duffloq "Lecons sur les Bacteries Pathogenes;" Flügge "die Mikroorganismen;" Lehmann and Neumann "Atlas u Grundriss d. Bakteriologie u Lehrbuch d. spec. Bakteriologie. Diagnosuk;" Migula "System der Bakterien."

Practice of Medicine.

Osler's Practice of Medicine.

Hilton Fagge's Practice of Medicine.

Wood and Fitz's Practice of Medicine.

Collateral reading—Flint's Practice of Medicine; Pepper's System of Medicine; Allbutt's System of Medicine; Eichhorst's Internal Medicine.

Physical Diagnosis.

Page's Physical Diagnosis.

Flint's Auscultation and Percussion.

Musser's Medical Diagnosis.

Vierordt's Medical Diagnosis.

Collateral reading—Bramwell's Heart and Thoracic Aorta; Fox on the Lungs; Sansom's Heart and Aorta.

Surgery.

Park's Surgery.

Tillman's Principles of Surgery and Surgical Pathology.

Warren's Surgical Pathology and Therapeutics.

Senn's Principles of Surgery.
 Moulin's American Text Book of Surgery.
 Jacobson's or Zuckerkandl's Operative Surgery.
 Robert's Modern Surgery.
 Wharton and Curtiss, Practice of Surgery.

Collateral reading—Ashurst's Encyclopædia of Surgery; Agnew's Practice of Surgery;
 Dennis' Practice of Surgery; Stimson's Fractures and Dislocations.

Genito-urinary Diseases.

Thompson's Diseases of Urinary Organs.

Collateral reading—Van Buren and Keys' Venereal Diseases; Bumstead and Taylor's Venereal Diseases.

Orthopædia.

Moore's Orthopædic Surgery.
 Bradford's and Lovett's Orthopædic Surgery.

Obstetrics.

Lusk, Hirst, Grandin and Jarman, Jewett, and Playfair.

Gynecology.

Pozzi's Gynecology.
 Garrigue's Diseases of Women.
 Byford's Diseases of Women.

Collateral reading—American System of Gynecology; Emmett's Diseases of Women;
 Keating and Coe's Gynecology.

Ophthalmology and Otology.

American Text Book of Diseases of the Eye, Ear, Nose and Throat.
 Noyes' Diseases of the Eye.
 Swanzy's Diseases of the Eye.
 Dench's Diseases of the Ear.
 Politzer's Diseases of the Ear.

Collateral reading—Berry's Diseases of the Eye; Fuch's Diseases of the Eye; Dench's Diseases of the Ear; Howell's Diseases of the Ear and Naso-Pharynx; Norris and Oliver's Ophthalmology.

Nervous and mental diseases.

Edinger's Anatomy of Central Nervous System.
 Gray's Nervous and Mental Diseases.
 Gower's Nervous Diseases.
 Bramwell's Diseases of the Spinal Cord.
 Savage's Insanity.
 Biglow's System of Electro-therapeutics.

Collateral reading—Hack Tuke's Dictionary of Psychological Medicine; Clouston's Lectures on Mental Diseases; Bevan Lewis' Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localizations of Cerebral Diseases; Strumpell's Text-book of Medicine; Hirt's Diseases of the Nervous System; Horsley's Brain and Spinal Cord; Ross' Diseases of the Nervous System; Collins' Aphasia.

Diseases of children.

J. Lewis Smith's Diseases of Children.
 Holt's Diseases of Children
 American Text-book of Diseases of Children.
 Collateral reading—Cyclopedia of Diseases of Children.

Diseases of skin.

Hyde's Diseases of the Skin.
Jackson's Diseases of the Skin.
Taylor's Venereal Diseases.
Collateral reading—Crocker's Diseases of Skin; Morris' Diseases of the Skin; Hayden's Diseases of the Skin.

Diseases of the nose and throat.

Bosworth's Diseases of the Nose and Throat.
Ingall's Diseases of the Nose, Throat and Lungs.
Sajous' Diseases of the Nose and Throat.

Hygiene.

Coplin and Bevan's Practical Hygiene.
Park's Hygiene.
Collateral reading—Richardson's Preventative Medicine; Buck's Hygiene and Public Health.

Medical jurisprudence.

Taylor's Medical Jurisprudence.
Collateral reading—Hamilton's American System of Legal Medicine; Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence.

DEGREES.

The degree of doctor of medicine is conferred by the Board of Regents upon students who are recommended, by vote of the faculty, for graduation. Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.
- (3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college.
- (4) Four full collegiate years spent in the study of medicine; the fourth year, at least in this University and the remainder in this or other recognized colleges of medicine.
- (5) Satisfactory examinations passed in all branches in accordance with the foregoing rules.

DISPENSARY AND HOSPITAL CLINICS.

DISPENSARIES.

The University free dispensary is to be located in the new clinical building. Several rooms are to be devoted to the reception of patients and to their examination and treatment. Its service is a growing one and is utilized for the teaching of the classes of the third and fourth years. The faculty and a corps of assistants manage the dispensary. Dispensaries at Asbury Hospital and St. Barnabas' Hospital are also open to the students of the University. They are largely attended by members of the faculty.

The St. Paul Free Dispensary is centrally situated and offers its clinics to the students of this college. It owns the building formerly used by the

St. Paul Medical College—a twenty-room building, which has been equipped for its occupancy. It centralizes the clinical opportunities of St. Paul and its staff is, similarly, made up largely of faculty members.

HOSPITALS.

The hospitals of the cities of Minneapolis and St. Paul have very generously opened their doors to the students of this department. Saturday and Wednesday mornings and afternoons, throughout the year, are devoted to the use of these clinical opportunities by the junior and senior classes. These classes alternate weekly between the two cities upon the days mentioned.

THE CITY HOSPITAL, of Minneapolis, occupies spacious buildings and affords a large mass of clinical material which members of the faculty upon its staff are permitted to utilize during their terms of service.

ST. MARY'S HOSPITAL has a staff upon which this faculty is represented by four members. Its management has seconded the efforts of the staff to make the hospital useful to medical students by providing an amphitheatre of modern construction, in which seventy-five spectators can be accommodated. The hospital also opens its wards for the bedside study of disease. Surgical and medical clinics are held here upon the weekly clinic days.

ST. BARNABAS' HOSPITAL has also generously equipped an amphitheatre, within which a class of fifty students can be gathered. Bedside instruction is given freely in its wards to the students of this college. Clinics are usually conducted in this amphitheatre on Saturdays. Its staff, also, numbers upon it six members of this faculty.

ASBURY METHODIST HOSPITAL offers its clinical opportunities to the college. Wednesday and Saturday clinics are held in its wards and amphitheatre. Its service is, in part, manned by faculty members.

THE CITY AND COUNTY HOSPITAL, of St. Paul, occupies a large building, of modern construction and generously equipped with clinical conveniences. Its management has spared neither efforts nor means to make it a model of its class. It contains a large amphitheatre for teaching purposes. It enters some two thousand patients annually, a large proportion of whom are of the emergency order or suffer from acute forms of disease. This college is represented upon its staff by a majority of the members.

ST. JOSEPH'S HOSPITAL has always contributed generously to the clinical advantages of the University. It contains a spacious amphitheatre, built and equipped for the students of this college. It has faculty members upon its staff who conduct weekly clinics in the hospital. Its service is large, its capacity being upwards of one hundred beds.

ST. LUKE'S HOSPITAL possesses all the most desirable features of modern hospital architecture and has a large clinical service. It is furnished with an amphitheatre for the benefit of students and has a thoroughly equipped operating room, in which clinics are frequently conducted.

SCHEDULE OF CLINICS—MINNEAPOLIS.

FIRST SEMESTER.

SATURDAY.

9-11..	Surgery.....	Prof. Dunsmoor.....	¼ Class	Asb. and St. Mary's Hosp.
9-11..	".....	Prof. Dunn.....	"	City Hospital.
11-12..	".....	Prof. Moore.....	Class..	St. Barnabas Hospital.

NOON RECESS.

1-2:30	Medicine.....	Prof. Staples.....	Section	City Hospital.
1-2:30	".....	Prof. Hunter.....	"	St. Barnabas Hospital.
2:30-4	".....	Dr. Head.....	Class..	"
4-6...	Autopsies.....	Prof. Stewart.....	Section	.....

WEDNESDAY

9-11..	Physical Diagnosis....	Prof. Bell, Dr. Nothnagel..	Section	City Hospital.
9-11..	Gynecology.....	Prof. Abbott.....	"	St. Barnabas Hospital.
9-11..	Surgery.....	Prof. Dunsmoor.....	Class..	Asb. and St. Mary's Hosp.
11-12..	Ophthalmol and Otol..	Prof. Todd.....	Class..	Asbury Hospital.

NOON RECESS.

1-2...	Laryngology.....	Prof. Laton.....	Section	University Dispensary.
1-2...	Medicine.....	Dr. Nothnagel.....	"	"
1-2...	Gynecology.....	Dr. Benjamin.....	"	"
1-2...	Surgery.....	Dr. Wright.....	"	"
2-3...	Mental & Nerv. Dis..	Prof. Jones.....	Class..	Medical Hall.
3-4...	Dermatology.....	Prof. Vander Horck.....	"	"
4-6...	Autopsies.....	Prof. Stewart.....	Section	.....

SECOND SEMESTER.

SATURDAY.

9-11..	Surgery.....	Prof. Dunsmoor.....	¼ Class	Asb. and St. Mary's Hosp.
9-11..	".....	Prof. Dunn.....	"	City Hospital.
11-12..	".....	Prof. Moore.....	Class..	St. Barnabas Hospital.

NOON RECESS.

1-2:30	Medicine.....	Prof. Staples.....	Section	City Hospital.
1-2:30	".....	Prof. Hunter.....	Class..	St. Barnabas Hospital.
2:30-4	".....	Dr. Head.....	Class..	"
4-6...	Autopsies.....	Prof. Stewart.....	Section	.....

WEDNESDAY.

9-11..	Physical Diagnosis....	Prof. Bell, Dr. Nothnagel..	Section	City Hospital.
9-11..	Gynecology.....	Prof. Abbott.....	"	St. Barnabas Hospital.
9-11..	Surgery.....	Prof. Dunsmoor.....	"	Asbury and City Hosp.
11-12..	Ophthalmol. and Otol.	Prof. Todd.....	Class..	Asbury Hospital.

NOON RECESS.

1-2...	Laryngology.....	Prof. Laton.....	Section	University Dispensary.
1-2...	Medicine.....	Dr. Nothnagel.....	"	"
1-2...	Gynecology.....	Dr. Benjamin.....	"	"
1-2...	Surgery.....	Dr. Wright.....	"	"
2-3...	Dermatology.....	Prof. Vander Horck.....	Class..	Medical Hall,
3-4...	Mental & Nerv. Dis..	Prof. Jones.....	"	"
4-6...	Autopsies.....	Prof. Stewart.....	Section	.....

Obstetrical Clinics throughout the year, Prof. Cates, City Hospital and Outpatient Department.

University Dispensary open daily at 1 p. m. to Seniors.

SCHEDULE OF CLINICS—ST. PAUL.

FIRST SEMESTER.

SATURDAY.

8:30-9:30	Nervous Diseases.....	Prof. Riggs	Class..	Disp. or City Hospital.
9:45-12:	Surgery.....	Prof. Wheaton	"	St. Jos. or St. Luke's.

NOON RECESS.

1:00-2:00	Eye and Ear.....	Prof. Fulton	Section	St. Joseph's Hospital.
1:00-2:00	Nose and Throat.....	Prof. Schadle	"	Dispensary.
1:00-2:00	Physical Diagnosis.....	Dr. Geo. Senkler	"	"
1:00-2:00	Nervous Diseases.....	Dr. Dunning	"	"
1:30-2:15	Ward Visit.....	Prof. Greene	"	City Hospital.
2:15-3:00	Medicine	Prof. Greene	Class..	"
3:00-4:00	"	Prof. Abbott or Prof. Senkler.....	Class..	City Hospital.
4:00-5:00	Autopsies	Dr. Rothrock.....	Section	"

WEDNESDAY.

9 to 10 a. m.	Physical Diag.....	Prof. Green	Class..	City Hospital.
altern. { 10:00-	Gynecology	Prof. MacLaren.....	"	"
weeks. { 12:30	Surgery	Prof. Ohage.....	"	"

NOON RECESS.

1:30-2:30	Orthopædia.....	Prof. Gillette.....	Section	Disp. or City Hospital.
1:30-2:30	Skin and Venereal.....	Prof. Foster.....	"	Dispensary.
1:30-2:30	Physical Diagnosis.....	Dr. Geo. Senkler	"	"
2:00-3:00	Ward Visit.....	Prof. Green.....	"	City Hospital.
2:00-3:00	"	{ Prof. Abbott or Prof. Senkler.....	Class..	"
3:00-4:00	Medicine.....			"
4:00-5:00	Autopsies by Dr. Rothrock, City Hospital.			

SECOND SEMESTER.

SATURDAY.

8:30-9:30	Nervous Diseases.....	Prof. Riggs	Class..	City Hosp. or Dispen.
9:45-	Surgery	Prof. Wheaton.....	"	St. Luke's, St. Joseph's or City Hospital.
12:30				

NOON RECESS.

1:30-2:30	Eye and Ear.....	Prof. Fulton	Section	St. Joseph's Hospital.
1:30-2:30	Nose and Throat.....	Prof. Schadle	"	Dispensary.
1:30-2:30	Medicine	Prof. Greene	"	"
1:30-2:30	Physical Diagnosis.....	Dr. Geo. Senkler	"	"
2:00-3:00	Ward Visit.....	Prof. Abbott.....	"	City Hospital.
2:00-3:00	"	Prof. Senkler	"	"
3:00-4:00	Medicine.....	Prof. Abbott or Senkler...	Class..	"
4:00-5:00	Autopsies	Dr. Rothrock.....	Section	"

WEDNESDAY.

9 to 10 a. m.	Physical Diag.....	Prof. Greene	Class..	City Hospital.
altern. { 10:00-	Gynecology	Prof. McLaren.....	"	"
weeks. { 12:00	Surgery	Dr. R. A. Wheaton.....	"	"

NOON RECESS.

1:30-2:30	Orthopædia.....	Prof. Gillette.....	Section	Disp. or City Hospital.
1:30-2:30	Nervous Diseases.....	Dr. Dunning.....	"	Dispensary.
1:30-2:30	Physical Diagnosis.....	Prof. Greene	"	"
2:00-3:00	Genito-Urinary.....	Dr. Coon.....	"	City Hospital.
2:00-3:00	Ward Visit.....	Prof. Abbott.....	"	"
2:00-3:00	"	Prof. Senkler	"	"
3:00-4:00	Medicine	Prof. Abbott or Senkler...	Class..	"
4:00-5:00	Autopsies.....	Dr. Rothrock.....	Section	" or Morgue.

Gynecology once a week throughout the year, Prof. Stone, Section, St. Joseph's Hospital.

Obstetrical Clinics, throughout the year, Prof. Ritchie and Dr. Davis, City Hospital and Outpatient Departments.

HOSPITAL APPOINTMENTS.

Upwards of twenty hospital positions are open to graduates of this college. Most of these positions are secured through competitive examinations. The board of trustees of the Minnesota State Prison has tendered the position of hospital steward to the student who stands highest in the classes of this college. This position pays a salary of seventy-five dollars monthly; its term of service is for a period of one year. Graduates of this college often receive appointments as resident physicians in the hospitals for the insane of this and adjoining states. A few appointments are awarded to undergraduates, by means of competitive examination.

ALUMNI ASSOCIATION.

The annual meeting of the alumni association of the college of medicine and surgery will occur at 8 p. m. on Alumni Day, June 6th 1900, in Medical Hall. The association may be addressed through its secretary, Dr. C. A. Erdmann. The alumni of this college are requested to send their names and addresses to the secretary.

CORRESPONDENCE.

N. B.—All correspondence relating to this college should be addressed to Dr. Parks Ritchie, Dean, College of Medicine and Surgery, University of Minnesota, Minneapolis.

College of Homeopathic Medicine and Surgery

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
ALONZO P. WILLIAMSON, LL. B., M. D., *Dean, and Professor of Mental and Nervous Diseases and Medical Jurisprudence.*
WILLIAM E. LEONARD, A. B., M. D., *Professor of Materia Medica and Therapeutics.*
GEORGE E. RICKER, A. B., M. D., *Professor of Clinical Medicine and Physical Diagnosis.*
ROBERT D. MATCHAN, M. D., } *Professors of Principles and Practice of Surgery.*
THOMAS J. GRAY, M. D., }
WARREN S. BRIGGS, B. S., M. D., } *Professors of Clinical and Orthopædic Surgery.*
MARSHALL P. AUSTIN, M. D., }
B. HARVEY OGDEN, A. M., M. D., *Professor of Obstetrics.*
EUGENE L. MANN, A. B., M. D., *Professor of Diseases of Nose, Throat and Ear.*
FREDERIC M. GIBSON, M. D., O. et A. Chir., *Professor of Ophthalmology.*
GEORGE E. CLARKE, Ph. B., M. D., *Professor of Theory and Practice of Medicine.*
GEORGE F. ROBERTS, M. D., } *Professors of Diseases of Women.*
EDWARD E. AUSTIN, M. D., }
HARRY M. LUFKIN, M. D., *Professor of Diseases of Children.*
THOMAS J. GRAY, M. D., *Professor of History and Methodology of Medicine.*
ROBERT R. ROME, M. D., *Professor of Clinical Obstetrics.*
ASA F. GOODRICH, M. D., *Professor of Skin and Genito-urinary Diseases.*
Instruction in the following branches is received in common with the students of the other colleges in the department of medicine:
GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*
RICHARD O. BEARD, M. D., *Professor of Physiology.*
CHARLES J. BELL, A. B., *Professor of Chemistry.*
JOHN F. FULTON, Ph. D., M. D., *Professor of Hygiene.*
THOMAS G. LEE, B. S., M. D., *Professor of Histology and Embryology.*
F. F. WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology and Pathology.*
J. CLARK STEWART, B. S., M. D., *Professor of Surgical Pathology.*
O. K. RICHARDSON, B. S. M. D., *Lecturer on Life Insurance Examination.*
EDWARD M. FREEMAN, B. S., *Instructor in Botany.*
JAMES F. BECK, M. D., *Adjunct to Chair of Physical Diagnosis.*
EDWIN H. SMITH, *Dispensary Assistant.*

ANNOUNCEMENT.

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY offers special advantages to all students seeking a medical education. Through the generosity of the State, an equipment of buildings, laboratories and apparatus is provided, equal to that of the best medical schools in this country or in Europe. With this equipment it is possible to lay that broad foundation for a medical education, without which no physician can hope for the highest success. An institution deficient in the requirements for teaching the fundamental branches of medical practice cannot long maintain the confidence of the medical profession. The claim once made that homeopathic medicine could be mastered in a few months study of *materia medica* and symptomatology, no longer meets the demands of an intelligent patronage. Homeopathy, as an expanding science, draws towards itself as a part of its rightful possession, every addition to medical knowledge that can be of any service in the cure of the sick. The homeopathic physician should feel that he is the "heir of all the ages" in medical learning, having that catholicity of training which places at his command every known resource including as his especial advantage, the added power of coping with disease, that comes from his knowledge of the science of homeopathy.

The breadth of view this result implies is provided in the college of homeopathic medicine and surgery in a real university course of study in, first: the history of medicine, botany, chemistry (organic and inorganic), histology, embryology, bacteriology, pathology, anatomy, physiology, hygiene and sanitary science, with all the accessories of laboratory work; second: in building upon this foundation a comprehensive knowledge of therapeutics, practice and surgery. The student has daily training in both the practical and theoretical aspects of medicine. In the first two years the practical training is provided in constant individual work in the laboratories or dissecting rooms; in the last two in a broad field of clinical study and observation, in both medical and surgical cases, which the nearly one-half million population of the twin cities abundantly supplies. The theoretical work is carried on in daily didactic lectures and text-book study throughout the entire course.

Especial emphasis is placed upon clinical instruction in both dispensary and hospital practice. Senior students will have opportunity to attend out-door patients, assist in special and general operations, and to attend obstetrical cases during the last course of lectures.

The college has now fairly passed the formative experiences incident to the early life of institutions and has become an integral part of the educational and professional forces of the state. Its alumni now at work in the state are the evidence of the character of its work. The loyal support of the profession throughout the northwest has encouraged and upheld the faculty in giving form to this new phase of the state work.

The college proposes to stand for a broad catholic, scientific, and therefore homeopathic, education in medicine and surgery.

TERMS OF TUITION.

The college has adopted a system of level fees, in which are included all charges for matriculation, lecture courses, laboratory courses,* dissections and graduation. These level fees are as follows:

For the first year.....	\$100.00
For the second year.....	100.00
For the third year.....	80.00
For the fourth year.....	80.00

One-half of the annual fee will be payable when the student matriculates. The registrar's receipt for this portion of the fee will entitle the holder to take the entrance examinations and to classify. The second half will be payable at the opening of the second semester, February 6, 1900. If the applicant fails to pass the entrance examination, his fees will be returned by the registrar. Absence or failure to continue study will not entitle the student to return of fees excepting in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will receive only a credit of five dollars upon his annual fee per semester for each laboratory course from which he may be exempt.

BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

All apparatus lost or damaged will be charged to him and must be paid for him before he can receive credit for his course or take his annual examination.

A statement of these charges will be submitted to the registrar and such breakage and loss fees will be payable to him.

SPECIAL STUDENTS.

Special students will pay to the registrar a fee of twenty dollars per year for each study they elect to pursue.

They will be charged fees, varying from five to twenty dollars, for each laboratory course they may enter.

*In each semester a fee of \$2.00 will be charged for the rental of a microscope in each course in which its use is required, provided the student is not supplied with a satisfactory instrument of his own. It is an advantage for the student to possess a microscope.

Graduate students will pay an admission fee of ten dollars which will entitle them to attend any lectures they may desire in regular courses, but such attendance does not entitle them to any credits unless they pass the required entrance examination.

Senior students who fail to graduate by reason of conditions will be charged a registration fee of ten dollars.

CURRICULUM.

The course in the college of homeopathic medicine and surgery leads to the degree of doctor in medicine. It covers a period of four years of college study, each year representing eight and one-half months in actual residence.

The studies are graded, so far as practicable, throughout the four years and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other.

The work of the first two years deals with the so-called scientific or laboratory branches; while that of the last two years includes the principles and practice of medicine and surgery, their associated specialties and the application of scientific or laboratory methods to clinical experience.

ADVANCED STANDING.

Applicants for advanced standing must pass the entrance examinations, or present the usual equivalents. They must furnish satisfactory evidence of the time spent and subjects covered in previous professional studies and must present themselves at the above dates and pass the examinations of all departments in which they wish to be exempt, if such examination is deemed necessary by the professors in charge of the various departments.

No conditions of advanced standing will entitle the student to take the two years of any graded study coincidentally.

Seniors in the college of science, literature and the arts who contemplate entering the department of medicine are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this department in lieu of similar science courses in the college of science, literature and the arts. This election will be contributive toward the degrees given in both colleges. Reciprocally the college of homeopathic medicine and surgery will accept full courses, taken in the college of science, literature and the arts, in histology, physiology and chemistry in lieu of the first year's work in these branches.

EXAMINATIONS.

Examinations will be conducted at the end of each year, upon subjects taught during the year, according to the schedule printed elsewhere. Attendance upon at least four-fifths of the lectures under each department is

required in order that a student may be allowed to enter for final examination, or to receive a certificate of attendance. Ten per cent of the graduating class will be recommended to receive the degree of doctor of medicine, "cum laude." The selection will be based upon the efficiency of the work of the student during the period of the entire course.

CLINICS.

Every member of the faculty (with two exceptions) is a clinical teacher. Thus each professor demonstrates the application of his didactic work.

DISPENSARY CLINICS.

The dispensary, located at 1416 Washington avenue south, occupies an entire building, and thus increased and unusual facilities are offered the student for individual examination of patients. The location is within easy access of those whose means compel them to ask dispensary assistance, and presents ample opportunity for the study of all forms of disease usually met with in practice. Patients present themselves in large numbers daily, (more than six thousand prescriptions having been made during the last year), and are assigned to particular departments according to the nature of their diseases. The classes are so divided and arranged as to afford every student abundant opportunity to familiarize himself with the best methods of diagnosis and treatment of the various maladies, medical and surgical, with which the clinic abounds. The college clinics are conducted throughout the entire year. Students and practitioners are invited to attend them at all times.

SUBJECT.	CLINICIAN.	CLINIC DAYS.	DAYS IN ATTENDANCE
DISEASES OF WOMEN	PROFESSOR E. E. AUSTIN (Assistant DR. F. L. BECKLEY)	Monday	Monday and Thursday
NERVOUS DISEASES	PROFESSOR A. P. WILLIAMSON	Monday	Monday and Friday
DISEASES OF THE EYE	PROFESSOR F. M. GIBSON (Assistant DR. E. E. HURD)	Tuesday	Tuesday and Saturday
DISEASES OF THE SKIN	PROFESSOR A. F. GOODRICH	Tuesday	Tuesday
DISEASES OF THE NOSE, THROAT AND EAR	PROFESSOR E. L. MANN (Assistant DR. H. S. LIDDLE)	Wednesday	Wednesday and Saturday
OBSTETRICS	PROFESSOR R. R. ROME	Wednesday	Wednesday
SURGERY	PROFESSOR M. P. AUSTIN	Thursday	Monday and Thursday
INTERNAL MEDICINE	PROFESSOR G. E. RICKER (Assistant DR. J. F. BECK)	Friday	Tuesday and Friday
DISEASES OF CHILDREN	PROFESSOR H. M. LUFKIN (Assistant DR. MARGT KOCH)	Saturday	Wednesday and Saturday

HOSPITAL CLINICS.

The college has unusual advantages in hospital clinics. In addition to the call upon students to assist the various professors in private cases, reg-

ular clinics are provided in the city hospitals of both St. Paul and Minneapolis and in St. Luke's and St. Joseph's hospitals in St. Paul.

Each Monday is devoted to clinics held in one of the hospitals, by a member of the faculty.

MINNEAPOLIS.

Oct. 2nd, 16th and 30th, 1899.	Feb. 5th and 19th, 1900.
Nov. 6th and 20th, 1899.	March 5th and 19th, 1900.
Dec. 4th and 18th, 1899.	April 2nd, 16th and 30th, 1900.
Jan. 1st, 15th and 29th, 1900.	May 7th and 21st, 1900.

ST. PAUL.

Oct. 9th and 23rd, 1899.	Feb. 12th and 26th, 1900.
Nov. 13th and 27th, 1899.	March 12th and 26th, 1900.
Dec. 11th and 25th, 1899.	April 9th and 23rd, 1900.
Jan. 8th and 22nd, 1900.	May 14th, 1900.

CITY HOSPITAL, MINNEAPOLIS.

The faculty of the college of homeopathic medicine and surgery is largely represented on the staff of this institution, where one-third of all the patients admitted are placed under their care.

Mr. A. E. Booth, of the senior class, has served as interne during the past year.

CITY HOSPITAL, ST. PAUL.

A full staff of homeopathic physicians and surgeons was created last year, including all St. Paul members of the college faculty. Each member of the staff is on duty two months of the year and has charge of all cases coming into his department during that time and uses suitable ones for clinical purposes.

Mr. A. T. Caine, of the senior class, was appointed interne for one year.

HOSPITAL INTERNES.

Graduates of this college are eligible for appointment to the position of interne in the Minneapolis City and St. Paul City and County Hospitals. Two internes are appointed each year after a competitive examination, in the former, and there are four vacancies in the latter each year for which the students may apply.

ST. LUKE'S HOSPITAL, ST. PAUL.

This hospital has recently erected a new building, thoroughly equipped with all modern facilities for caring for medical and surgical cases. It contains an amphitheatre in which clinical lectures are delivered. A number of the faculty are members of the visiting staff.

ST. JOSEPH'S HOSPITAL, ST. PAUL.

Through the addition to its staff of members of the college faculty, students have access to both the surgical and medical cases upon exactly the same footing as in other hospitals.

GENERAL REMARKS.

In all hospital work students are given special bedside instruction in diagnosis, in "taking the case," in prescribing, in surgical dressing, in the after care of patients and all forms of accessory treatment.

ACKNOWLEDGEMENTS.

In continuance of the custom established five years ago, an invitation was extended to members of the profession, not connected with the college, serving upon the staffs of the several hospitals of the two cities, to lecture or present clinical demonstrations to the students. The faculty desires to express its appreciation to the following physicians and surgeons for their generous acceptance of the invitation: Drs. Adele S. Hutchison, Pearl M. Hall and Charles Neill, of the City Hospital staff, Minneapolis, and Drs. Henry Hutchinson, Harry M. Lufkin and O. M. Hall, of the staff of the City and County Hospital, St. Paul, and St. Luke's Hospital, St. Paul. The faculty is also under obligations to Dr. J. Davidson Lewis, of St. Paul, for a series of very valuable lectures on diseases of the ear, and to Dr. H. S. Liddle, of Minneapolis, for an exceedingly complete course of instruction, both clinical and didactic, upon the nose and throat.

COURSE OF INSTRUCTION.

The extension of the course of instruction to four years enables the faculty to present to the students a more thorough and practical training in the practice of medicine than has heretofore been possible. The schedule of study is so arranged that the student reaches the practical work of his profession by gradual steps through theoretical and laboratory courses. There are also offered lectures upon subjects which have been omitted in previous years, because of lack of time.

FIRST YEAR.

History and methodology of medicine.
 Medical terminology.
 Medical botany.
 Inorganic chemistry—laboratory.
 Histology and embryology—laboratory.
 Anatomy—bones, muscles and joints.
 Physiology.
 Homeopathic pharmacy.

SECOND YEAR.

Materia medica—experimental.
 Organic chemistry—toxicology and urinalysis.
 Anatomy, dissection.
 Physiology—chemical and experimental.
 Surgical emergencies and bandaging.
 Hygiene and sanitary science.

THIRD YEAR.

Surgical anatomy.
 Bacteriology, general pathology.
 Materia medica and therapeutics.
 Practice of medicine, organon and institutes of medicine.
 Clinical medicine and physical diagnosis.
 Obstetrics.
 Principles and practice of surgery.
 Diseases of women.
 Ophthalmology.
 Nose, throat and ear.
 Clinics, medical and surgical.
 Medical jurisprudence.

FOURTH YEAR.

Surgical pathology.
 Materia medica and therapeutics.
 Practice of medicine.
 Clinical medicine.
 Mental and nervous diseases.
 Dermatology and genito-urinary diseases.
 Obstetrics.
 Clinical obstetrics.
 Principles and practice of surgery.
 Ophthalmology.
 Diseases of women—didactic and practical.
 Orthopædic and clinical surgery.
 Clinics, medical and surgical.
 Paenology.
 Electro-Therapeutics.
 Life insurance examinations.

MATERIA MEDICA AND THERAPEUTICS.

The course upon this topic is graded to cover four years' study. Lectures, daily quizzes and daily demonstrations of materials and methods are held regularly throughout the year, pains being taken to fit each student for the actual practical application of his knowledge.

FIRST YEAR

One lecture each week is given upon the methods of homeopathic pharmacy, each student being trained in writing and filling prescriptions and having demonstrated before him the more common preparations. Apparatus and material for these purposes are taken from Prof. Leonard's laboratory, which is abundantly supplied with the crude and perfected drugs for demonstration throughout the course. Mr. G. A. Babendrier, who has kindly given this instruction so satisfactorily for several years will continue the same the coming year.

SECOND YEAR.

Lectures and quizzes twice each week upon the toxicology and physiological action of a few drugs, each typical of a class of remedies, thus furnishing the groundwork for a more detailed study of symptoms in later years. As far as possible, actual experiments in testing drugs upon members of the class will be made, the blanks used and methods being under Prof. Leonard's personal supervision and in accordance with the rules of the Provers' Union of the American Institute of Homeopathy.

THIRD YEAR.

Three lectures a week, with quizzes, upon the vegetable remedies, about thirty major and seventy-five minor drugs, of the *materia medica*, arranged according to their natural groups and their clinical relationships in disease, and studied in their origin, history, preparation, physiology and symptomology, full practical comparison being made with other allied remedies. The endeavor in these studies and those of the following year will be to present only such usage of drugs as is practical and fully corroborated, little, if any, time being spent upon their minor and less fully proven applications.

FOURTH YEAR.

Three lectures and quizzes each week upon the mineral, animal and nosological remedies of the *materia medica*—about forty major and twenty minor drugs, grouped and studied in detail as those of the second year, attention being given to their toxicology and physiological action, where this had a direct bearing upon their homeopathic application to chronic diseases, in as much as the drugs of this course are more often applied thereto.

Three lectures each week, two semesters, senior year.

Examinations in the form of written review quizzes from time to time or at the end of the term, will be held, the student's final standing being made up of this and his daily quiz markings.

THEORY AND PRACTICE.

Lectures on the theory and practice of medicine will be delivered to students of the third and fourth year. It will be the purpose to thoroughly acquaint the student with the description, course and diagnosis of disease, and the method of treating such disease in accordance with the Homeopathic law of cure.

The cardinal principles of the philosophy of homeopathy will be clearly presented in didactic and clinical lectures. Students are familiarized with accurate methods of investigation, record of symptoms and history of cases; with the use of the repertory to assist in accurately affiliating the indicated remedy.

THIRD YEAR.

The course of the students of the third year consists of twenty-six didactic lectures, mainly on diseases of the mouth, stomach and bowels. Eight lectures will be given on the philosophy of homeopathy. Frequent selections of cases from private practice will be given to better set forth the various lectures, as well as methods employed in the record of cases and selection of the remedy. One-half of the time allowed will be employed in frequent quizzes and review of the work gone over.

FOURTH YEAR.

The course to students of the fourth year consists of twenty-two didactic lectures on pulmonary and hepatic affections, with such of the important continued fevers as fall to this chair. The *Organon* work will take the form of frequent "class-room talks," chiefly on the subjects of the following sections, viz: 272-274; 247; 245-251; 252-251; 167-168; 204-205.

In addition, students will be required to present written reports of the history and symptoms of cases treated, the repertory work in selecting the remedy, the dose, repetition and results. Much time and attention will be given to this feature of the course as tending in the highest manner to perfect the pupil in the art of *accurate prescribing*.

PHYSICAL DIAGNOSIS.

The course on physical diagnosis consists of a series of twenty-four didactic lectures to the third year class illustrated upon the healthy human subject, thus familiarizing the student with the normal appearances, feelings and sounds. These lectures are classified as follows: Introduction, general examination, respiratory system, circulatory system, digestive system, urinary system.

CLINICAL MEDICINE.

FOURTH YEAR CLASS.

For this course abundant material is found in the University homeopathic free dispensary, where clinics are held twice a week, and in the City Hospitals of Minneapolis and St. Paul, where the clinics are held each Monday morning.

In these clinics particular effort is made to supplement the course in physical diagnosis and to fully illustrate the application of the homeopathic law in therapeutics.

In order that the student may obtain as wide a view as possible in this all important branch, they receive instruction not only from Professor Ricker at the bedside in the City Hospital wards, but from the various members of the homeopathic staffs in the Twin Cities, attending the hospitals but not otherwise connected with the University.

In addition the dispensary furnishes many outside cases which are treated in their own homes by the members of the fourth year class, under the supervision of Professor Ricker, thus enabling the student to acquire the self-reliance and confidence so necessary to the beginning practitioner.

SURGERY.

Two years ago the work in surgery was greatly enlarged. It now occupies two full years, the third and fourth and includes the labors of four members of the college faculty. The work is divided into clinical and didactic surgery.

CLINICAL SURGERY.

The work in clinical surgery will consist in operations before the class in connection with which clinical lectures will be given upon the cases presented. These will occupy each Monday of the fourth year, which is set apart as the day for clinics. The third year class is required to attend the clinics, unless their regular class work interferes. The second year students will receive thorough practical instruction in bandaging two hours each week, two semesters.

The diagnosis, prognosis and homeopathic treatment and the operations for surgical diseases and accidents will be taught practically.

At the clinics which are held at the City and County Hospital, St. Luke's and St. Joseph's Hospitals, of St. Paul, and the City Hospital and Free Dispensary of Minneapolis are demonstrated the value of antiseptic and aseptic treatment of wounds, the minute details of the application of surgical appliances and dressings, and operative technique. Post-operative care for reaction, shock, etc., will be considered.

Senior students are instructed in the practical use of anæsthetics and are required to attend a number of surgical patients at their homes, carrying out post-operative detail under the direction of the professor.

DIDACTIC COURSE.

The didactic course covers the entire field of the principles and practice of surgery. The lectures will occupy the third year class two hours and the fourth year class three hours each week. Demonstrations will be made upon the cadaver, aided by models and charts.

The lectures to the third year class will include surgical pathology, inflammation, hemorrhage, surgical appliances, surgical emergencies, minor surgical operations, ligation of arteries, burns and scalds, surgical treatment of the anus and rectum, antiseptics, anæsthetics, abscesses, ulcers, gangrene, hernia and the elements of the treatment of wounds, fractures, dislocation and amputation.

The lectures of the fourth year class will include the surgery of the bones, joints, genito-urinary organs, tumors, cysts, fractures dislocations, amputations, syphilis, together with the operative surgery of the head, face, chest, abdomen, pelvis, skin, nerves and extremities.

All the lectures will aim to be comprehensive, practical and in keeping with the best standards of advanced surgery.

ORTHOPAEDIA.

The course on this subject is both didactic and clinical. It consists of one lecture a week during the fourth year.

The whole subject of deformities, their causes, care and removal, is carefully considered in detail. The mechanical apparatus used in the treatment of such cases is exhibited and rules are laid down for the improvising and applying temporary means and instruments. Recent progress in the knowledge of the underlying causes of bony, muscular and habit deformities, and their serious reflex effects, has led to great changes in the methods pursued to overcome them.

The early recognition and treatment of such cases are of the utmost importance and hence, as they are usually first presented to the general practitioner, a full knowledge of this branch of surgery becomes exceedingly valuable.

The subjects discussed include functional and organic diseases of the bony spine, the several forms of club-foot, joint inflammations, both simple and tuberculous, and their sequelae, cleft-palate, hair-lip, etc.

OBSTETRICS.

This subject will be taught by lectures and recitations, thoroughly illustrated with charts, manikins and specimens. The course will be graded and divided between the third and fourth years.

During the third year the subjects covered will embrace the anatomy and physiology of the female generative organs and the pelvis, the development of the embryo, the maternal changes of pregnancy, the diagnosis of pregnancy, the physiology, pathology and hygiene of pregnancy, the physiology and course of normal labor, the conduct of normal labor and the management of the puerperium.

During the fourth year the following subjects will be taught: the mechanism of labor, diagnosis and management of the various presentations, dystocia, complications of labor, physiology, pathology and management of the puerperium, and obstetric surgery.

CLINICAL OBSTETRICS.

This department will instruct the fourth year students and apply practically the teachings of the department of obstetrics. An abundance of material is supplied by the dispensary and city hospitals of St. Paul and Minneapolis. The student will be thoroughly educated to locate accurately the position and condition of the internal parts both in health and disease, the obstetric points of the pelvis, as well as the diameters, planes and curve, the presentations, and positions of the child and methods of diagnosis, the stages and mechanism of labor, the management of normal and abnormal labors, the application of the forceps and the necessary steps in performing version.

Each member of the class will be assigned at least three cases of pregnancy which he will be required to attend under the immediate direction of the professor of the chair.

During the last month of the pregnancy of a case so assigned, the student in charge will report to the professor the patient's name, address, age, number of previous labors, date of first and last labors, date of quickening, condition of the uterus, heart, lungs, bowels, kidneys, etc., and a detailed statement regarding the appearance of the patient, location of the foetal heart, position of the child, character and size of the pelvis.

At the time of the labor the student will be required to keep a record of the following facts:

No. of the case, date, name, address, condition of the Os uterus, height of presenting part, pulse rate and quality (ante and post partum), rapidity of foetal heart beats and where heard most clearly, presentation, position and duration of the first, second and third stage.

Also the sex of the child, the diameters of its head, weight and length. The post partum condition of the uterus, cervix and perineum.

An operative course on the female cadaver will also be given, demonstrating the operative technique in symphysiotomy and Cæsarean section.

DISEASES OF WOMEN.

This course will consist of one didactic lecture during the third and fourth year and two clinics a week during the fourth year.

In the third year, both semesters, the anatomy, physiology and pathology of the pelvic contents and perineum are carefully described. The preparation of the patient for surgical operation together with the necessary steps taken, the various surgical procedures as well as the medical treatment of all pelvic disease, will receive minute attention during both semesters of the fourth year.

The medical and surgical diseases of women will be treated in didactic lectures and recitations. The entire field of gynecology will be covered in the lecture room. As cases present themselves in the city hospitals of St. Paul and Minneapolis, the subjects thus described will be demonstrated on the living subject.

DISEASES OF CHILDREN.

The course on this subject will consist of one lecture each week and two clinics to the fourth year students, and extending over two semesters. The clinics are full and afford an exceptional opportunity to study the common diseases of childhood. In the out-door department many cases of exanthematous cases are treated by the members of the class.

The didactic course embraces a description of the normal development of infancy and childhood, natural and artificial infant feeding, signs and symptoms of hereditary syphilis, contagious and infectious diseases, tuberculosis, erysipelas, and the diseases of the respiratory and urinary organs; those of the circulatory, nervous and digestive systems, rickets and diseases of the skin.

MENTAL AND NERVOUS DISEASES.

This course consists of twenty-eight didactic lectures, in the fourth year, and as many clinical demonstrations as material is presented at the dispensary and the City Hospital Minneapolis. It is the aim of the chair to qualify the student to detect the earliest symptoms of insanity and diseases of the nervous system.

The anatomy and physiology of the brain and spinal cord are reviewed, and particular attention is paid to the causes, development, characteristic symptoms and the pathological conditions of the diseases of the nervous system. The therapeutics, dietetics and directions for the personal care in each disease is especially elaborated.

ELECTRO-THERAPEUTICS.

This subject will be carefully taught. The physics of electricity will be sufficiently considered to enable the student to understand the construction and manipulation of galvanic faradic, sinusoidal and static batteries. The application of every form of electricity to disease will be practically demonstrated.

OPHTHALMOLOGY.

In the department of Ophthalmology the endeavor is to give thorough instruction in those parts of the work which will ordinarily come into the hands of the general practitioner.

The course is supplemented by as much practical work as time allows, in the use of the ophthalmoscope for the study of intraocular troubles whose recognition would aid in the diagnosis of various constitutional affections; and following a short didactic course given early in the year on the subject, practical work in the correction of the refraction is carried on at the dispensary during both semesters.

The clinical material provided in this department is very abundant, interesting and instructive cases, embracing all varieties of eye troubles calling for medical and surgical aid being presented to the students bi-weekly throughout the entire year.

The following schedule shows the subjects considered in the present course of lectures.

Anatomy and physiology of the eye; refractions and use of the lenses for the correction of its errors; diseases of the lids; conjunctiva; cornea; sclera; lachrymal apparatus; iris and ciliary body; lens; choroid; retina and optic nerve; affections of the muscular apparatus of the eye and the general relationship between eye strain and reflex and nervous disorders. The didactic course consists of thirty-two lectures during the fourth year and ten during the third year.

DISEASES OF THE NOSE, THROAT AND EAR.

The course will consist of didactic lectures and clinical demonstrations.

One didactic lecture a week will be given to students of the third year. An understanding of the anatomy and physiology of the organs is presupposed and but little time will be devoted to the review of the more important points in their bearing upon diseases of these organs. The lectures will enter upon a study of the diseased processes in the nose—the various forms of acute and chronic catarrhal inflammation, their causes, development, symptoms, consequences and treatment both general and local, abnormal growths, affections of the septum and diseases of the accessory sinuses, finishing the course on the nasal cavities with the neuroses, functional and organic.

The diseases of the naso-pharynx are treated with special reference to their dependence upon nasal conditions and their influence upon the organ of hearing. The course includes acute and chronic catarrhal processes, adenoid vegetations and morbid growths.

Diseases of the pharynx are considered in their dependence upon alimentary disorders, acute and chronic inflammatory conditions; morbid growths and neurosis, together with the pharyngeal and tonsillar conditions incident to the exanthemata, diphtheria, typhoid fever, etc.

In the laryngeal disorders we become more closely associated with respiratory diseases; the various forms of laryngeal inflammation, morbid growths and nervous affections will be discussed—special stress being put upon the early laryngeal manifestations of tuberculosis and the laryngeal disorders of voice users with the importance of proper vocalization and respiration upon all diseases of this organ.

Ear diseases resolve themselves into: diseases of the external canal and pinna, dermoid inflammations; diseases of the middle ear, mucous inflammations; and diseases of the internal ear, serous and nerve inflammation.

The course to the fourth year students will be entirely clinical, the class being divided into sections for dispensary work; the aim will be to familiarize the students with the use of the various diagnostic means at their disposal, and the appearance of the various abnormal conditions, together with the technique of the numerous operative procedures. The material for clinical demonstrations is abundant.

SKIN AND GENITO URINARY DISEASES.

This course will consist of one didactic lecture, and one clinic each week for students of the fourth year. It will include the disease of the skin, syphilis and all genito-urinary diseases including the kidneys.

The first semester will be devoted to a study of genito-urinary and kidney diseases, the second to diseases of the skin and syphilis. The dispensary clinics will be especially valuable in supplementing the work of the professor in the lecture room by familiarizing the students with the appearance of the various forms of skin diseases so essential to a correct diagnosis of the same.

MEDICAL JURISPRUDENCE.

The object of this chair is to familiarize the student with his duties, rights and responsibilities from a legal standpoint. The law on each subject discussed is carefully explained and illustrated, as far as possible, with adjudicated cases.

HISTORY AND METHODOLOGY OF MEDICINE.

The lectures given in this chair are an exposition of the philosophy and art of medicine by the historical method. The student is taught to see how in each age the *practice* of medicine has been the outgrowth of the beliefs current regarding the nature of man. Give to a student the theories held by a people regarding the constitution of matter, the nature of mind and force, and he can accurately foresee the medical science such a people will accept. The unfolding of the world's thought in medicine sets homeopathy in its high place and gives the student an outlook much needed in the profession. The tendency of medicine has always been to over-estimate the material side of man's nature and to make innumerable hypotheses to explain disease. The conflicts in medicine have been the clashing not of opposite sects, but of antagonistic systems of thought, and reconciliation is possible only on the grounds of a higher science than that of mere sense knowledge. This ground is revealed in the history of the philosophy of medicine.

The course includes the medicine of the Egyptians, Persians, Indochinese, Hebrews, Greeks, Arabians and of Europe down to the present.

One lecture each week during the Freshman year.

LIFE INSURANCE EXAMINATION.

This subject will be taught with the purpose of familiarizing the student with all the duties and responsibilities belonging to the position of medical examiner.

HISTOLOGY AND EMBRYOLOGY.

The laboratory of histology and embryology occupies most of the first floor and of the laboratory of medical sciences.

The general laboratory, 44x72 feet, extends across the north wing and is abundantly lighted by large windows on three sides and part of the fourth. Study tables accommodating seventy students are placed directly under the windows. A second tier of desks provides for twenty other students. Each student is furnished with a separate locker for the storage of apparatus and material. The special laboratory, 24x35 feet, for research work by advanced students, adjoins the general laboratory. The next apartment, the library of the laboratory, contains a reference library consisting of a small but carefully selected collection of related literature, both standard and periodical.

These laboratories are equipped with seventy-five Leitz' microscopes, each fitted with nosepiece and Abbé condenser, various forms of microtomes, such as freezing, Thoma, Minot, Schanze, &c., injection apparatus, aquaria, thermostats, incubators, water baths, chemical hoods, a great variety of technical glassware, Grübler's stains, a set of His' wax models, photomicrographic and reconstruction apparatus, charts, reference cabinets containing carefully selected slides, a large collection of hardened histological and embryological material with an abundant supply of fresh tissues.

The courses are made as practical as possible, beginning with the technique of the microscope, followed by the preparation of permanent specimens. Collections of typical specimens, also, will be loaned to the students for study. During the two years course the student will acquire a valuable collection of slides of his own preparation illustrating the structure and development of the human body.

The course is illustrated by charts and lantern-slides of histological and embryological specimens. Demonstrations are given under the microscope of typical sections of tissues and organs, accompanied by camera lucida drawings, or photo-micrographs, with explanatory text.

All students are recommended to purchase a microscope at the beginning of their medical course. This instrument is an indispensable part of the outfit of a well-trained physician. Suitable microscopes can be purchased at from \$50 to \$60, which may be fitted at any time with such other parts as may be desired.

Students not owning microscopes will be furnished with instruments at a rental of \$2 per semester for each course requiring the use of a microscope.

Course I. General morphology and histology.

Lectures, demonstrations and laboratory work. The course includes the structure and manipulation of the microscope, the structure and properties of protoplasm: the cell, its structure; cell division and reproduction. A detailed study of the structure and life history of certain typical unicellular animal and plant forms, and of certain multicellular forms, leading to the consideration of the elements of structure in the vertebrata. A comparative study of the histology of the blood, of the epithelial, connective, muscular and nervous tissues and of the vascular and lymphatic systems. Lectures, etc., 2 hours a week. Laboratory work, 6 hours a week, 1st semester, 1st year.

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Course II. Elements of embryology and histogenesis.

Lectures, demonstrations and laboratory work. A comparative study of reproduction; the ovum, the spermatozoon, fertilization, cleavage, formation of blastodermic layers, the formation of the embryo, foetal envelopes, etc., with practical work on chick, frog and mammalian embryos. The differentiation and histogenesis of the tissues, etc. Lectures, etc., 2 hours a week; laboratory work 6 hours a week, 2d semester, 1st year. Open to those who have completed course i.

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Course III. Advanced histology and embryology.

Lectures, demonstrations and laboratory work. Advanced methods of histological and embryological technique, with practical laboratory work. The comparative study of the minute structure, origin and development of the various organs of the integumentary, alimentary, respiratory and uro-genital systems; the central and sympathetic nervous systems, the organs of special sense, etc. Lectures, etc., 2 hours a week; laboratory work, 3 hours a week. 1st and 2d semesters, 2d year. Open to those who have completed the courses of 1st year in histology and embryology.

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The following courses are open to properly qualified students and will consist of practical work in the laboratory, a prescribed course of reading, with reports of work, and of lectures and demonstrations to be given from time to time.

Course IV. Methods of microscopical work.

The preparation and use of the various solutions employed in fixing, hardening and staining; methods of embedding, sectioning, reconstruction, etc.

Course V. (a) Comparative histology and histogenesis of the tissues.

The animal cell, the epithelial, connective, muscular and nervous tissues, blood, etc.

(b) *Comparative histology and embryology of the viscera.* The epidermal, digestive, respiratory and uro-genital systems of organs.

(c) *Comparative histology and histogenesis of the nervous system and sense organs.* Central nervous system, etc., after the methods of Weigert, Golgi, etc.

Course VI. Comparative embryology of vertebrates.

A detailed study of the various stages in the development of vertebrate types, as acanthias, petromyzon, trout, amblystoma, frog, chick, rat, pig and human embryos.

Research work in histology and embryology.

Opportunity will be offered for those desiring to pursue original investigations.

Courses III and VIII in animal biology in the college of science, literature and the arts are accepted in lieu of first year histology and embryology in the department of medicine.

ANATOMY.

The department of anatomy occupies rooms in medical hall. These include two large student's dissecting rooms, the general laboratories of anatomy, a bone laboratory for research work, the offices of the professor and demonstrator of anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

The bones of the human skeleton are furnished to the student for purposes of study and recitations from the specimen are conducted by the demonstrator of anatomy.

A series of lectures upon syndesmology follows, accompanied by recitations, which are illustrated by human preparations and by fresh and preserved sections of joints.

A course of descriptive lectures in myology is then given, with demonstrations upon the cadaver.

Lectures and a brief course of dissections of the abdominal and thoracic viscera of the lower animal complete the work of the first year in this branch.

In the second year, the student takes lectures, recitations and demonstrations of the vascular system, the alimentary canal, the respiratory tract, the genito-urinary system and the inguinal and perineal structures. He then pursues a course in regional anatomy, embracing a study of the surgical regions of the entire body; a course in the anatomy of the eye and ear and of the brain, spinal cord and ganglionic system, illustrated by fresh and permanent preparations, models and diagrams.

He dissects, during the year, the entire human body; recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the demonstrator of anatomy.

In the third year, the student takes up the study of the human body from a topographical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in the relations, structure and distribution of the nervous system.

Course I. Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; three hours each week, for 10 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, in sections, 2 hours each section, for 10 weeks, first semester. Required of all first year students.

Cours. II. Syndesmology.

Lectures, recitations and laboratory demonstrations. 3 hours each week, for 4 weeks, first semester. Open to those who have taken course i.

Course III. Myology.

Lectures and recitations, covering the entire muscular system of the human body, with supplementary study of comparative myology; 3 hours each week, 16 weeks. Laboratory work consists of identifying the muscles of the human body on dissected preparations and showing their actions. Class, in sections, 4 hours each week, for 5 weeks. Open to those who have taken course ii.

Course IV. Splanchnology.

Lectures on the thoracic, abdominal and pelvic viscera; 2 hours each week, for 10 weeks. Open to those who have taken course iii. Laboratory work, demonstrating and dissecting the thoracic, abdominal and pelvic organs of the human subject or of the dog or sheep.

Semi-weekly recitations upon the subjects of the first year's course, conducted in sections.
PROFESSORS HENDRICKS AND ERDMANN.

Course V. Splanchnology.

Descriptive and topographical anatomy of the thoracic viscera, the alimentary and urino-genital organs. Lectures and recitations, 3 hours each week, for 10 weeks. Required of second year students.

Course VI. Descriptive and surgical anatomy.

Head, neck, trunk and extremities. Lectures and recitations, 3 hours each week, for 12 weeks. Open to those who have completed course v.

Course VII. The nervous system.

Cerebro-spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system; and the special sense organs. Lectures and recitations, 3 hours each week, for 8 weeks. Open to those who have completed course iv.

PROFESSOR HENDRICKS.

Course VIII. Dissecting.

The work extends over 2 periods of 6 weeks each, requiring 5 afternoons of each week. The method of work follows that laid down in Holden's Manual of Dissections.

PROFESSOR ERDMANN and DR. HACK.

The second year lecture and dissecting courses are open to those having completed the first year's work in anatomy and histology.

Weekly recitations upon the subjects of the second year's course, conducted in sections.

Course IX. Surgical anatomy.

The instruction consists of dissections, demonstrating the relations of structures composing the surgical regions of the body; demonstrations upon the living subject, showing the anatomical and surgical landmarks, and their applications; also the location, by surface tracings, of the viscera contained in the various cavities and of the important arteries, veins and nerves. 1 hour a week, second semester. Required of third year students.

PROFESSOR HENDRICKS AND DR. ERDMANN.

Course X. Applied anatomy of the nervous system.

Elective.

Opportunity is afforded for advanced work in practical anatomy at any time during the college year.

PHYSIOLOGY.

The department of physiology occupies a suite of rooms in the laboratory of medical sciences, including the laboratory of experimental physiology, the laboratory of physiological chemistry and practical dietetics, a demonstration and recitation room, the laboratory library and the office of the professor in this branch. A large amphitheater, adapted to the demonstration of major experiments, immediately adjoins the physiological laboratories and is used, also, for lecture purposes by this and other chairs.

In the basement of the laboratory of medical sciences, the chair maintains large and well equipped animal-rooms, which are furnished with a large aquarium, frog tanks, animal enclosures and breeding cages. From this animal room are furnished supplies of material and animals for the work in experimental physiology, physiological chemistry, histology, embryology, pathology and bacteriology. The hygienic conditions of the room are studied carefully, with a view to maintaining the physiological and structural integrity of its animal occupants as perfectly as possible. Stock required for bacteriological purposes is removed and placed in an isolated department at a distance from this room.

The physiological laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, and with materials, glassware, digesters, water baths, ventilating hoods, etc., for the work in physiological chemistry. Their outfit includes sets of vivisection instruments, an artificial respiratory machine, batteries; Du Bois-Reymond coils, galvanometers, rheostats, moist muscle chambers, recording drums, Ludwig's kymograph, spring myograph, Burdon-Sanderson's stethometer, Dudgeon's sphymographs, Runnes'

chronographs, Roy's tonometer, Gaskell's clamp, oncometers, hæmometers, hæmoglobino-meters, plethysmograph, etc., etc. They are furnished with motor power for the operation of recording apparatus and for the manufacture of apparatus in the laboratory workshop.

The course in physiology is graded in the first and second years. In the first year, the student hears lectures, recites and attends demonstrations in general physiology. These embrace the discussion and, so far as possible, the observation of the physiological ingredients of the animal body: the study of the physiology of cell-life, of the fundamental properties of the cell; of the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues, the connective tissues, and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, respiration and excretion.

In the second year, the work is made as practical as possible and includes the study of such advanced topics as metabolism, nutrition, dietetics, reproduction; the physiology of foetal life, of infancy, of maturity and of old age; and the functions of the brain, spinal cord and ganglionic system. Three hours each week, during the first semester, are occupied in laboratory work in physiological chemistry. This course affords the student a practical knowledge of the tissues and fluids of the body from a chemical standpoint. It embraces studies in the several classes of proteids, in fats, carbohydrates, bone, muscle, blood, milk, the digestive fluids, glycogen, etc.

A similar number of hours during the second semester are devoted to experimental physiology. For this work the class is divided into sections and the instruction is individualized so far as possible. The student is familiarized with physiological apparatus and its uses; with forms of electrical stimulation and with methods of experimentation; while his knowledge of physiological principles is strengthened by the observation of functional facts. The courses are illustrated by means of a series of charts, in oil and water colors, which picture the physiological anatomy, the mechanical relations and the biologic-chemical changes of the tissues.

In the fourth year, an optional course in practical dietetics is conducted during the first semester. It deals with the analysis of foods, with the general principles of food preparation and with the selection of a suitable dietary for the several periods of life.

A laboratory reference library is in process of collection, to which the advanced student will have access for collateral reading.

Course I. General physiology.

Lectures, recitations and demonstrations, dealing with the physiological chemistry of the human body; the physiological properties of the cell; the nutritive media; nervous mechanisms in general; the muscular tissues, the connective tissues and the epithelial tissues, as the structural bases of the animal body. Two hours a week, first semester, first year. PROFESSOR BEARD.

Course II. Systemic physiology.

Lectures, recitations and demonstrations. This course includes the physiology of the vascular system; the digestive system; the respiratory system; the secretory and excretory systems. Four hours a week, second semester, first year. Open to those who have completed course i. PROFESSOR BEARD.

Semi-weekly recitations upon the subjects of the first year are conducted in sections of the class.

Course III. Advanced physiology.

Lectures, recitations and demonstrations. This course includes the discussion of the phenomena of metabolism; of nutrition; of temperature production, regulation and loss; of reproduction; of the physiological changes incident to successive periods of life; and of the functions of the nervous system. Two hours a week, first sem-

ester; three hours a week, second semester, second year. Open to those who have completed the courses in physiology of the first year. PROFESSOR BEARD.

Weekly recitations upon the subjects of this course are conducted in sections of the class.

Course IV. Physiological chemistry and microscopy.

Laboratory work. A practical study of the several classes of proteids; of carbohydrates, fats, bone, muscle and blood; of gastric juice, saliva, pancreatic juice, and bile in their respective digestions; of milk; of glycogen; and extractives. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiological emulsions of fat; of crystalline waste products; and of the blood-cells and the process of fibrin formation. Practical instruction is given during this course in the enumeration of the blood-cells, in the estimation of hemoglobin and corpuscles in mass, in the spectroscopic examination of the blood and in the use of the polariscope. Nine hours a week, first semester, second year. Open to those who have completed courses i and ii. PROFESSOR BEARD AND DR. WILCOX.

Course V. Experimental physiology.

Laboratory work and demonstrations. A study of physiological apparatus, electrical stimuli and methods of experimentation; the demonstration of experiments which illustrate physiological function in the muscular, nervous, vascular, respiratory and glandular systems. Three hours a week, second semester, second year. Open to those who have completed course iv. PROFESSOR BEARD AND DR. WILCOX.

Course VI. Practical dietetics. (Optional.)

Lectures and laboratory exercises. A study of food analysis, food preparation and of the general principles of food selection. Two hours a week, first semester, fourth year. PROFESSOR BEARD AND DR. WILCOX.

Opportunity will be afforded, in the laboratories of physiology and physiological chemistry, for the pursuance of special courses of study, in both experimental and chemical physiology, under the direction of the chair.

Courses i and iv in animal biology in the college of science, literature and the arts will be accepted in lieu of first year physiology in the department of medicine.

CHEMISTRY.

The work in this subject is carried on in a building especially arranged for this work. The qualitative laboratory has a floor space of about 2300 square feet and accomodates 100 students at a time. It is used for instruction in general chemistry and analysis. It is well supplied with the usual apparatus. The quantitative laboratory has a floor space of about 1500 square feet, and accomodates 68 students at one time. It is used for instruction in the analysis of the urine, quantitative analysis and organic chemistry. The chemical lecture room is situated in Medical Hall.

Course I. General inorganic chemistry, including qualitative analysis. Lectures, and recitations. 3 hours a week, first semester; 2 hours a week, second semester, first year. PROFESSOR BELL.

Laboratory work; qualitative analysis. 6 hours a week, first year, from October 15th to May 8th. PROFESSOR BELL AND MR. CAREL.

Course II. Analysis of urine and toxicology; chemistry of carbon compounds.

Lectures and recitations. 1 hour a week, first semester; 2 hours a week, second semester, second year. PROFESSOR BELL.

Laboratory work; analysis of the urine. 6 hours a week, second year, from October 15th to January 1st. PROFESSOR BELL AND MR. CAREL.

Courses I, II and III in chemistry in the school of technical and applied chemistry are accepted in lieu of first year chemistry in the department of medicine.

PATHOLOGY AND BACTERIOLOGY.

The laboratories of pathology and bacteriology occupy spacious quarters in the laboratory of medical sciences. A general laboratory, 44x70 feet, is well lighted by windows on three sides and a part of the fourth. Electric light for microscopic and general illuminating purposes is also provided. The arrangement is such that three students are grouped so as to have a sink, with gas, water and waste connection, and ample desk space next the windows. Six lockers, arranged beneath the table and on the walls, provide for apparatus, microscopes, etc., given at the beginning of the course to each student. Immediately behind and accessible to each student, are sterilizers, incubators, blow-pipes, etc. Cupboards, drawers, a large incubator, sinks, fume chambers, demonstration and distribution tables, complete the arrangement of the room.

A pathological preparation room flanks it upon one side, and the room of the demonstrator on the other. Adjoining the latter are the department library and the office and private laboratory of the professor of pathology and bacteriology. Adjoining this is the private laboratory of the professor of surgical and clinical pathology. Specimens illustrative of surgical pathology are here prepared and diagnostic work done.

In the basement of the building, the department has store rooms and a room where pathological animals are housed. Here too are equipped laboratories for bacteriology and experimental pathology, as well as a room in which all the culture media are made.

In the third story, immediately above and of the same size as the large laboratory, is a museum for the storage and exhibition of pathological specimens, while a preparation room for their reception and assorting adjoins it.

The hospitals of Minneapolis and St. Paul afford a large supply of material and frequent opportunities for post-mortem examinations.

MICROSCOPES.

An adequate equipment of microscopes with attachments, immersion lenses, etc., permits of the rental of an instrument to each student, at a cost of \$2.00 per semester, whenever he is unprovided with one suitable for his purposes.

Course I. (a) Bacteriology.

Lectures and demonstrations. This subject will be treated not only from the aspect of pathology, but in its relation to hygiene and public health. The general scope of bacteriology, the classification of the various bacterial forms, the composition and manufacture of culture media, the methods of isolation and culture, the testing of various bactericidal materials, conditions, etc., will be studied until a thorough knowledge of technique is acquired, (so far as may be possible with non-pathogenic bacteria). The special study and comparison of the various pathogenic micro-organisms will then be systematically taken up. 2 hours per week, first semester, third year. PROFESSOR WESBROOK AND DR. WILSON.

(b) Bacteriology. Laboratory work, teaching the general principles of and familiarization with the making of culture media, the methods of culture isolation and the microscopic examination of stained and living bacteria, the testing of various antiseptics, etc.

The student will then be required to grow in the various media, for macroscopic and microscopic examination, all the important pathogenic bacteria, such as the pyogenic bacteria, *B. anthracis*, *B. typhi abdominalis*, *B. coli commune*, *Vibro*

cholerae, B. diphtheriae, B. tuberculosis, etc. Materials and tissues from men and animals, containing these and other bacteria, will be provided for diagnosis, and the isolation of the bacteria in pure culture, where practicable. Parallel study of micro-organisms which might be mistaken for these, will also be pursued. Bacteriological diagnosis, in its relation to clinical diagnosis and public health, will be especially dwelt upon. Nine hours a week, for the first twelve weeks of the first semester, third year.

PROFESSOR WESBROOK, DR. WILSON AND DR. WHITE.

Course II. (a) General pathology.

Lectures, demonstrations and laboratory work on the general processes involved in disease. Bacteriology and its etiological relation is taught concurrently (see above). The general considerations of tumors will be omitted, since it is fully dealt with in the course on surgical pathology and special pathology.

(b) General pathology 2 hours a week, first semester, third year.

Laboratory work, particularly on the history of inflammation, (largely experimental) degenerations, etc. Nine hours a week for four weeks at the end of first semester, third year.

PROFESSOR WESBROOK, DR. WILSON AND DR. WHITE.

Course III (a) Special pathology.

Lectures and demonstrations. The special study of the pathological processes occurring in the blood, vascular and lymphatic systems, lungs, liver, kidneys, alimentary canal, etc., will be taught by the demonstrations of fresh tissues and preserved specimens from the pathological museum. Three hours a week, second semester, third year.

PROFESSOR WESBROOK AND DR. WHITE.

(b) Special pathology. Practical laboratory work, in which the students will be required to mount and examine under the microscope selected, fresh and stained specimens of morbid tissues, fluids, etc. The microscopic and chemical study of such materials as pathological blood, sputum, urine, contents of alimentary canal, etc., and the application of laboratory methods to clinical diagnosis will form an important part of this work, and will be taken up at the completion of the study of the morbid condition in each organ or system. The animal parasites will also receive attention. The histology of the various tumors will be fully given and students will be provided with specimens for staining, remounting and examination. Nine hours a week, second semester, third year.

PROFESSOR WESBROOK, DR. WILSON, DR. HEAD AND DR. WHITE.

(c) Special pathology. Autopsies and post-mortem technique. Students will have an opportunity of personally taking part in this work, under the direction of the pathologist in charge, in the hospitals of Minneapolis and St. Paul. A knowledge of the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.

PROFESSOR STEWART AND DR. ROTHROCK.

Course IV, Surgical pathology.

(See principles of surgery). This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological bases of surgery. The lectures will be illustrated by charts and diagrams, by fresh and preserved specimens, and, so far as practicable, demonstrations will be given of the various processes and of the bacteria concerned. Especial attention will be given to inflammation and its complications, to the infectious diseases of surgical importance and to tumors. 2 hours a week, first semester, third year, and 3 hours a week, second semester, fourth year.

PROFESSOR STEWART.

TEXT-BOOKS AND COLLATERAL READING.

The following text-books are preferred by the faculty. Reference works are suggested, also, for collateral reading:

Medical Dictionaries.

- Gould's Medical Dictionary.
- Dunglison's Medical Dictionary.
- Duane's Medical Dictionary.

Histology.

First year—

- Wilson's The Cell.
- Piersol's Histology.
- Stöhrs Histology.
- Quain's Anatomy, 10th Ed. Vol. I, Pt. II.
- Schæfer's Histology.
- Parker's Biology.

Second year—

- Piersol's Histology.
- Quain's Anatomy, Vol. III, Pts. I, III and IV.

Collateral reading—Kölliker's *Gewebelehre* Pts. I and II; Duval's *Précis d' Histologie*; Ranvier's *Traite d' Histologie*; Böhm u Davidoff's *Histologie*; Behren's *Kossel u Schiefferdecker's Gewebelehre*; Klein's *Histology*; O. Hertwig's *The Cell*; Lee's *Microtomist's Vade Mecum*; Stirling's *Practical Histology*; Willey's *Amphioxus*, etc.; Thomson's *Zoölogy*; Huxley & Martin's *Biology*; Davenport's *Experimental Morphology*.

Embryology.

- Minot's *Embryology*.
- Hertwig-Mark's *Embryology*.
- Marshall's *Vertebrate Embryology*.

Collateral reading—Kölliker's *Enwicklungsgeschichte*; Prenant's *Embryologie*; Schenk's *Embryologie*; O. Schultze's *Embryologie*.

Anatomy.

First year—

- Quain's Anatomy, 10th edition, Vol. II, Pts. I and II.
- Gray's *Descriptive and Surgical Anatomy*.

Second and third years—

- Quain's Anatomy, 10th edition.
- Morris' *Text-Book of Anatomy*.
- Gray's *Anatomy*.
- Holden's *Practical Anatomy*.
- Hayne's *Manual of Anatomy*.
- Holden's *Manual of Dissections*.
- Treve's *Applied Anatomy*.

Collateral reading—*Flower's Osteology of Mammals*; Gegenbauer's *Elements of Comparative Anatomy*; Chauveau's *Comparative Anatomy*; McClellan's *Regional Anatomy*; Ranney's *Applied Anatomy of the Nervous System*; Meynert's *Psychiatry*, Part I: anatomy, physiology and chemistry of the brain.

Physiology.

First and second years—

- Foster's *Physiology*, sixth edition.
- Howell's *American Text-Book of Physiology*.
- Stirling's *Practical Physiology*.
- Burdon-Sanderson's *Handbook of Physiological Laboratory*.
- Waller's *Human Physiology*.

Collateral reading—Landois and Stirling's *Handbook of Physiology*; Chapman's *Physiology*; Stewart's *Practical Physiology*; Yeo's *Physiology*, Martin's *Human Body*.

Chemistry.

Second year—

Tyson's Examination of Urine.
Reese's Toxicology.

Materia medica and therapeutics.

First year—

Pharmacopoea of the American Institute of Homeopathy.

Second year—

Hughes' Pharmacodynamics.

Third and fourth years—

Farrington's or Cowperwaite's Materia Medica, Hahnemann's Organon.

Reference books—Third and fourth years—Allen's Hand Book, Hering's Condensed Materia Medica, Dunham's Lectures.

Pathology.

Ziegler's General and Special Pathology.

Stanglo Text Book of Pathology.

Collateral reading—Hamilton's Text-book of Pathology; Delafield and Prudden's Hand-book of Pathological Anatomy and Histology; Woodhead's Practical Pathology; Weichselbaum's Elements of Pathological Histology; Boyce's Morbid Histology.

Surgical pathology.

Park's Surgery, Vol. 1.

Collateral reading—Warren's Surgical Pathology; Senn on Tumors; Bowly's Surgical Pathology; Tillman's Principles of Surgery and Surgical Pathology; Watson Cheyne's Tuberculosis of Bones and Joints.

Clinical microscopy.

Von Jaksch's Clinical Diagnosis.

Simon's Clinical Diagnosis.

Collateral reading—Lenhartz "Mikroskopie u Chemie am Krankenbett;" Limbeck "Grundriss e Klinischen Pathologie d. Blutes."

Bacteriology.

Abbott's Principles of Bacteriology.

Kanthack and Drysdale's Practical Bacteriology.

Collateral reading—Sternberg's Manual of Bacteriology; Fraenkel's Bacteriology; McFarland's Pathogenic Bacteria; Woodhead's Bacteria and their Products.

Practice of Medicine.

Goodno's Practice.

Raue Therapeutics.

Lippe's Repertory.

Knerr's Repertory.

Pepper's System of Medicine.

DaCosta's Diagnosis.

Physical Diagnosis.

Lilienthal's Therapeutics.

Lippe's Repertory,

Farrington's Clinical Materia Medica.

Vierodt's Medical Diagnosis.

Abrams' Manual of Clinical Diagnosis.

DaCosta's Diagnosis.

Surgery.

- Park's Surgery.
- Homeopathic Text Book of Surgery.
- Moulin's American Text Book of Surgery.
- Bradford & Lovett, Orthopaedic Surgery.
- Pye's Surgical Handicraft.

Skin and Genito-urinary Diseases.

- Skin—Kippax, Hyde, Pye-Smith.
- Genito-Urinary—Doughty, Carlton.

Obstetrics.

- Leavitt.
- Lusk's Midwifery.
- American Text-book of Obstetrics.
- American System of Obstetrics.
- Grandin and Jarman's Midwifery.
- Playfair's Midwifery.
- Boisliniere, Obstetric Accidents, etc.
- Davis' Obstetrics.

Gynecology.

- Wood, Text Book of Gynecology

Ophthalmology.

- Norton, Buffum, Swanzy, Noyes.
- Collateral reading—Fuch's Diseases of the Eye.

Otology and Rhinology.

- McBride, Burnett, Ivins, McDonald, Bosworth.

Nervous and mental diseases.

- Worster on Insanity.
- Clouston Mental Diseases.
- Edinger's Anatomy of Central Nervous System.
- Martin's Nervous Diseases.
- Dana Text-book Nervous Diseases.
- Bigelow's System of Electro-therapeutics.
- Mill's The Nervous System and its Diseases.
- Collateral reading—Hack Tuke's Dictionary of Psychological Medicine; Bevan Lewis' Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localizations of Cerebral Diseases; Strumpell's Text-book of Medicine; Hirt's Diseases of the Nervous System; Horsley's Brain and Spinal Cord.

Diseases of children.

- Tooker's Diseases of Children.
- Holt's Diseases of Children.
- Fisher's American Text-book of Diseases of Children.
- Collateral reading—Cyclopedia of Diseases of Children.

Hygiene.

- Coplin and Bevan's Practical Hygiene.
- Parke's Hygiene.
- Collateral reading—Richardson's Preventative Medicine; Buck's Hygiene and Public Health.

Medical jurisprudence.

- Taylor's Medical Jurisprudence.
- Chapman's Medical Jurisprudence.
- Collateral reading—Hamilton's American System of Legal Medicine; Withaus' and Becker's Medical Jurisprudence and Toxicology; Wharton and Stille's Medical Jurisprudence.

BOTANY.

All students are required to take this course who have had sufficient training in this subject to satisfy the requirements of the chair of materia medica. Lectures, recitations and laboratory exercises. The structure and functions of the vegetative organs of plants, roots; stems and leaves are first discussed, with an outline of plant histology, a consideration of the cell and principal tissues. There are next considered the main facts of plant physiology; the chemical processes in the plant; the various products of metabolism; their function in the plant economy and their economic and medicinal value. The morphology and physiology of flowers, fruits and seeds are studied; it is pointed out how these and other parts of plants come to be of medicinal importance. The principles of scientific nomenclature are briefly set forth, with a discussion of broad lines of classification. A brief account is given of some of the more important plant families, with special reference to plants of medicinal value. Freshman year, first semester.

All communications pertaining to the college of homeopathic medicine and surgery should be addressed to the Dean, A. P. Williamson, M. D., No. 602 Nicollet Avenue, Minneapolis, Minn.

The College of Dentistry

FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
THOMAS E. WEEKS, D. D. S., *Professor of Operative Dentistry and Crown and Bridge-Work.*
WILLIAM P. DICKINSON, D. D. S., *Professor of Therapeutics and Clinical Professor of Operative Dentistry.*
THOMAS B. HARTZELL, D. M. D., M. D., *Professor of Pathology and Oral Surgery.*
OSCAR A. WEISS, *Professor of Prosthetic Dentistry and Orthodontia.*

OTHER INSTRUCTORS.

- GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*
CHARLES A. ERDMANN, M. D. *Assistant Professor Anatomy.*
RICHARD O. BEARD, M. D., *Professor of Physiology.*
CHARLES J. BELL, A. B., *Professor of Chemistry.*
THOMAS G. LEE, A. M., M. D., *Professor of Histology and Embryology.*
HENRY M. BRACKEN, M. D., *Professor of Materia Medica.*
FRANK F. WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology and Pathology.*
FRANK R. WRIGHT, D. D. S., M. D., *Lecturer on Anæsthesia and Chief of Anæsthetic Clinic.*
ALFRED OWRE, D. M. D., M. D., C. M., *Instructor in Metallurgy and Operative Dentistry.*
MARY V. HARTZELL, D. M. D., *Instructor in Dental Anatomy.*
H. M. REID, D. D. S., *Instructor in Prosthetic Dentistry.*
E. FRANKLYN HERTZ, D. M. D., *Instructor in Prosthetic Dentistry.*
JAMES O. WELLS, D. M. D., *Instructor in Crown and Bridge-Work.*

ANNOUNCEMENT.

The College of Dentistry of the University of Minnesota offers a progressive course of study which covers three terms of nine months each, in three separate calendar years. Classes are graded as first, second and third year. Students who successfully pursue this course are given the degree D. M. D. (doctoris in medicina dentaria), which entitles them to come before any state board of dental examiners for a license to practice dentistry in that state.

The central idea upon which this institution was founded, is that dentistry is a branch of the healing art, and that the practitioner should possess a medical education, hence the curriculum has been broadened so as to include the fundamental principles that underlie the practice of medicine. In this connection special attention is called to the fact that while a thorough course is required, practical work is not neglected. The technical courses are very complete and the clinical facilities are unsurpassed.

Another special feature of this institution is that in laboratory work and infirmary practice, students at all times operate under competent instructors, the professors themselves serving as demonstrators, and every stage of each operation receives due criticism and marking.

COURSES OF INSTRUCTION.

FIRST YEAR.

ANATOMY.

Osteology. Lectures and recitations, covering a thorough study of the human skeleton, and supplementary work on the osteology of domestic mammals; three hours each week, for ten weeks of first semester. Laboratory work on the human skeleton; class in sections, two hours each section, for ten weeks, first semester.

Syndesmology. Lectures, recitations and laboratory demonstrations. Three hours each week, for four weeks, first semester.

Myology. Lectures and recitations, covering the entire muscular system of the human body with supplementary study of comparative myology; three hours each week, sixteen weeks. Laboratory work consists of identifying the muscles of the human body on dissected preparations and showing their actions. Class in sections, four hours each week, for five weeks. Also attendance upon lectures on descriptive, topographical and surgical anatomy, two hours per week.

Text-book required—Quain's Anatomy, 10th edition, Vol. II, parts 1 and 2, or Gray's Anatomy.

DENTAL ANATOMY.

The subject is taught by a thorough laboratory course, in which the student studies the teeth by dissections, modelling, carvings and drawings. In the study of dental anatomy, human and comparative, the definition, terminology, notation, form and arrangement of the teeth will be fully considered, also macroscopic and microscopic characteristics of sections, including the study of the relation of enamel to dentine and of the pulp canal.

In the study of structural anatomy, teeth will be selected and mounted upon wooden blocks. They will then be filed down until the pulp chamber and canals are exposed, and drawings from actual measurements of the different aspects will then be made and carefully studied.

The didactic instruction will be in nature of "chalk talks" and recitations from Black's Dental Anatomy. The standing of the student will be determined by marks given on the cutting of sections, models, drawings and recitations.

Text-book required—Black's Dental Anatomy and Week's Operative Technics.

PHYSIOLOGY.

The subject is taught by recitations and lectures illustrated by practical demonstrations. These embrace the discussion, and as far as possible, the observation of physiological ingredients of the animal body; of the physiology of cell life or the fundamental properties of the cell; the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues, and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, excretion and respiration.

Text-book required—Foster's Physiology.

HISTOLOGY AND EMBRYOLOGY.

This course will consist of lectures, recitations, laboratory work and demonstrations, and will include a study of the structure and properties of protoplasm; the cell, its structure

and properties, cell division, reproduction, ovum, spermatozoon, and formation of blastoderm. A study of the structure and life history of certain type forms of unicellular animals and plants, as amoeba paramoecium yeast, sperogrya, etc., simple metazoa, as hydra, etc.; a consideration of the structure of vertebrates; the tissues, as epithelium, connective tissue, cartilage, bone, etc., muscle, nerve, blood and lymph; vascular and lymphatic system. The teeth, enamel, dentine, cementum, pulp, etc. A general outline of the development of the embryo; the formation of the head; development of the jaws, teeth, oral cavity, glands, etc.

First semester, recitations, four hours per week; laboratory, six hours per week.

Text-book required—Stöhr's Histology.

CHEMISTRY.

Lectures on inorganic chemistry. Laboratory. General chemistry and qualitative analysis.

Text-book required—Remsen's Chemistry.

PROSTHETIC DENTISTRY.

The work in this year is entirely technical and includes the consideration of impression materials of different kinds and their properties; taking impressions, making casts and models; making partial upper plate with rubber base, comprising the making of trial-plate, taking bite, mounting case in articulator, grinding and arranging teeth for proper articulation, flasking, packing, vulcanizing and finishing; this plate is then broken and repaired and must fit the model when completed. Making full upper and lower sets of teeth upon rubber base, using plain teeth and arranging same in accordance with the Bonwill law of articulation; making full upper and lower swaged metal plates, comprising the making of models moulding in sand, casting dies and counter-dies; swaging plate to fit model, soldering rim and grinding and polishing metal. Making lower cast-metal plate, comprising the making of models and moulds, casting and polishing.

The properties of steels, forging, hardening, tempering and polishing, the making of excavators and chisels, band drivers, band removers and wrenches or keys. Making taps for and threading nuts, etc. Each operation is performed by the student after a demonstration by the teacher.

Text-book required—Essig's Prosthetic Dentistry or Richardson.

SECOND YEAR.

ANATOMY.

I. Splanchnology. Lectures on the thoracic, abdominal and pelvic viscera, two hours each week, for 10 weeks. Laboratory work. Demonstrating and dissecting the thoracic, abdominal and pelvic organs of the human subject, or of the dog or sheep.

II. Splanchnology. Descriptive and topographical anatomy of the thoracic viscera, the alimentary and urino-genital organs. Lectures and recitations, three hours each week, for 10 weeks.

III. Descriptive and surgical anatomy. Head, neck, trunk and extremities. Lectures and recitations, three hours each week, for 12 weeks.

Text-book required—Quain's Anatomy, 10th edition, or Gray's Anatomy.

IV. Dissecting. The work extends over a period of eight weeks, requiring 15 hours each week. The dissection of two parts is required. The method of work follows that laid down in Holden's Manual of Dissections.

MATERIA MEDICA AND THERAPEUTICS.

I. Pharmacology. This course includes the study of the general characteristics of drugs and their physiological action, beginning with a comprehensive classification of remedies employed in dentistry. Lectures, recitations and laboratory work. Until holiday vacation.

Text-book required—Bracken's Materia Medica.

II. Therapeutics. This course is given by lectures and recitations, and clinically. The student being instructed in the special therapeutics of dental and oral diseases; systemic treatment, in cases requiring it, receiving due consideration. New remedies that give promise of value are fully studied and put to practical test in the infirmary under direct supervision. Antiseptic and disinfectant methods also receive due attention. After holiday vacation.

Text-book required—Gorgas' Dental Medicine.

PATHOLOGY.

The instruction in this branch will begin with a consideration of the terminology belonging to the subject, followed by a presentation of the lesions of inflammation, local and general, and the degenerate changes in the tissues.

The general character of tumors, practical consideration of pathological dentition, pyorrhœa alveolaris, pulpitis, pulp nodules, secondary dentine, pericementitis, alveolar abscess, caries of jaw, and necrosis dependent on a diseased condition of the teeth, the various inflammations of the oral cavity, including syphilis and tuberculosis, will all receive due attention.

Text-book required—Delafield and Prudden.

OPERATIVE DENTISTRY.

Didactic. Lectures and recitations, covering the influence of form and arrangement of the teeth as a predisposing cause of caries. Deposits and their removal; classification and preparation of cavities; filling materials, their preparation and insertion; pulp treatment, radical and conservative; mechanical principles of force and resistance; exclusion of moisture; separation of teeth; contour, contact and occlusion and the use of the matrix.

An examination will be held at the close of each subject.

Technical—The course of technics which is given at the beginning of this year includes the formation of typical cavities in plaster models and natural teeth. Preparing and inserting the various filling materials—gutta percha, cements, amalgam, tin and gold. Protecting nearly exposed pulps, and capping exposed pulps; treating and filling pulpless teeth, gaining access to canals, cleaning and filling them with various materials, subsequently examining them to note results. The application and retention of the rubber dam, etc.

Clinical. Students enter the infirmary as soon as they have mastered sufficient of the technics to warrant their admission. Here they are under the immediate supervision of the instructors in this branch, who teach them how to meet patients, diagnose, treat and prognose cases, beginning with those requiring the simplest service and progressing as their skill increases. This intimate association of the technical and clinical enhances the value of the former and facilitates progress in the latter. Each operation is first presented to the student by a demonstration given by the instructor.

Text-book required—Weeks' Operative Technics.

PROSTHETIC DENTISTRY.

Didactic. Lectures and recitations will cover the various bases used in mounting artificial teeth, their characteristics and preparation, mineral and porcelain teeth, their composition, form and color as related to the several temperamental types and their forms as adapted to the various kinds of bases. The preparation of the mouth for artificial teeth and various methods in use for their retention will be fully considered.

Technical. Making upper swaged plate of german silver, mounting plain teeth thereon to articulate with model of lower natural teeth. Making upper combination swaged metal and rubber plate, mounting gum section teeth thereon to articulate with lower natural teeth. Making partial lower swaged metal plate with reinforcement and clasps. Making partial upper swaged metal plate with teeth attached by soldering. Making lower cast metal plate, casting metal around lingual side of teeth and forming gum upon labial and buccal sides with pink rubber.

Clinical. The student enters the infirmary this year upon completion of the technic course, and puts into practice the principles there acquired.

Text-book required—Essig's Prosthetic Dentistry, or Richardson.

ORTHODONTIA.

The work in this year is technical and includes a consideration of material for regulating appliances. German silver, its properties, annealing and tempering; drawing wire, making tubing and band material, constructing bands with screw: jack-screws of different forms, rotation and expansion appliances, retractors and retainers.

Text-book required—Guilford's Orthodontia.

CROWN AND BRIDGE WORK.

Didactic. The work of this year is didactic and technical. Lectures and recitations will cover the preparation of roots for gold, porcelain and porcelain-faced crowns. The principles of construction and attachment of the various kinds of crowns and bridge-work will be fully taught.

Technical. Preparing root for post, grinding, setting porcelain crown without band. Preparing root for porcelain crown with band, measuring root, making band to fit same. Construction of the crown. Gold shell crown, making band, swaging, reinforcing and fitting cap, assembling, soldering, finishing and setting upon root. Making cap and post for porcelain-faced crown, grinding, fitting, backing and attaching face to cap, finishing and setting upon root. Making gold and porcelain-faced dummies and assembling the same with crown to form a bridge.

Text-book required—Essig's Prosthetic Dentistry.

THIRD YEAR.

PATHOLOGY.

The course in this year includes lectures, recitations and practical work in the laboratory, beginning with the study of inflammation, giving particular attention to the minute changes occurring in the tissues; inflammation in bone; chemiotaxis and phagocytosis demonstrated; the history of an abscess; the degenerations; and the study of tumors, with special reference to those growths most common to the face and oral cavity.

Text-book required—DeLafield and Prudden.

BACTERIOLOGY.

Lectures and recitations, illustrated by microscope; preparations and culture of various pathogenic bacteria; laboratory exercises in staining and diagnosing pathogenic bacteria. Opportunity will be offered in the laboratory for special research work.

Text-book required—Abbott.

ORAL SURGERY.

The subject of oral surgery will be taught clinically and didactically. The large amount of clinical material presenting at the infirmary, furnishes ample opportunity for practical demonstration. Students are required to take charge of cases and carry them through under the advice of the instructor in charge. The didactic lectures will include a full consideration of all the surgical lesions of the oral cavity and associate parts, including oral tumors and the reflex neuroses connected with the fifth pair of nerves; fracture of the maxilla; cleft palate and hare-lip; caries and necrosis of the jaws from constitutional causes; adenoid growths and nasal polypi in their relation to oral surgery; suppuration of the antrum; ulitis; epulic growths; fungoid pulp; ranula; exostosed and fused teeth; ankylosis and discolorations, implantations, obturators, interdental and other forms of dental splints.

Arrangements have been made with several clinicians connected with the different hospitals of the city to give special clinics. An abundance of material representing all the dif-

ferent forms of diseased conditions of the mouth and associate parts is daily to be found in the infirmary service, which will be assigned to students for treatment under direction of the professor of oral surgery.

Clinical lectures on the cases presenting will be given from time to time. These cases include alveolo-dental abscesses; caries and necrosis of the maxillary bones; diseased condition of the antrum; pyorrhœa-alveolaris; dislocations and ankylosis; facial neuralgias; tumors of the mouth and associate parts; hare-lip, cleft-palate; implantation cases and fractures.

Text-book required—Marshall's Oral Surgery.

ORTHODONTIA.

Didactic. Lectures and recitations upon the classification of irregularities of the teeth; etiology, local and constitutional, evils arising from; various systems of appliances used in treatment of; materials and details of their construction.

Clinical. In this year an ample clinic affords opportunity for each student to treat cases of irregularity. He will be allowed to use such of the technical material, which he has constructed, as is necessary. The correction of at least one case is obligatory.

Text-book required—Guilford's Orthodontia.

OPERATIVE DENTISTRY.

Didactic. The lectures and recitations of this year will include, the relation of the deciduous to the permanent teeth and their treatment; sensitive dentine and its control; erosion and abrasion; bleaching teeth; and inlays of porcelain and gold. Examinations will be held at the conclusion of each subject and a general review will be had at the close of the year.

Clinical. Many clinics demonstrating advanced operations and peculiar methods are given in this year. The student has ample opportunity to put these methods into practice; he will also give special attention to the different forms of pathological lesions that pertain to daily office practice, and will carry cases on to completion, including the restoration of the teeth to usefulness by filling, crowning or bridging, as the case may require. All operations will be marked and the record so made, together with a written examination on the didactic work, will form the final test in this branch.

Text-book required—Kirk's Operative Dentistry.

PROSTHETIC DENTISTRY,

Didactic. Lectures and recitations on obturators, their application and construction, continuous-gum work and its application and construction.

Technical. The construction of vulcanite and metal plates employing the various methods of rigid retention, and the construction of continuous-gum plates.

Clinical. In this year the student does the more complicated operations of this branch. The rarer cases which appear in the clinic are all utilized to the advantage of the entire class.

Text-book required—Essig's Prosthetic Dentistry or Richardson.

METALLURGY.

Didactic. This subject will be treated in the following order: Metallurgical terms, processes and the principles upon which they are based; the various metals and their ores; processes of extraction and refining; their properties and application in the arts, especially in dentistry; alloys, general, and those used in dental amalgams. Lectures and recitations once a week throughout the year, written quizzes monthly.

Technical. Refining of gold and silver, producing pure metals from scraps and filings. Making alloys for plate, crown, and bridge-work, solders, and alloys for dental amalgams.

Special attention is given to the melting, casting, cutting, annealing and testing of dental amalgam alloys. Each student will be required to provide metal scraps for refining, and metals for amalgam alloys, with which to produce by the processes named, metals and alloys which shall be retained by him for future use.

Text-book required—Hodgen's Practical Dental Metallurgy.

CROWN AND BRIDGE-WORK.

Technical. The construction of porcelain crowns and bridges, and crowns with attachments for the rigid retention of plates.

Clinical. The student in this year will perform practical operations in the mouth, covering all forms of crown and bridge-work.

Text-book required.—Essig's Prosthetic Dentistry.

PHYSICAL DIAGNOSIS.

The subject of physical diagnosis will be taught didactically and practically. This course will have direct bearing upon the subject of anæsthesia and will be as complete as its importance demands.

Text-book required—Tyson, Physical Diagnosis.

ANÆSTHESIA.

This subject will be taught didactically and clinically, the technics of anæsthetics, both general and local, receiving full consideration. All anæsthetics are administered in the clinic, and full instruction concerning the use of them is given. The members of the senior class are required, under direction, to administer them and extract teeth under these agents.

Text-book—Turnbull's Manual.

STUDENTS' DENTAL SOCIETY.

In this year a society is organized, which is under the direct supervision of the faculty, and is made a part of the course of instruction. Every third year student is required to prepare an original paper upon some dental or allied topic, and present it to the secretary of the faculty before the holiday vacation. These papers will be marked by the chairs to which the topic belongs, and the eight students whose papers receive the highest marks will have the honor of presenting them before the society. Three members of the class will be required to prepare discussions of the subject of each, the essays being furnished them in advance for the purpose. The meetings will be held at half past seven o'clock, on evenings to be designated by the faculty, after the holiday vacation.

The junior class students are expected to be present, in order to become familiar with the details of conducting deliberative associations of this character.

RECAPITULATION.

FIRST YEAR.

Anatomy—Lectures and recitations.

Physiology—Lectures and recitations.

Histology and embryology—Lectures and laboratory.

Chemistry—Lectures and laboratory.

Dental anatomy—Lectures and laboratory.

Prosthetic technics—Laboratory.

SECOND YEAR.

Anatomy—Lectures and laboratory.

Pathology—Lectures.

Materia medica—Lectures and laboratory.

Therapeutics—Lectures, recitations and clinical.

Operative dentistry—Lectures, technical and clinical.
 Prosthetic dentistry—Lectures, technical and clinical.
 Orthodontia—Technical.
 Crown and bridge work—Lectures, recitations and clinical.

THIRD YEAR.

Pathology—Lectures.
 Bacteriology—Lectures, recitations and laboratory.
 Oral surgery,
 Physical diagnosis, } Lectures and clinical.
 Anæsthetics, }
 Orthodontia—Lectures, technics and clinical.
 Operative dentistry—Lectures and clinical.
 Prosthetic dentistry—Lectures, technical and clinical.
 Crown and bridge work—Technical and clinical.
 Metallurgy—Lectures and technical.
 Students' Dental Society.

GENERAL INFORMATION.

THE COLLEGE YEAR.

The twelfth annual session of this college opens Tuesday, September 12th, 1898, and closes on the first Thursday in June, 1900.

The college year will be divided into semesters, the first ending January 27th, 1900. The succeeding week will be devoted to the midwinter examinations. The second semester begins February, 6th, and the lecture courses will close May 17th, when the final examinations of the year commence.

Practical work for both the senior and junior class, will continue until June 1st.

The technic and laboratory courses begin immediately upon the opening of the school, the classes being called Wednesday, September 13th. The lecture courses commence Tuesday, September 19th.

Commencement exercises will occur in common with the other departments of the University, on Thursday, June 7th, 1900.

All statements in this announcement as to courses of study, conditions, requirements or fees, have reference or binding force upon the session of 1899-1900.

QUALIFICATIONS FOR MATRICULATION.

The examinations for admission commence Tuesday, September 5th, and will be conducted by a committee appointed by the President, from the College of Science, Literature and the Arts, of the University. All applicants will be required to present one of the following:

(1) The diploma of a recognized university or college conferring upon the holder the bachelor's degree.

- (2) The diploma of a high school of the first grade of this or other states,
 - (3) The diploma of the advanced course of a Minnesota state normal school. Diplomas will not be accepted unless accompanied by certificate showing amount of work done.
 - (4) Certificates of the Minnesota state high school board, or pass an examination in *English*. A composition of not less than 200 words, upon a subject to be announced at the time. Spelling, punctuation and grammatical construction will be considered.
- Algebra*, as covered in Olney's Elements.
- Physics*, as treated in Avery's or Gages' Elementary text-books.
- Latin*, covering declension, conjugation, construction, rules of grammar, and the translation of three books of Caesar, and
- Plane geometry*.

In addition to the above, certificates will be required, which shall represent the successful passing of two (2) terms of twenty (20) weeks, from the following studies, or passing an examination which shall be equivalent to the same. The certificates may be for one term each from two studies, or two terms from one study.

Language and literature, { Advanced English.
 { German.
 { French.

Mathematics. { Advanced Arithmetic.
 { Higher Algebra.

History. { United States.
 { General.

Physical Geography.

Physiology and Hygiene.

It is provided, that if the above credentials do not represent a sufficient amount of Latin, the applicant will be required to pursue the course provided.

Student may carry one condition in any of the above subjects, English excepted, during their first year; which condition must be removed before entering upon the work of the second year.

In 1900, the requirements will be the same as the requirements for admission to the freshman class of the college of science, literature and the arts, at the present time.

ENROLLMENT.

All students *must be enrolled not later than September 22nd.*

This is in accordance with a rule of the National Association of Dental Faculties; of which this College is a member, requiring all applicants for matriculation to be present not later than ten days after the opening of the session, as published in the announcement.

Students will be assigned seats in the order of, and at the time of their matriculation. Such matriculation and assignment of seats will be had in the office of the registrar of the University. Students will then present themselves for entrance examination; or for the approval of their evidence of preliminary qualification, to a committee of the College of Science, Literature and the Arts appointed for this purpose. Having received an entrance certificate from this committee they will report to the Secretary of the College for admission and classification. They will then be furnished with a record of their standing and of the studies which they will be permitted to take; these they will be required to present to the departments in charge of such studies, within the first week of the term.

ATTENDANCE AND DISCIPLINE.

Students are required to attend four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must invariably be entered during the first week in which they begin.

Habitual absence, without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

The connection of any student with this college, may be terminated at any time, without a return of fees, whenever such action may be advisable on the ground of immorality or disorderly conduct, or a failure to conform to the established rules.

MATERIALS FOR TECHNICS.

One issue for each piece of work will be made by the college, which, in case of failure, loss, damage or destruction, must be replaced by the student.

The completed work remains the property of the college; from three to five pieces in each branch will be retained as honor cases; the remainder may be taken by the students on conditions which will be announced.

INSTRUMENTS, TOOLS AND MATERIALS.

All students are required to provide themselves with instruments, tools and materials as prescribed by the college. These can be obtained in the city, with the usual discount to students. The first installment must be procured and be approved by the instructor before seats can be assigned in the technic laboratories.

COLLEGE MUSEUM.

Members of the dental profession, and others interested, are invited to contribute pathological specimens, casts of malformations, irregularities of the teeth, models, charts, drawings, etc., which may be useful as illustrative matter in the lecture rooms.

ALUMNI ASSOCIATION.

An association of the graduates of the college has its annual meeting during commencement week.

CLINICAL FACILITIES.

The opportunities for acquiring a practical knowledge of both operative and prosthetic procedures is unsurpassed, the material presenting in the infirmary clinic being more than ample for all purposes of instruction.

GRADUATION.

At the close of the third year, a student who has passed all examinations satisfactorily, receives the degree of Doctor of Dental Medicine (D. M. D.) upon the following conditions:

He must be twenty-one years of age and of good moral character.

He must have attended the full courses of instruction, the last of which must have been in this college.

He must have dissected at least two parts; must have performed thoroughly and to the satisfaction of the Professors of Operative Dentistry the usual dental operations, and also demonstrated suitable proficiency in the department of prosthetic dentistry, to the satisfaction of the Professor of Prosthetic Dentistry. All the above operations, as well as the prosthetic work must have been done in the college.

ADVANCED STANDING, ETC.

For regulations as to advanced standing, see page 213; for class standing, page 212; for conditions, page 212; breakage and loss, page 217; buildings and equipments, page 209.

FEES AND EXPENSES.

The college fee, which includes all charges for matriculation, lecture and laboratory courses, dissections, and diploma, (upon graduation,) is, for each year, one hundred dollars, (\$100.00).

One half of this fee will be payable when the students matriculates. The registrar's receipt for this portion will entitle the holder to take entrance examinations and to classify. The second half will be payable at the opening of the second semester February 6th, 1900.

If the applicant fails to pass the entrance examinations, his fee will be returned by the registrar. Absence, or failure to continue study, will not entitle the student to return of any part of above fees, excepting in cases of special hardship, when application may be made to the Executive Committee of the Board of Regents.

A student who takes advanced standing, will receive a credit of five dollars per semester for each laboratory course from which he may be exempt.

In addition to the college fee, there is a rental fee of \$2.00 for a microscope, in each semester when its use is required, provided the student is not supplied with a satisfactory instrument. It is an advantage for the student to possess his own, and assistance in the selection of one will be given when desired. There is also a rental fee of \$1.00 for microscope in the course of bacteriology in the third year.

The cost of books, instruments, tools and materials, is approximately

For the first year course, (including dental engine and vulcanizer),	\$100.00
For the second year course,	85.00
For the third year course,	35.00

The greater part of which will be useful in subsequent practice.

There are no free scholarships, and no students are received for less than the regular fees.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week according to accommodations.

Furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the Secretary of the University Y. M. C. A., Mr. L. T. Savage, to whom inquiries or applications may be addressed.

From one hundred and fifty to one hundred and seventy-five dollars are necessary to defray the expenses of the first month. These include tuition for first semester, board and room for the month, and books, instruments, tools and materials for the year, which must be purchased before commencing work. In order to avoid embarrassment the student should bring sufficient funds to cover these first expenses.

No student will be permitted to take final examinations until after all fees and charges have been paid.

For further information address Dr. W. P. Dickinson, Secretary, Dayton Building, Minneapolis.

The College of Pharmacy

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
FREDERICK J. WULLING, Ph. G., B. S., LL. B., *Dean; Professor of Pharmacology, Pharmaceutical Chemistry, Pharmacal Jurisprudence and Sanitary Science.*
HENRY M. BRACKEN, M. D., *Professor of Materia Medica.*
— *Professor of Pharmacognosy.*
CHARLES J. BELL, A. B., *Professor of Chemistry (General, Medical and Analytical).*
GEORGE B. FRANKFORTER, Ph. D., *Professor of Chemistry.*
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
CONWAY MACMILLAN, M. A., *Professor of Botany.*
EDWARD M. FREEMAN, B. S., *Instructor in Botany and Practical Pharmacognosy.*
FRANK F. WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology.*
GEORGE D. HEAD, B. S., M. D., *Instructor in Clinical Microscopy.*
RICHARD O. BEARD, M. D., *Professor of Physiology.*
JOHN F. FULTON, Ph. D., M. D., *Professor of Hygiene.*
H. L. STAPLES, A. M., M. D., *Instructor in Medical and Pharmaceutical Latin.*
— *Instructor in Mineralogy.*
B. O. LEUBNER, Ph. D., *Assistant in Pharmacy.*
H. C. CAREL, B. S., *Instructor in Chemistry.*
HARRY HOBART HAZELTINE, *Instructor in Materia Medica.*

ANNOUNCEMENT.

In the organization of this college the Board of Regents has aimed to secure the coöperation of the pharmacists of the State. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade. The college is located on the University campus, in the new building, and is one of the colleges of the department of medicine, but is distinct in the government of its affairs. The new building and laboratories are on a par with those of the best in the country, and their equipment is complete.

The work of the college, as outlined in the following pages, is conducted by means of lectures, quizzes and laboratory exercises. Students will find their time fully occupied. The work is of such a nature that no student can accomplish it in the short term of five or six months. Students who may feel unable to complete the work in two years may divide the work in a manner to complete it in three years. Practicing pharmacists who may desire to take certain branches of study, may avail themselves of any of the college facilities, but their studies and time will be subject to regulation as special students.

COURSES OF INSTRUCTION.

- PHARMACY—*General*—Metrology; nomenclature; pharmaco-technology; dispensing.
Inorganic—Non-metals; Metals; gravimetric analysis; alkalimetry; acidimetry; pharmaceuticals.
Organic—Organic drugs; assays; pharmaceuticals.
- CHEMISTRY—*Inorganic*—General, complete through non-metals and metals; chemical philosophy; pharmaceutical; analytical; qualitative; quantitative (volumetric and gravimetric); toxicological; inorganic poisons.
Organic—General, elementary, descriptive and experimental; pharmaceutical; qualitative; quantitative (volumetric, gravimetric); toxicological, organic poisons.
- BOTANY—*Structural*, or organography; comparative anatomy and embryology; histological; microscopical; physiological; systematic.
- MATERIA MEDICA—*Inorganic*—Non-metals; salts of metals; new remedies.
Organic—Vegetable drugs; new remedies.
- PHARMACOGNOSY—*Organic*—Descriptive; microscopical.
- PHYSIOLOGY—*Human*—Elementary; descriptive.
- BACTERIOLOGY—*Elementary*—Descriptive; practical—optional.
- MATHEMATICS—*Pharmaceutical*—*Chemical*.
- URINALYSIS—*Complete*—Chemical; microscopical.
- LATIN—*Elementary*—Medical; pharmaceutical.
- HYGIENE—*Lectures*.
- PHARMACAL JURISPRUDENCE—*Lectures*.
- MINERALOGY—*Elementary*—Pharmaceutical.
- PHYSICS—*Pharmaceutical*—*Chemical*.
- TOXICOLOGY—*Lectures*.
- DISPENSING—*Practical*.
- HOMEOPATHIC PHARMACY—*Lectures and Laboratory*.
- MICRO-CHEMISTRY—*Lectures and Laboratory*.

The courses are comprehensive and thorough, especially adapted to the higher education of pharmacists. In the majority of them the instruction enters into minute details, and the most effective modern methods of teaching are employed in all, including laboratory work. The studies are graded and progressive throughout.

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.
General pharmacy,	Advanced pharmacology,	Students who divide their
Metrology,	" pharmaco-technology,	work among three years will
Nomenclature,	" inorg. pharmaceutical	take the following studies in
Pharmaco-technology,	chemistry,	the first year and divide the
Inorganic pharmaceutical	" organic pharmaceutical	remaining ones equitably
chemistry,	chemistry.	among the remaining two
Inorganic elementary chem-	" inorganic general	years:
istry.	chemistry,	Inorganic general chemistry,
Qualitative chemistry,	" qualitative chemistry,	Inorg. pharmaceutical chem.
Pharmaceutical mathematics,	" pharmaceuticals,	Qualitative chemistry,
Physiology,	" pharmacognosy,	Physiology,
Botany,	" microscopy,	Botany,
Materia medica,	" materia medica,	Latin.
Pharmaceuticals,	Quantitative chemistry,	
Physics,	Pharm. and medical juris-	
Pharmacognosy,	prudence,	
Microscopy,	Bacteriology,	
Pharmacopœia,	Toxicology,	
Latin.	Urinalysis,	
	Mineralogy,	
	Hygiene,	
	Pharmacopœia,	
	Unofficial pharmacy,	
	Proximate analysis,	
	Chemistry of foods.	

PHARMACY, THEORETICAL AND PRACTICAL.

The junior course begins with preliminary lectures considering the history and development of pharmacy, the rank which pharmacy occupies among other professions, text-books, and works of reference. The pharmacopœia and dispensaries receive detailed attention. Measures and weights, the balance—its construction and varieties, and methods of weighing; specific gravity, in detail, follow.

The Pharmaceutical laboratory is under the direct charge of the Dean. The time of instruction is so arranged that the student becomes familiar with the subjects of the lectures from practical work immediately following and relating to them, thereby fixing facts and scientific principles in the student's mind in a manner that does not depend upon his capacity for remembering merely stated facts. A student can better remember that which he did than that which he heard.

Among the practical subjects that receive attention, are the following: Drug grinding and powdering, comminution, contusion, trituration, elutriation, levigation, sifting fineness of powders according to the United States Pharmacopœia.

Collection of drugs, drying, curing, cutting, garbling, etc.

Heat—its sources and uses in pharmacy, its determination, latent and sensible heat; thermometers—the various scales, testing and comparing thermometers, combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens, steam, hot-air and water ovens; drying closets, desiccators, blow-pipes, crucibles; baths for controlling and equalizing heat; water-salt-sand-oil-glycerine-paraffine-hot-air baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, granulation, dehydration, torrefaction, roasting, reduction, oxidation, carbonization, deflagration, ignition, etc.

Solutions—chemical, pharmaceutical, simple, complex, saturated; circulatory, displacement.

Dialysis—construction of dialyser; osmosis, endosmosis, exosmosis, crystalloids and colloids.

Maceration—expression, infusion, decoction.

Percolation—history, theories, various methods and forms of percolators, exhaustion, repercolation, continuous percolation, etc.

Filteration—filtering media, filtration of chemical solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, upward filtration, colation.

Decantation—the syphon and its uses; guiding rods.

Distillation—simple, fractional, destructive, kinds and varieties of stills.

Crystallization—water of crystallization, deliquescence, efflorescence.

Granulation—methods of affecting, etc.

Precipitation—separation, weighing, drying precipitate.

Practical pharmacy—the preparation of pills, solutions, mixtures, cachets, ointments, plasters, suppositories, powders, emulsions, lozenges, etc. Arrangements and appliances of dispensing department.

Inorganic, U. S. P.

Senior course—This course begins with the consideration in detail, of the pharmacy, of organic and inorganic drugs. It embraces a careful study of every important galenical preparation, with the methods of preparation, physical characteristics, reactions, impurities, adulterations and sophistications, etc.

A study of incompatibility is one of the special features of this course; it is viewed from a pharmaceutical and chemical standpoint.

Among the important subjects that will be treated of are the following:

Plant exudations; gums, resins, balsams, gum-resins, oleo-resins, etc.

Cellulin and its various products.

Destructive distillation of wood; acetic acid series.

Carbohydrates: their relationship and characteristics.

Fermentation products: alcohols, ethers, chloroform, nitrous ether, chloral, spirituous liquors, etc.

Organic acids: the official salts and preparations of tartaric, salicylic, benzoic, citric acid and others.

Fixed oils and fats: their preparation, composition and purification, various methods of examination; chemical properties and relations; liquid and solid fats.

Waxes, and animal fats.

Volatile oils: their preparation, physical and chemical properties, composition; adulterations and their detection; botanical and chemical classification.

Alkaloids: physical and chemical properties; the various methods of extraction and identification; classification, alkaloidal reagents, etc.

Glucosides: difference from alkaloids; full consideration of properties.

Animal drugs and products; all the animal drugs are taken up in detail.

The prescription; the study of the prescription, of incompatibilities, reactions; solubility, etc. New remedies are studied, and an exposition of their chemistry and pharmacy is presented.

The laboratory work in pharmacy follows each lecture, and has direct reference to the subjects treated at the lecture. The preparation of the official standard solutions is fully illustrated. The course includes a thorough study of the pharmacy of the following metals and their salts and preparations: Sodium, potassium, ammonium, lithium, barium, calcium, zinc, magnesium, lead, copper, aluminum, mercury, silver, arsenic and antimony, bismuth, iron, manganese, gold, platinum, etc. The course includes a thorough application of the U. S. P. tests for identity, impurities, and strength of official preparations. Considerable time is given to quantitative work, volumetric and gravimetric, including analysis of nostrums, butter, alcoholic liquors and proximate organic analysis if the time permits.

Text-books—U. S. P., U. S. D., Remington's Pharmacy, National Dispensatory, Caspari's Pharmacy.

PHARMACOGNOSY.

This important subject is taught in the senior year.

The vegetable drugs of the United States Pharmacopœia are taken up in the following order: roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum resins, waxes and starches. Each drug is carefully examined both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact form, the history and important features of each drug, with consideration of its importance to the pharmacist. About a month's time is devoted to the examination of powdered drugs especially those most liable to sophistication. The quizzes include careful drill on the constituents, action and dose and official preparations of each drug considered. Identification receives careful attention with weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts.

Text-book—Sayre's Organic Materia Medica and Pharmacognosy.

Reference books.—U. S. P.; U. S. D.; Fückiger and Hanbury's Pharmacographia, Tschirch's Atlas der Pharmacognosie, etc.

The drugs will be considered in the following order:

Roots—Sarsaparilla (Mexican, Para and Honduras), senega, gentiana, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, phitolacca, althæa, belladonna, brionia, calumba, rheum, glycyrrhiza (Spanish and Russian), ipecacuanha, gelsemium, pareira, krameria, rumex.

Rhizomes—Aspidium, zingiber, (Jamaica, East Indian and African), calamus, veratrum, iris versicolor, cyripedium, convallaria, sanguinaria, geranium, podophyllum, valeriana, arnica, serpentaria, spigelia, hydrastis, caulophyllum, cimicifuga, leptandra, menispermum, berberis, triticum.

Tubers and Bulbs—Jalapa, aconitum, colchicum, scilla, allium.

Twigs and Woods—Quassia, hæmatoxylon, santalum rubrum and album, gualacum, dulcamara.

Barks—Cinchona (Rubra and Flava), prunus, virginiana, viburnum prunifolium, viburnum opulus, rubus, quercus, granatum, aspidosperma, irangula, cascara sagrada (false and true), juglans, xanthoxylum, mezereum, gossypii radix, euonymus (of root and stem), quillai, ulmus, sassafras, cascarilla, cinnamomum (Ceylon, Saigon and cassia).

Leaves and Leaflets—Pilocarpus, eucalyptus, uva-ursi, senna (Alexandria and India), erythroxyton (Bolivian and Truxillo), belladonna, stramonium, hyoscyamus, tabacum, digitalis, matico, salvia, hamamelis, castanea, eriodictyon, chimaphila, buchu (long and short), rhustoxicodendron.

Herbs and Flowers—Santonica, caryophyllus, sambucus, calendula, cusso, arnica, matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, thymus, hedeoma, marrubium, chirata sabina, chelidonium.

Fruits—Juniperus, humulus, piper (longum, nigrum and album), cubeba, pimenta, rhus glabra, capsicum, colocynth, cassia fistula, chenopodium, xanthoxylum, illicum, cardamomum, coriandrum, conium, anisum, carum, foeniculum (Roman and German), macis, aurantii amari cortex, aurantii dulcis cortex, limonis cortex, prunum, tamarindus (East and West Indian), phytolacca, ficus, rubus, idacus.

Seeds—Physostigma, amygdalus (dulcis and amara), pepo, theobroma, sinapis (alba and nigra); nux vomica, delphinium, staphisagria, ricinus, tiglium, stramonium, colchicum, cardamomum, strophanthus, linum.

Miscellaneous—Guarana, lactucarium, aloe (Socotrina, Barbadosensis and Capensis), catechu, gambir, kino (Malabar and Pallas), opium, elastica, manna, saccharum lactis, acacia, tragacantha; mastiche, sandaraca, colophonium, mei, guaiaicum, benzoinum, cambogia, galbanum, asafoetida, copaiba, terebinthina, pix (Burgundica et liquida), styrax, balsamum peruvianum, balsamum toltutanum, camphora, thymol, menthol, ammoniacum scammonium, myrrha, ergota (Spanish and German,) sassafras medulla, galla (Apello and Chinensis), kamala, lupulinum, lycopodium, amyllum, cetaceum, cera, cantharis, coccus, ichthyocola, moschus.

Besides the foregoing, a number of the more important unofficial drugs will also be discussed.

GENERAL CHEMISTRY.

This is a course in general chemistry given in the department of medicine. In the presentation of the subject, practical work in the chemical laboratory follows the lectures. The system is one which gives the student confidence in his work from the beginning and the better enables him to keep step with the rapid progress of the instruction.

The course is graded through the junior and senior years, with three lectures and two afternoons' laboratory work weekly during the entire first year and during half of the second year. The second half of the senior year is devoted to lecture work only, the laboratory work concluding in the first half.

Text-books—Remsen's Inorganic Chemistry; Wulling's Chemistry.

QUANTITATIVE CHEMISTRY.

The course in quantitative analysis is given during the senior year. It is graded and begins with simple gravimetric determination of certain acids and metals, followed by determinations of several ingredients of the same compound, and by complex analysis. Volumetric methods are next learned and applied, then gravimetric and volumetric are employed together. The course is didactic and practical. The work may be increased or decreased at the discretion of the dean of the college.

Text-books—Schimpf's Volumetric Analysis.

ORGANIC CHEMISTRY.

This course is given in the senior year. It includes both descriptive and experimental lecture and laboratory work. The organic chemistry of pharmacy is taught in connection with the course in pharmacy and pharmaceutical chemistry.

PHARMACEUTICAL CHEMISTRY.

Inorganic and organic pharmaceutical chemistry is taught in both the first and second years. As it is so important a part of the curriculum it receives attention both in special

lectures and in the laboratory. The principles of chemistry acquired in the other course in chemistry are here applied directly to pharmacy. The chemistry necessary to the thorough comprehension of the Pharmacopœia is expounded and applied in this course.

Text-books—Wulling's *Pharmaceutical Chemistry*; U. S. P.; Sadtler & Trimble's *Pharm. and Med. Chemistry*.

TOXICOLOGICAL CHEMISTRY.

The study of this subject follows the course in general chemistry in the senior year. The course includes the chemistry of organic and inorganic poisons. Toxicology proper is included in the course in materia medica.

Text-books—Reese's *Toxicology*; Taylor on *Poisons*.

BOTANY AND MICROSCOPY.

This course in botany receives the careful attention which is due to a subject of such importance to the pharmacist. It is a junior study and occupies four hours weekly of the students time throughout the college year. The course is a thorough one, including microscopy and a large amount of laboratory work.

The course is chiefly devoted to a study of the morphology and anatomy of the higher seed plants with special attention to the microscopic characters of roots, rhizomes, barks, fruits and seeds. The formation and occurrence of carbohydrates, glucosides, alkaloids, organic acids, resins and gums are carefully studied. Students receive practical training in the preparation and staining of microscopic sections and in the use of micro-chemical reagents. Laboratory work precedes, whenever possible, the lectures on each branch of the subject. Frequent quizzes both oral and written serve to fix the salient points in the students' minds.

Text-books—Strasburger, Noll, Schenck, and Schimper; Porter's Translation.

Reference books—Bastin, Bessey, Vines, Bergen.

MATERIA MEDICA AND THERAPEUTICS.

The work in organic and inorganic materia medica, which includes some therapeutics and toxicology, extends throughout the two years, and occupies from two to four hours weekly. It is taught by lectures, frequently illustrated with specimens belonging to the collection of the college. Pharmacodynamics, including the study of the identity, quality and characteristics of drugs, which is usually included in materia medica, shares fuller attention in the courses in pharmacognosy.

Text-books—U. S. Pharmacopœia; Bracken's *Materia Medica*; Maisch's *Materia Medica*; U. S. Dispensatory and National Dispensatory.

ELEMENTARY PHYSIOLOGY AND ANATOMY.

This subject is taught to the juniors in the latter part of the junior year in a special course of eighteen lectures. The study of the action of drugs and their effect upon the system cannot be intelligently carried on without some knowledge of the structure and functions of the various organs.

Text-book—Martin's *Human Body*.

BACTERIOLOGY.

The course in bacteriology is given to the seniors, and consists of lectures and recitations illustrated by microscopic preparations and culture of various pathogenic bacteria. There is also laboratory exercise in staining and diagnosing of various pathogenic bacteria. Opportunity will be afforded in the laboratory for special research work. This course is optional with students in pharmacy.

Text-books—Schenk's *Bacteriology*; Stenberg's *Bacteriology*; Frankel's *Bacteriology*; Abbott's *Bacteriology*.

MATHEMATICS.

Students in this college receive careful drill in the subject of pharmaceutical and chemical mathematics during the two years.

URINALYSIS.

This course comprehends both qualitative and quantitative determination of the constituents of normal and pathological urine, and a microscopical examination of deposits. Seniors attend in the latter half of the year. The instruction is given partly in the chemical and partly in the histological laboratory.

Text-book—Tyson's Examination of the Urine, Hoffmann and Uitzmann.

HYGIENE AND SANITARY SCIENCE.

A course of from six to ten lectures is provided in this subject. Required of seniors.
Text-book—Parks.

HOMEOPATHIC PHARMACY.

A course in homeopathic pharmacy has been added to the curriculum. It comprises both lectures and laboratory work and is given in the senior year.

Text-book—Homeopathic Pharmacopœia.

MICRO-CHEMISTRY.

This course will be extended during the coming year. Seniors attend.

MEDICAL AND PHARMACEUTICAL JURISPRUDENCE.

A course of lectures in this subject is provided and seniors are required to attend. The lectures are delivered by the dean of the college.

LATIN.

A special course is provided in medical and pharmaceutical Latin, which all students are earnestly advised to attend. Latin is one of the entrance requirements, and this course has been introduced especially for students who are proficient in the other entrance requirements, but not in Latin. The attendance upon the lectures is obligatory for such, and optional for those who have fulfilled the entrance requirement in Latin. The latter will profit by taking this course as it is especially adapted to pharmacists. One hour weekly is given to the study during the school year.

MINERALOGY.

A short course of lectures embracing the minerals and ores which are the sources of the metals and salts used in pharmacy is provided.

PHYSICS.

Students are required to be familiar with elementary physics before entering this college. The physics involved in the various chemical and pharmaceutical processes, is, however, fully elucidated as occasion suggests or requires, and considerable attention is given the subject incidentally, principally in the pharmaceutical laboratory.

PHARMACY LAW.

Several lectures will be given to the seniors on the pharmacy laws of the State.

TEXT AND REFERENCE BOOKS.

Pharmacy: U. S. Pharmacopœia, Remington, Caspari, Coblenz, U. S. Dispensatory, National Dispensatory, Lyons' Pharmaceutical Assaying, Storer's Dictionary of Solubilities, Hager, Fluckiger and Hanbury's Pharmacographia, Era Formulary, American Pharm. and Proceedings, Berichse der Pharm. Gesellschaft, Peter's Ancient Pharmacy; National Formulary, Homeopathic Pharmacopœia, German Pharmacopœia, British Pharmacopœia.

- Pharmaceutical Chemistry*: Wulling, Sadtler and Trimble, Atfield, Simon, Hoffman and Power's Examination of Medical Chemicals, Schmidt, Elsner.
- General Chemistry*: Remsen's Inorganic, Prescott and Johnson's, Watts' Forones, Gmelin's Handbook, Roscoe and Schorlemmer, Watt's Dictionary, Fresenius, Sadtler's Industrial Organic Chemistry.
- Prescriptions*: Ruddiman on Incompatibility, Gerrish's Prescription Writing, Rice's Posological Tables.
- Mathematics*: Oldberg's Pharm. Problems, Weights and Measures, Mathematical Chemistry, Helm and Morgan's, Metric System by Hamblin Smith.
- Materia Medica*: U. S. Pharmacopœia; Sayre; Bracken; Maisch, U. S. Dispensatory; National Dispensatory; Culbresh, Bentley and Trimen's Medicinal Plants.
- Pharmacognosy*: Sayre, Maisch, Rusby and Telford, Flücker, Husemann and Hilger's Pflanzenstoffe, Base on Vegetable Microscopy, Hanbury's Pharmacographic and Science Papers, Tschirch and Oesterle's Anatomischer Atlas der Pharmacognosie, Herlaut's Micrographie des Poudres Officinales.
- Botany*: Strassburger, Woll and Shimper's, Bergen, Bastin, Vines, Bessey, Bentley, Gray, Cross and Bevan on Cellulose, Wiesner's Rohrstoffe, Strassburger and Hillhouse, Geddes, Zimmermann on Botanical Microtechnique, Warning and Posser.
- Urinalysis*: Tyson, Flint, Von Taksch on Clinical Diagnosis, Simon's Clinical Diagnosis, Beale's Chart, Hoffman and Ullmann, Peysers' Atlas.
- Mineralogy*: Dana.
- Physiology*: Martin's Human Body, Foster, Howell's American Text-book of Physiology.
- Bacteriology*: Schenck, Sternberg, Fraenkel, Abbott.
- Toxicology*: Reese, Taylor on Poisons.
- Latin*: Robinson's Latin Grammar of Pharmacy, Jones, Harkness.
- Miscellaneous*: Gill's Oil Analysis, Mandel's Bio-Chemistry, Lefmann and Beam's Analysis of Milk, Wing's Milk and its Products, Lassar and Cohn's Chemistry in Daily Life, Park's Hygiene and Sanitary Science, Stewart's Pocket Dose-book.

LIBRARY.

The students of this college have free access to all the library facilities of the University. The medical library contains, in addition to about fifteen hundred volumes of a technical nature, the more important American and European medical and pharmaceutical periodicals.

LENGTH OF COURSE.

The complete course extends over two years, of eight months each. Students may arrange their work so as to take the course in three years, without additional expense to them. It is quite possible that a three years' course may be required of students in this college in the near future.

The eighth course begins Wednesday October 4th, 1899. at 9:00 a. m., at which time all applicants for admission should present themselves.

REQUIREMENTS FOR ADMISSION.

All applicants must be at least eighteen years of age.

I. Candidates who present a diploma of a reputable college, or of a high school of the first grade, or of the advanced course of a Minnesota State normal school, or of the preparatory department of either Hamline University or Carleton College, or of Pillsbury Academy, or of the Minneapolis Academy, or of any institution of similar standing or grade, will be admitted without examination.

Those bringing certificates of good standing in institutions of the collegiate grade are also admitted without examination.

II. Applicants who bring evidence of having been engaged in the practice of pharmacy for two or more years, who cannot meet the above requirements, are examined in the following branches:

1. English—An original composition of not less than 300 words upon some topic to be announced at the time of examination. Orthography, punctuation, use of capitals, grammatical construction and rhetorical fitness will be considered.

2. Algebra—elementary.

3. Physics—elementary.

III. Other applicants will be examined in the following branches:

1. English.

2. Algebra or geometry—elementary.

3. Physics—elementary.

4. Physiology or botany.

5. Latin—Jones' First Latin Book or an equivalent.

A foreign language, preferably German or French, may be offered in place of Latin, but Latin must then be pursued subsequent to entrance. Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other evidence, that the work in these branches is substantially equivalent, such branches will be accepted as a substitute for those omitted.

The examinations for entrance are conducted by the faculty of the college of pharmacy, in the pharmacognosy room, beginning at 9:00 a. m., Wednesday, October 4th, 1899. Lecture work begins as soon as possible after the examinations, usually the following Monday.

PROFESSIONAL EXAMINATIONS.

Examinations are held during the last two weeks of the regular session and during the last week in January, and are supplementary to the written recitations and quizzes that are held at frequent intervals during the term, and with them form the basis of final determination of fitness for promotion or graduation. Students are rated through-out the year, and all students who have a standing of eighty-five per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but, instead, they keep complete records of all of their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors will call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

DEGREE.

This college confers the degree of pharmaceutical chemist (Ph. C.), upon its graduates.

REQUIREMENTS FOR GRADUATION.

Regular attendance at lectures, quizzes and laboratory exercises. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least four-fifths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character and must be twenty-one years old; must have attended two full lecture and laboratory courses, the last at this college, and must have passed a successful examination in the subjects required for graduation.

Drug store experience is not a requirement for graduation.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon paying an additional fee of five dollars, and complying with all other requirements.

GRADUATE COURSES.

In addition to the course outlined, and which leads to the degree pharmaceutical chemist (Ph. C.), this college offers two graduate courses, the first to continue through one college year and to lead to the degree master of pharmacy, and the second to continue through an additional year or longer, and to lead to the degree doctor of pharmacy. The first graduate course, the one leading to the master's degree, will begin as soon as there are a sufficient number of applicants. It is now intended that the curriculum shall include higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of foods, spectroscopic work, therapeutics, bacteriology and some histology, and a thesis of at least 5,000 words, embodying the results of original work.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent, a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of undergraduate course are equal to those of the undergraduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature in these languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course will be seventy-five dollars, and, in case of graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and breakage in laboratories are the same as those obtaining in the undergraduate course.

The course leading to the doctor's degree will begin one year after the beginning of the course leading to the master's degree.

GENERAL STATEMENT.

Those who do not pass the entrance examinations, may enter this college and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations before the end of the first year. There are a number of preparatory schools in the neighborhood of the University, where the subjects required for admission may be pursued.

Students will be permitted to use crude drugs for the making of preparations, provided such material is approved by the dean of the college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality, are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Students are earnestly requested to be present at the beginning of the school year. Special students, however, may enter at any time; they will not be rated in their work, nor will they be examined unless they make a special request therefor. All the facilities for work in the University are open to the students of this college, subject to the approval of the dean. Opportunity is afforded to do advanced work in all branches. Text books may be obtained after coming to the University.

FEES.

TWO YEAR COURSE.

First year.....	\$75.00
Second year.....	80.00
Diploma.....	10.00
	<u>\$165 00</u>

Students who divide their work into three years pay their fees as follows:

THREE YEAR COURSE.

First year.....	\$45.00
Second year.....	55.00
Third year.....	55.00
Diploma.....	10.00
	<u>\$165.00</u>

There are no other fees in the regular course. Half the annual fees are payable before entrance, the remaining half *before* February 1st. Those desiring to take special work will be required to pay fifteen dollars a subject in the didactic courses and twenty-five dollars in the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two dollars. A rental of two dollars per college year is charged for the use of a microscope. All moneys are payable to the Registrar of the University who will give receipts which must be deposited with the Dean. The receipts are returned to students at the end of each year.

The diploma fee is to be paid by candidates for graduation before the beginning of the final examination. Those whose term rating exempt them from the final examinations pay the diploma fee at least one week before commencement.

If a student is forced to discontinue work before the Christmas vacation, for sufficient reasons, his lecture fee will be returned; if he discontinues work for insufficient reason the fees will be retained and credited pro rata, on any succeeding course of lectures.

Laboratory fees will not be returned, except in case of discontinuance for sufficient reason, before the student has been assigned to a place in the laboratory. It is imperative that the students enter at the opening of the session in order to be admitted to the laboratories.

State Board of Pharmacy—The Board meet at the college in January, April, July and October of each year. For information concerning the Board, address the Secretary, H. G. Webster, 517 Bank of Commerce Building, Minneapolis, Minn.

COLLEGE OF PHARMACY ALUMNI ASSOCIATION.

The Alumni Association meets annually in the college building the day before commencement, at 3 p. m. Every member of the Association is urgently requested to report change of address to the Secretary.

COMMUNICATION.

Address all communications to the Dean, Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

Students

GRADUATE STUDENTS.

CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—45.

Abbetmeyer, Rev. Charles A., <i>B. A. Northwestern Univ.</i> English Philology and Literature, French, German.	Baltimore, Md.
Alcott, A. N., <i>B. A. Washington and Jefferson Univ.</i> Sociology, Philosophy, History.	Minneapolis.
Angus, William, <i>B. A.</i> , '93. American Public Economy—Taxation, History.	Wadena.
Beane, George Samuel, <i>B. A., Victoria Univ.</i> Physics, Astronomy, Mathematics, Chemistry.	Minneapolis.
Benton, George H., <i>B. A., Yale</i> , '75. Economics, History, Politics.	Minneapolis.
Boraas, Julius J., <i>B. L.</i> , '95. English, Philosophy, Scandinavian, French.	Red Wing.
Brohough, Gustave O., <i>B. L.</i> , '89. Political Economy.	Red Wing.
Bronson, H. A., <i>M. A., U. of N. D.</i> , '95. Latin, Greek, Political Science.	Minneapolis.
Buck, Benjamin Frank, <i>Carleton College</i> , Science of Government, Private Economy, Public Economy.	St. Charles.
Danner, Harry R., <i>M. A.</i> International Law.	Stillwater.
Dever, Charles S., <i>B. L., LL. B.</i> International Law, Private International Law, Political Economy.	Minneapolis.
Dunlap, George C., <i>M. A.</i> History, Philosophy.	St. Paul.
Eddy, Ruth Elizabeth, <i>B. A., Vassar</i> , '93. Embryology, Bacteriology, Chemistry.	Minneapolis.
Elmqvist, Rev. A. F., <i>B. A., Gust. Adolphus Cd.</i> Semitic, German and Scandinavian Languages and Literatures.	Duluth.
Evans, Mrs. M. C. English.	
Fink, Bruce, <i>M. S.</i> , '94, <i>University of Illinois; M. A. Harvard.</i> Botany, Zoology, Geology.	Dubuque, Ia.
Flaten, Nils, <i>M. A.</i> , '96. Romance Languages, Latin, Semitic Languages.	Minneapolis.
Gains, Alvin D., <i>M. A., Dartmouth.</i> Economics, Philosophy, English.	St. Anthony Park
Glasoe, Paul M., <i>M. S.</i> Chemistry, Physics, Mineralogy.	Minneapolis;
Griffith, Rev. Samuel N., <i>B. A. Wisconsin.</i> American Public Economy, History of Philosophy, Psychology.	St. Paul.
Hall, Arthur Dillwyn, <i>M. A.</i>	Minneapolis.
Harding, Everhart Percy, <i>M. S.</i> , '95. Chemistry, Physics, Philosophy.	Waseca.

Heard, Rev. J. W., <i>M. A., Lawrence.</i> '86. Philosophy, History, Geology.	Minneapolis
Herrick, Clarence Luther, <i>M. S.</i> Neurology, Zoology, Geology.	Albuquerque, New Mexico.
Hilleboe, Hans, <i>M. A.</i> Pedagogy, English, Scandinavian.	Willmar.
Hodgson, John Edward, <i>M. S., '96.</i> Politics, Economics, History.	Minneapolis.
Jayne, Violet Delille, <i>M. A., Michigan.</i> '87. English Literature and Philology, European History, German.	Minneapolis.
Johnston, George H., <i>M. S., '97.</i> History, Philosophy, Political Economy.	Minneapolis.
Kennedy, Joseph, <i>B. S., '98.</i> Political Science, Constitutional History.	Grand Forks, N. D.
McDonald, Hope, <i>M. S.</i> History, Political Science, Philosophy.	Minneapolis.
MacQueary, T. Howard, <i>M. A.</i> History, Economics, French.	Minneapolis.
Mott, Alice J., <i>M. A., Iowa.</i> Philosophy, Anthropology and Sociology.	Faribault.
Nicholson, Edward E., <i>B. S., Nebraska.</i> Chemistry, Mining, Metallurgy.	
Ramaley, Francis, <i>M. S., '96.</i> Botany, Animal Histology, Chemistry.	St. Paul.
Sawyer, Charles L., <i>M. A., Dartmouth.</i> Pedagogy, History.	Minneapolis.
Sewell, Hannah Robie, <i>M. A., Mich.</i> Economics and Politics—The Doctrine of Value, History.	St. Anthony Park.
Shillock, Anna, <i>M. L., '97.</i> German, History, Philosophy.	Minneapolis.
Swenson, David F., <i>M. A.</i> Philosophy, Greek, Physiology.	Minneapolis.
Tilden, Josephine, <i>M. S., '97.</i> Algology, Organic Chemistry.	Minneapolis.
Tuckey, Edson N., <i>B. A., Hamline.</i> History, Philosophy, Political Science.	Minneapolis.
Whited, Oric Ogilvie, <i>B. Ph. Univ. of N. W.</i> History, Economics, Politics.	Minneapolis.
Winchell, Alexander N., <i>M. S., '97.</i> Geology, Physics, Biology.	Minneapolis.
Young, Alice, <i>M. L.</i> English, French, German.	Minneapolis.
Zeleny, Anthony, <i>B. S. '92, M. S. '93.</i> Physics, Theoretical Mechanics, Mathematics.	Minneapolis.
Zeleny, John, <i>B. S., '92.</i> Physics—Higher Mathematical Analysis.	Minneapolis.

CANDIDATES FOR THE DEGREE OF MASTER OF ARTS—27.

Atwood, John Murray, <i>B. A., St. Lawrence Univ.</i> Political Science, Philosophy, Greek.	Minneapolis.
Austin, Lloyd B., <i>B., A. '96.</i> History, Political Science, Latin.	Minneapolis.
Bailey, Clara Edith, <i>B. A., '92.</i> Greek, French, Sanskrit, German.	Minneapolis.
Beck, Lilly L., <i>B. A. Woman's College.</i> Latin, English, French.	Minneapolis.
Bergin, Rev. Alfred, <i>B. A., Augustana.</i> Hebrew, Oriental History, Old Swedish, German.	Minneapolis.
Biglow, Helen, <i>B. A., Grinnell.</i> Latin, German, History.	Minneapolis.
Cravath, May Hannah, <i>B. A., N. Dak.</i> Economics, Latin, German.	Minneapolis.
Dahlen, Fred, <i>B. A., Luther College.</i> English, Scandinavian, Latin.	Minneapolis.

Darling, Rev. Charles W., <i>B. A., Macalaster.</i> History, Philosophy, Greek.	Warren.
Eaton, Benjamin Galen, <i>B. A. Bates.</i> History, Greek, Philosophy, Latin.	St. Paul.
Ekblad, A. Theodore, <i>B. A., Augustana.</i> Anglo Saxon, Hebrew, German.	Minneapolis.
Fugleskjel, Ole A., <i>B. A., St. Olaf.</i> History, English, Pedagogy.	Sacred Heart.
Gaw, Albert C., <i>B. A., William Jewell College.</i> History, Latin, English.	Faribault.
Geisness, Thomas, <i>B. A., '97.</i> English, Latin, French.	New Richmond, Wis.
Hagsetad, Knut M., <i>B. A., Luther.</i> Latin, History, German.	Minneapolis.
Hodder, Mrs. Mabel E. B., <i>B. A., Syracuse.</i> History, English, Latin.	Minneapolis.
Hoyt, Fannie, <i>B. A., Carleton.</i> English, German, Latin.	Minneapolis.
Jewett, Edmund Gale, <i>B. A.</i> History, Philosophy, Greek.	St. Paul.
Johnson, George, <i>B. A., Luther.</i> English, Scandinavian, Latin.	Minneapolis.
Larsen, Ditman., <i>B. A., St. Olaf.</i> Arabic, German, Scandinavian.	Webster, S. D.
Larson, Adolph, <i>B. A., St. Olaf.</i> Political Economy, English, Latin.	Minneapolis.
Lysnes, Olaf, <i>B. A., St. Olaf.</i> Hebrew, Political Science, French.	Canton, S. D.
Newkirk, Burt L., <i>B. A., '97.</i> Astronomy, Physics, Greek.	Minneapolis.
Nilsson, Victor, <i>Ph. D.</i> Comparative Philology, Scandinavian, Latin, Spanish.	Minneapolis.
Pemberton, John, <i>B. A., Hamline.</i> Philosophy, Economics, Greek.	St. Anthony Park.
Rankin, Albert William, <i>B. A., '80.</i> History, English, German.	Minneapolis.
Snyder, Fred B., <i>B. A., '81.</i> History, Politics, Literature.	Minneapolis.

CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE—21.

Baker, Franklin Luther, <i>B. A., Colgate.</i> Glacial Geology, Chemistry, Histology.	Minneapolis.
Bennett, Estelle Hallam, <i>B. L., S. Dak.</i> Philosophy, History, Sociology.	Minneapolis.
Campbell, John E., <i>B. S.</i> Chemistry, Embryology, Mineralogy.	Minneapolis.
Curtis, John P., <i>B. S.</i> Psychology, Scandinavian, Paleontology.	Minneapolis.
Erickson, Henry Anton, <i>F. E., '96.</i> Physics, Mathematics, Astronomy.	Minneapolis.
Freeman, Edward M., <i>B. S.</i> Botany, Chemistry, Histology.	St. Paul.
Galloway, Lee, <i>B. S., '96.</i> History, German, Economics.	So. St. Paul.
Godward, William A., <i>B. A., '95.</i> Philosophy, German, Sanskrit.	Pembina, N. D.
Gunderson, Alfred L., <i>B. A., Stanford.</i> Physics, Astronomy, Pedagogy.	Minneapolis.
Hartshorn, Willis E., <i>Ph. B. Colorado, M. D.</i> Pathological Histology, German, French.	Minneapolis.
Hitchings, John R., <i>B. A., '98.</i> Botany, Chemistry, Histology.	Minneapolis.
Hoverstad, Torger, <i>B. Ag., B. S.</i> Political Science.	Crookston.

Keller, Frank H., <i>B. S.</i> Chemistry, German, Mining.	Minneapolis.
Kunze, William F., <i>B. S.</i> , '97. Chemistry, Physics, Geology.	Lake City.
Larson, Augustus Theodore, <i>B. A.</i> , '94. English Constitutional History, American History, Greek History, Science of the State, International Law.	Alexandria.
Maxwell, Asa Frank, <i>B. S.</i> , '96. Astronomy, Mathematics, Italian.	Seattle, Wash.
Murfin, Arthur M., <i>B. S.</i> , History, Philosophy, Political Science.	Sleepy Eye.
Olander, Joshua E., <i>B. A.</i> , <i>Augustana</i> . Botany, Chemistry, Psychology.	Minneapolis.
Pease, Levi B., <i>B. S.</i> Chemistry, German, Mining.	Minneapolis.
Pickett, Victor G., <i>B. S.</i> , '96. Economics, History, English.	Minneapolis.
Zeleny, Charles, <i>B. S.</i> Zoology, Botany, Chemistry.	Minneapolis.

CANDIDATES FOR THE DEGREE OF MASTER OF LITERATURE—18.

Bagley, Horace E., <i>B. L.</i> , '94.	Minneapolis.
Beaven, Arthur H., <i>B. L.</i> , '96. History, English, Political Science, Economics.	Minneapolis.
Brugger, Vida, <i>B. L.</i> History.	Minneapolis.
Buer, James, <i>B. L.</i> , '98.	Minneapolis.
Comfort, Sarah Catherine, <i>B. L.</i> , '90. History, English, German.	Minneapolis.
Evans, Mary S., <i>B. L.</i> , '97. History, French, German.	Minneapolis.
Herrick, Mary L., <i>B. L.</i> Drawing.	Minneapolis.
King, Josephine Marrs, <i>B. L.</i> History, German, English.	Minneapolis.
Kingsford, Alfred Charles, <i>B. L.</i> Political Science.	Minneapolis.
Klose, W. H., <i>B. A.</i> , <i>Roanoke</i> . German, English, French.	Minneapolis.
Koehler, Elizabeth S., <i>B. L.</i> French, English, Latin.	Hastings.
McVey, Mrs. Mabel Sawyer, <i>B. L.</i> English Literature.	Minneapolis.
Mattteson, Herman H., <i>B. L.</i> , '96. English, French, Pedagogy.	Minneapolis.
Rankin, Jean S., <i>B. L.</i> , <i>Ripon</i> . English.	Minneapolis.
Ringstad, Edward O., <i>B. L.</i> English, History, Comparative Philology.	Minneapolis.
Sakagami, Yasuzo, <i>B. L.</i> International Law, French, English.	Minneapolis.
Shortt, Edith M., <i>B. L.</i> History.	West Superior, Wis.
Smith, E. Blanche, <i>B. L.</i> English, German, Latin.	Minneapolis.

CANDIDATE FOR THE DEGREE MASTER OF ELECTRICAL
ENGINEERING—1.

Springer, Frank Wesley, <i>B. E. E.</i> , '97. Electric Street Railways, Theory of Alternating Currents, Mathematics.	Anoka.
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OTHERS DOING GRADUATE WORK—62.

Adams, Bertram S., <i>B. S.</i> Psychology.	Minneapolis.
Anderson, Martha Scott, <i>B. A.</i> '93, <i>Ohio Wesleyan Univ.</i> History, English.	Minneapolis.
Andrist, Charles Martin, <i>M. L.</i> , '97 Gothic.	Minneapolis.
Baldwin, Clara F., <i>B. L.</i> English.	St. Paul.
Berg, John N., <i>B. S.</i> '96. Political Science.	St. Paul.
Bennett, J. Cora, <i>Univ. of Wis.</i> Organic Chemistry, Mineralogy.	Minneapolis.
Bennett, Frances L., <i>B. L.</i> '96. French, Pedagogy, Voice Culture.	Minneapolis.
Bryant, Julius Clarence, <i>B. A.</i> '78. Greek, Latin, Engineering.	St. Paul.
Burnes, Clara T., <i>B. L.</i> History, English.	Hopkins.
Carel, Herbert C., <i>B. S.</i> French, German.	Minneapolis.
Chamberlin, Annie E., <i>B. Ph.</i> , <i>Wisconsin.</i> English, German, French.	Minneapolis.
Clark, Mary B. English.	Minneapolis.
Cook, John H., <i>B. A.</i> , <i>Ohio Wesleyan</i> , '78. Chemistry, Mineralogy.	Minneapolis.
Countryman, Gratia A., <i>B. L.</i> English.	Minneapolis.
Dalgren. Latin.	Minneapolis.
Dobie, Ellen, <i>B. S.</i> Physics.	Minneapolis.
Doherty, Agnes E., <i>B. L.</i> , '95. History, English.	St. Paul.
Donovan, Mary E., <i>B. A.</i> , <i>Carleton.</i> English.	Minneapolis.
Eliason, Adolph O., <i>B. A.</i> , <i>Harvard.</i> Economics, English.	Montevideo.
Eliason, Mrs. Annette C., <i>B. L.</i> , <i>Illinois.</i> English.	Minneapolis.
Elwell, Laura. History.	Minneapolis.
Evans, Tamazine McKee, <i>M. L.</i> English.	Minneapolis.
Firkins, Ina., <i>B. L.</i> Italian.	Minneapolis.
Ereeman, Edward M., <i>B. S.</i> Botany, Chemistry, Histology.	St. Paul.
Fullerton, Caroline, <i>M. L.</i> German.	Worthington.
Gould, Chester N., <i>B. A.</i> Comparative Philology, Scandinavian, Greek.	Minneapolis.
Griffith, Edith, <i>B. L.</i> , <i>Carleton.</i> Drawing, Archaeology.	Minneapolis.
Grose, Ingebrikt F., <i>B. A.</i> , <i>Luther.</i> History.	Minneapolis.
Harmon, Mary F., <i>B. L.</i> , <i>Carleton.</i> Latin, English, German.	Minneapolis.
Henry, Anna. Psychology.	
Herman, W. B. Latin.	

Hillman, Ada, <i>B. L.</i> English,	Minneapolis.
Hitchcock, Julius R., <i>B. Ph., Hamline.</i> Pedagogy, English, History.	Minneapolis.
Holland, W. H. Latin, Economics.	
Huntoon, Milton B., <i>B. S., (E. E.), Mich.</i> Alternating Currents, Electrical Laboratory, Mechanical Laboratory, Valve Gears.	Minneapolis.
Keyes, Charles F., <i>B. A., '96.</i> Economics.	Minneapolis.
Kelsey, S. C., <i>Kansas Univ.</i> Alternating Currents, Mathematics, Telephone Engineering.	Minneapolis.
Knight, Bertram, <i>B. S.</i> Physics, Mathematics	Minneapolis.
Leavenworth, (Mrs.) J. C., <i>B. A., Indiana Univ.</i> French.	Minneapolis.
McKay, Donald D., <i>M. A. Manitoba.</i> Philosophy.	Minneapolis.
McMillan, Bertha Laura, <i>B. A.</i> Drawing.	Minneapolis.
Newcastle, Lena M., <i>Columbia College.</i> Mechanical Drawing.	Minneapolis.
Nickerson, Margaret Lewis, <i>B. A., Smith; M. A., Radcliffe.</i> Histology.	Minneapolis.
Noyes, Edmund S. History.	
Peithman, E. C., <i>Ph. D.</i> Physiology.	Minneapolis.
Pendergast, Sophie, <i>B. L.</i> Scandinavian, German.	Hutchinson.
Pettit, Mary S., <i>B. L.</i> English, Drawing, Logic, Italian.	Minneapolis.
Potter, Franc Murray, <i>B. A., '02. M. A., '05.</i> French, English, Philology and Phonology, History.	Minneapolis.
Rankin, Mrs. Jean S. English.	Minneapolis.
Robbins, Edith F., <i>M. S.</i> French, Spanish, Italian, Latin.	Robinsdale.
Rose, A. R. Chemistry, Mineralogy.	Minneapolis.
Sperry, Frederick J., <i>B. A., '96.</i> Animal Biology.	Wasiojo.
Squire, Carrie Ranson, <i>M. S.</i> History, Psychology.	St. Paul.
Sterrett, Lillian J., <i>B. S.</i> German.	St. Paul.
Stevens, Jessie E., <i>B. S., '96.</i> Mathematics, Latin.	Mankato.
Tennant, Grace M., <i>B. A.</i> English.	Minneapolis.
Thompson, Paul J., <i>B. A., Ripon.</i> Political Science, Latin.	Minneapolis.
Traver, Maidee M., <i>B. A., Vassar.</i> Philosophy.	Minneapolis.
Wilder, Helen A., <i>B. S.</i> Mathematics.	Minneapolis.
Xavier, Johan V., <i>B. A., Luther.</i> English Philology, Logic, Pedagogy.	Minneapolis.
Young, Charles Elon, <i>B. A., '03.</i> History.	Henderson.
Young, May. German.	

UNDERGRADUATE STUDENTS.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

SENIOR CLASS—131.

CLASSICAL SECTION—22.

Baxter, Stephen Henry, Minneapolis.	Hotchkiss, Foi, Minneapolis.
Beede, Harry R., Northfield.	Hutchinson, Effie Hinkley, Minneapolis.
Bessesen, Henry John, Albert Lea.	Lothrop, Daniel John, Minneapolis.
Carleton, Lillian Gregory, Minneapolis.	Newkirk, Harris Dana, Minneapolis.
Carson, Charles Frederic, Minneapolis.	Newman, Fannie Sophia, Minneapolis.
Comstock, Grace Eleanor, Mankato.	Nichols, Georgia Lenore, Fergus Falls.
Crouse, Emma S., Minneapolis.	Roberts, Guy Hall, Minneapolis.
DeCoster, Esther Louise, Litchfield.	Sardeson, Eva Rossing, Minneapolis.
Finch, Arthur James, Clinton Falls.	VanVliet, Flora, Burlington, Vt.
Fish, Florence Adams, Minneapolis.	Williams, Essie Winning, Hudson Wis.
Holt, Sophie Sherman, Duluth.	Wyer, Malcolm Glenn, Excelsior.

SCIENTIFIC SECTION—56.

Andrews, Adolph Peterson, Minneapolis.	Hays, Grace A., Minneapolis.
Basford, Alice Whitnee, Minneapolis.	Huff, Charles, Little Falls.
Benedict, Walter Lewis, Minneapolis.	Humphrey, Harry Baker, Elk River.
Bingham, Alice Jennie, Sleepy Eye.	Jacobson, Effie Mabel, Luverne.
Bothe, Edwin Benjamin, St. Paul Park.	Johnson, Charles Anton, Sauk Centre.
Brace, Emory Chace, St. Anthony Park.	Kellam, Collius Marcus, Winona.
Brown, Minot James, Owatonna.	Kinyon, William Ward, Owatonna.
Butters, Frederic King, Minneapolis.	Koch, Gesena Wilhemina, Ashmore Flats.
Chapman, Fanny Belle, Minneapolis.	La Due, Samuel John, Fertile.
Clement, Lucian Orville, Waseca.	Lee, Rudolph Alfred, Long Prairie.
Cornish, Edwin Joseph, Myrna.	Mabey, Perl William, Lake City.
Couper, Everett Wilson, Lodi, Cal.	McIntyre, James, Manannah.
Dinehart, Clarence Christopher, Slayton.	McIntyre, William Adelbert, Minneapolis.
Duncan, Theodore L., Fargo, N. D.	Mann, William Seward, Minneapolis.
Dunlap, Alexander Hamilton, Manistee, Mich.	Mealey, Olive Agatha, Minneapolis.
Eggen, Halsten Olson, Norden, S. D.	Nickerson, Bernard Smith, Monticello.
Emmons, Frank William, Minneapolis.	Olds, Charles Samuel, Luverne.
Fanning, Mary Gilmore, St. Paul.	Olson, Mary Sarah, Grove City.
Fitch, Lester John, Minneapolis.	Plymat, Walter Ashton, Mankato.
Forsyth, Olga Berliot, La Crosse, Wis.	Riggs, Annie Isabel, Monticello.
Foss, Elizabeth H., Minneapolis.	Sasse, Frank George, St. Charles.
Furst, William, Minneapolis.	Shaw, William Thomas, St. Anthony Park.
Gray, Stella E., Preston.	Spencer, Nelle Centenial, Minneapolis.
Green, George Heigert, St. Peter.	Thomas, Alice Agnes, Mankato.
Hall, Sarah Phebe, Zumbrota.	Tone, Add Addison, Gilman, Iowa.
Hallock, Olive Nilsson, Faribault.	Wales, Harriet Emma, Minneapolis.
Hanson, Perry Oliver, St. Paul.	Webster, Jennie Sarah, Clinton Falls.
Hart, Albert, Harmony.	Whitney, Arthur Byron, Slayton.

LITERARY SECTION—53.

Arneson, John Marelius, Lyle.	Buehler, Hettie G., Minneapolis.
Atwood, Sadie May, Minneapolis.	Caplin, Grace, Minneapolis.
Bennett, Kate Townsend, Minneapolis.	Case, Lucy Roberts, Aberdeen, S. D.
Brill, Ethel Claire, St. Anthony Park.	Chadwick, Isabel Clare, Owatonna.
Brooks, Adelia Sophia, Boston, Mass.	Chapman, Lucy Lord, St. Paul.
Brown, Harriette Stuart, Minneapolis.	Child, (Mrs.) Bertha, St. Peter.
Buck, Clemma, Minneapolis.	Cooley, Bret Eugene, Otsego.

Craig, Alice Evelyn, St. Paul.
 Daniel, May, Minneapolis.
 Doty, Mabel Olive, Courtland.
 Dresser, Medora Estelle, Minneapolis.
 Featherstone, Ora M., Red Wing.
 Felch, Frances Barclay, Elk River.
 Funk, Gertrude Elizabeth, Minneapolis.
 Gowdy, Chestine, Minneapolis.
 Henry, Laura Alice, Minneapolis.
 Hibbard, Mrs. Mary Davis, Ithaca, N. Y.
 Hills, Martha Ford, Minneapolis.
 Hoverstad, Bertha, Holden.
 Jackson, Jeanie Moore, Minneapolis.
 Kennedy, Georgena Frances, Minneapolis.
 Kingston, Howard William, St. Paul.
 Klove, Lewis, Dunbar, Ia.
 McGinnis, Edward Francis, Benson.
 Marlow, Kyle Fayette, Morris.
 Marsh, Olive Vincent, Minneapolis.
 Martin, Sophia H., Mason City, Ia.
 Mattison, Sarah, Minneapolis.
 Mitchell, Harriet Grace, Deavenport, Ia.
 Moody, Helen Augusta, Minneapolis.
 Morgan, Abbie, Minneapolis.
 Nickerson, Alice, Elk River.
 O'Hair, Anna Mary Grace, Delano.
 Ormond, James Butler, Hegbert.
 Parker, Isabel Davis, St. Anthony Park.
 Patterson, Iva Fern, Mankato.
 Phelps, George Sidney, Denver, Colo.
 Phillips, Jennie Crays, Minneapolis.
 Priest, Janet, Minneapolis.
 Rector, Grayce Williamnia, Minneapolis.
 Savage, Nellie, Minneapolis.
 Smith, Gustavus Foster, Newton, Ala.
 Snow, Winifred, Minneapolis.
 Weber, Amy N., Owatonna.
 Whitten, Lena Gertrude, Anoka.
 Williams, Bessie Adelaide, Minneapolis.

JUNIOR CLASS—161.

CLASSICAL SECTION—30.

Allen, Laura Louisa, Coudersport.
 Barkuloo, Paul Allen, Annandale.
 Beach, Joseph Warren, Gloversville, N. Y.
 Benham, Allen Roger, St. Paul.
 Brearley, Charles Sumner, Minneapolis.
 Butts, Mary Louise, Stillwater.
 Chant, Sarah Emily, Minneapolis.
 Colson, Louis Henry, Wadena.
 Cross, Clare Amelia, Minneapolis.
 Donaldson, Eleanor Lavinia, Minneapolis.
 Faude, Paul, Minneapolis.
 Gislason, Haldor B., Minnesota.
 Griffin, Miriam Edmonds, St. Paul.
 Harris, Julia Fimorie, Minneapolis.
 Heard, Paul Carrier, Minneapolis.
 Hutchinson, Drusilla Christiana, Mps.
 Hutchinson, Ruth Sarah, Minneapolis.
 Johnson, Carl Emanuel, Pilot Mound, Ia.
 Joyslin, Paul, Minneapolis.
 Lee, Emma S., Minneapolis.
 Lehman, Albert, Wadena.
 Lindquist, Ida Pauline, Minneapolis.
 Lühr, Louis Christian, Spring Valley.
 Moon, Seymour Ellsworth, Villard.
 Myers, Raymond Horace, Minneapolis.
 O'Hara, Frank, Lanesboro.
 Sanford, Edward Patterson, Philadelphia.
 Silloway, Charles Frank, Minneapolis.
 Thomas, Clara Champline, Minneapolis.
 Thompson, Horton, Lanesboro.

SCIENTIFIC SECTION—79.

Adams, Mabel, Minneapolis.
 Adams, Paul, Minneapolis.
 Allen, Walter Jewett, Minneapolis.
 Armstrong, Albert, St. Paul.
 Asseln, Bertha Catharine, Fergus Falls.
 Bartholomew, Orlo Alpheus, Chariton, Io.
 Beardsley, Richard Stanley, Camden Place.
 Bedford, Fred William, Rushmore.
 Benson, Harry William, West Superior.
 Braasch, William Frederick, Minneapolis.
 Bradford, Charles Sidney, Farmington.
 Brown, William Lindsay, Minneapolis.
 Carey, Henry Benjamin, Mapleton.
 Carlson, Elmer Ethan, Lake City.
 Chambers, Winslow Clark, Owatonna.
 Cohen, Lillian, Minneapolis.
 Cole, George Emerson, Minneapolis.
 Dibble, Eugene Russell, Minneapolis.
 Dunton, Harriet Emma, Clearwater.
 Fleming, Ellsworth, Garden City.
 Folwell, William B., Cuba.
 Force, Frank W., Minneapolis.
 Fullerton, Ellen Clark, Minneapolis.
 Furber, James Lawrence, Cottage Grove.
 Geiser, Rudolph, Monticello.
 Gerhard, Mary Lamb, Minneapolis.
 Goulding, Louise Sarah, St. Paul.
 Grant, Sarah Catherine, St. Paul.
 Gratz, William Edward Jonathan, Mpls.
 Harrison, Merton E., Minneapolis.
 Hayden, Julius Clyde, Albert Lea.
 Hodgson, William Clague, Herman.
 Ireys, Charles Goodrich, Minneapolis.
 Jerome, Waldron Mirtalu, Minneapolis.

- Kennedy, Arthur Henry, Minneapolis.
 Kierland, Iver, Minneapolis.
 Klein, Horace Cadwell, Minneapolis.
 Kotlaba, Francis Gregory, Winona.
 Laramee, Louis Alfred, Minneapolis.
 Lewis, Claude Bernard, Sauk Center.
 Lossow, Albert Henry, St. Clair.
 Lowry, Horace, Minneapolis.
 Lyon, Edith Eliza, Plainview.
 Lyon, Harold Lloyd, Hastings.
 McBride, Arthur Andrew, Austin.
 MacGregor, Bruce Elmo, Mapleton.
 McIntyre, Mary Stuart, Minneapolis.
 March, Samuel Albert, Minneapolis.
 Marlow, Cora Emilie, Morris.
 Mayo, Robert Johnston, Minneapolis.
 Moyer, Sumner Livingston, Montevideo.
 Nason, Wayne Crocker, Pipestone.
 Nicol, James Houden, Dubuque, Iowa.
 O'dell, William Frederick, Chaska.
 Olson, Charles William, Minot, N. D.
 Page, Leroy Albert, Jr., Mason City, Ia.
 Peterson, Selmer L., Norseland, Minn.
 Pillsbury, Charles Stinson, Minneapolis.
 Pillsbury, John Sargent, Jr., Minneapolis.
 Pitt, Herald, Minneapolis.
 Prouty, Emery Mason, St. Paul.
 Pugh, Loye Moses, Hayward, Wis.
 Roe, Ada, Hudson, Wis.
 Roe, Harry B., Minneapolis.
 Sawyer, Fannie Louise, Faribault.
 Schmidt, Gottfried, St. Paul.
 Selover, Jennie Howard, Minneapolis.
 Smith, Elizabeth Marie, St. Paul.
 Smith, Fred William, Mankato.
 Spaulding, Hector Galloway, Minneapolis.
 Squyer, Jane Allen, Minneapolis.
 Stephenson, Robert a Becket, Minneapolis.
 Steuert, Bertha, Fennimore, Wis.
 Stewart, William B., Fergus Falls.
 Stone, Mabel Perrin, Minneapolis.
 Thomas, Anna Belle, Minneapolis.
 Wetzel, Reinhard August, Sauk Rapids.
 Wheeler, William George, Minneapolis.
 Williams, Fred, St. Cloud.

LITERARY SECTION—50.

- Babcock, Mira Arlone, Minneapolis.
 Barber, May Louise, Minneapolis.
 Bradford, Winnifred Grace, Minneapolis.
 Brokaw, Lena Estella, Litchfield.
 Brown, Eliza Kay, Minneapolis.
 Burnham, Ethel Iola, Minneapolis.
 Byrnes, Mary Russell, Minneapolis.
 Campbell, Effie May, Minneapolis.
 Carlson, Lydia Bernhardina,
 West Superior, Wis.
 Cogelow, William J., St. Paul.
 Cone, Benjamin Andrews, Windom.
 Coxe, Jessie Esterbrook, Thomson.
 Crocker, Francis Edna, Minneapolis.
 Crozier, Mary Ruth, Big Lake.
 Dahl, Anna Dorothea, Minneapolis.
 Doak, Jennie Chase, St. Paul.
 Doherty, Anne Edgworth, St. Paul.
 Elton, Carrie Amelia, Owatonna.
 Foote, Clara DeMarrs, Minneapolis.
 Fritzsche, Frances Pauline, Fargo, N. D.
 Grant, Mrs. Airs, Mitchell.
 Hooper, Marie Louise, Minneapolis.
 Jamieson, Gertrude Elizabeth, Devil's
 Lake, No. Dak.
 Johnson, Marie Augusta, Minneapolis.
 Jones, Alice Margaret, Duluth.
 Knox, John Cowing, Jackson.
 Lamborn, Alice Sarah, Minneapolis.
 Lenox, Itha May, Minneapolis.
 Leslin, Lydia Elova, Wabasha.
 Livingston, Grace, Minneapolis.
 McColloch, Maria Reed, Minneapolis.
 McVoy, Maude, St. Paul.
 Marchand, Eliza Young, St. Paul.
 Mareck, Felicitas, Minneapolis.
 Peake, Ora Olga, Minneapolis.
 Quevli, Anna, Windom.
 Rich, Agnes Isabel, Minneapolis.
 Ripley, Edna May, Minneapolis.
 Schibsbv, May, Omaha, Neb.
 Shaw, Mable Edna, St. Paul.
 Simpson, Earl, Winona.
 Sperry, Mary Halesia, Wasioja.
 Tracy, Jennie L., St. Paul.
 Warner, Bertha Bell, Minneapolis.
 Watson, Susanne Helmer, St. Paul.
 Weigel, William Barton, Plainview.
 Wheaton, Maude Esther, Elk River.
 Whitney, Nellie Ardell, Barton, Vt.
 Wiran, Myra, Minneapolis.
 Woodruff, Harriet Isabella, Minneapolis.

CIVIC SECTION—2.

- Gates, Gertrude Eliza, West Superior.
 Hennings, Bernice, Willmar.

SOPHOMORE CLASS—185.

CLASSICAL SECTION—24.

Anderson, Emil John W., Minneapolis.	Jewett, Frank Fanning, St. Paul.
Anderson, Ingvold, Helena, N. D.	Koenig, Helen Ida, Minneapolis.
Bernhagen, John Fred, Minneapolis.	Libby, Harry Clinton, Minneapolis.
Brandsmark, Gertrude Marie, Minneapolis.	McGregor, Earnest Frank, Minneapolis.
Burkhard, Oscar Carl, Preston.	Maley, Linda Helen, Minneapolis.
Carson, Frank, Upsala.	Otte, George Benjamin, Farmington.
Chase, Josiah Hook, Minneapolis.	Squires, Ralph Elmo, St. Paul.
Colter, Florence Pearl, St. Paul.	Sunne, Dagny, Minneapolis.
Davis, Addie May, Minneapolis.	Tate, Isaac Nesbit, Faribault.
Davis, Louis David, Elgin.	Thoreson, Ole, Woodvill, Wis.
Franklin, Mae, St. Paul.	Wakefield Bertha, Sioux City.
Hanson, Henry G., Willmar.	

SCIENTIFIC SECTION—82.

Aarnes, Alvilda, Montevideo.	Knight, Harold Morris, Glencoe.
Adams, Clara May, Minneapolis.	Lamoreaux, Ellen Adelia, Newark, N. Y.
Adams, Sidney DeWitt, Lisbon, N. D.	Lende, Olai A., Hanley Falls.
Belden, Harry Ide, Minneapolis.	Lenfest, John William, Anoka.
Bell, James Ford, Minneapolis.	McClure, John H., St. Paul.
Bidne, Peter K., Highlandville, Ia.	Mahoney, Laura Charlotte, Luverne.
Bidermann, Jacob, Stillwater.	Meyer, Frederick Sophus, Minneapolis.
Brady, Eva Willoughby, Dodge Center.	Nelson, Otto Ferdinand, Hastings.
Burger, Jeremiah A., Huron, S. D.	Nickerson, Clarence Edwin, Monticello.
Burnes, Isabell Francis, Minnetonka Mills.	Norwood, William, Balaton.
Burns, Sara, St. Paul.	Olds, Alice Alena, Luverne.
Buttz, Adrian, Buttsville, N. D.	Page, Arthur G., Minneapolis.
Case, Cleona Louise, Minneapolis.	Page, George Edgar, Anoka.
Case, Mabel Amelia, St. Peter.	Parmelee, Egbert Nelson, Waseca.
Chase, Roe Giddings, Anoka.	Patch, Edith Marion, Camden Place.
Child, Alice May, Glencoe.	Peabody, Eunice D., St. Paul.
Chrysler, Karl Gerard, Lake Park, Ia.	Perry, Gale Willis, St. Paul.
Collins, Arthur N., Minneapolis.	Peterson, Alfred Emanuel, Litchfield.
Cook, Louis Gray, Minneapolis.	Peterson, Matilda E., Minneapolis.
Corson, Margaret Bond, Minneapolis.	Prendergast, Alice M., St. Paul.
Crouley, William Dudley, Redwood Falls.	Price, Harry Edward, St. James.
Dalaker, Hans H., Ossian, Ia.	Reed, Ethel Augusta, Minneapolis.
Denton, Van Lyman, Minneapolis.	Reid, Nettie Clara, Minneapolis.
Duncan, Urni S., Glencoe.	Reid, Niles Edgerton, St. Paul.
Dye, Willard Belshaw, Winona.	Robbins, Amy, Robbinsdale.
Egleston, M. Jay, Wykoff.	Rodgers, Walter Spottswood, Farmington.
Fanning, Clara Elizabeth, Minneapolis.	Rosendahl, Otto, Spring Grove.
Foster, Guy Alton, Becker.	Smith, Edna Lamb, Minneapolis.
Frost, William Stewart, Willmar.	Smith, John Phillip, Cottonwood.
Glover, Frederick, Minneapolis.	Smith, Paul Sherburne, Minneapolis.
Golseth, Gustav, Ashby.	Smith, Robert Percy, Mason City, Ia.
Grass, Charles F., Fergus Falls.	Solhaug, Jens Johan, Glenwood.
Hanson, Peter, Sleepy Eye.	Steel, Glenn, Wabasha.
Harris, Martha Elizabeth, St. Paul.	Thompson, Melvin Charles, Faribault.
Ireland, Roy R., Granite Falls.	Thompson, Rosamond Estella, Minneapolis.
Jeness, Josephine Fancher, Willmar.	Wagner, Minnie Adelaide, Minneapolis.
Kamrar, Melva L., Blue Earth City.	Ward, Laura Belle, Bismarck, N. D.
Kelly, Margaret Reat, Aberdeen, S. D.	Ware, J. Roland, Pipestone.
Kelsey, Grace Louise, Minneapolis.	Weston, William Snow, Faribault.
Kiichli, Adelaide Julia, Duluth.	Whalen, Anna, Minneapolis.
Kinsey, Esther Eliza, Minneapolis.	Wheeler, Frederick Lacy, Minneapolis.

LITERARY SECTION—65.

Allen, Mary G., Red Wing.
 Baker, Gertrude Whittier, St. Paul.
 Bartleson, Maude Muller, Minneapolis.
 Brunes, Gunda, Minneapolis.
 Byers, Blanche Minerva, Princeton.
 Carpenter, Emma H., Minneapolis.
 Christison, Isabelle, St. Paul.
 Comstock, Jessie May, Moorhead.
 Cornish, Bonnie, Myrna.
 Cutler, Helen Gertrude, Red Wing.
 Dodge, Victor Levi, St. Paul.
 Ferry, Thomas Patrick, De Graff.
 Fitzgerald, Alice Ellen, Stillwater.
 Foerster, Alma Ida, St. Paul.
 Freeman, Maude Gertrude, St. Paul.
 Glasoe, Olga, Spring Grove.
 Glover, Daza Marguerite, Minneapolis.
 Graham, Alice Pitcairn, Minneapolis.
 Helliwell, Heler, Minneapolis.
 Hemenway, Helen Juliet, Minneapolis.
 Higbee, Marjorie Alice, Minneapolis.
 Horton, Warren Hale, Duluth.
 Jackson, Alice, Minneapolis.
 Johnson, Einar, Muskegon, Ind.
 Keller, Annice Boory, St. Paul.
 Kjosness, Hannah Josephine, Madison, Minn.
 Kjosness, Martha Albertine, Madison.
 Knox, Earle Seymour, Raymond.
 Lambert, Bernard Nelson, Waverly.
 Langley, Mary C., St. Paul.
 Lawrence, James Wetherby, Minneapolis.
 Luse, Claud Zeph, St. Paul.
 McGinnis, James Bernard, Benson.
 McMillan, Margaret, Minneapolis.
 Mann, Edith, Minneapolis.
 Masee, Will W., Menomonie, Wis.
 Matson, Sadie Lee, Minneapolis.
 Melon, Carl Marcus, Dawson.
 Miller, Maude, St. Paul.
 Moore, Charlotte Love, St. Paul.
 Moore, Margaret, Minneapolis.
 Morey, Vera Louise, Minneapolis.
 Morley, Clara Edith, Minneapolis.
 Olsgard, Edwood Cornelius, Lakota, N. D.
 Olsgard, Helmer Osaias, Lakota, N. D.
 Phillips, Kate Edna, Minneapolis.
 Pierce, Elizabeth Armena, Minneapolis.
 Plummer, Frank Lincoln, Anoka.
 Randall, Bertha Augusta, Anoka.
 Rostad, Edward P., Hader.
 Rydeen, Edward A., Maine.
 Schacht, Theodore Albert, Elgin.
 Snell, Edith Jane, St. Paul.
 Soule, Franta, Minneapolis.
 Spicer, Jessie Irene, Willmar.
 Stanford, Blanche Mary, Kelso, N. D.
 Starr, Augusta Mara, Minneapolis.
 Stevens, Hal J., Spring Valley.
 Stewart, Clara Everts, St. Paul.
 Thomas, George Edwin, St. Paul.
 Todd, Edith Cornelia, Minneapolis.
 Velikanje, Johanna Emma Clara, New Uim.
 Voorhees, Blanche, Minneapolis.
 Wilcox, Mrs. Alice Hurd, Minneapolis.
 Woodcock, Gertrude Mary, Minneapolis.

TEACHERS' SECTION—13.

Aaberg, Arne O., Starbuck.
 Barton, Bertha May, Minneapolis.
 Cloyd, David E., Minneapolis.
 Conser, Charles Calvin, Minneapolis.
 Dennison, Lottie M., Minneapolis.
 England, Ida Albertine, Alexandria.
 Fehr, Margaret, St. Cloud.
 Freeman, Edward A., Delano.
 Gregory, Alice, Minneapolis.
 Lundgren, Alma Marie, Alexandria.
 McGregor, Eliza, Minneapolis.
 Messerschmidt, Lydia, Quincy.
 Sikes, Laura M., Minneapolis.

CIVIC SECTION—1.

Parshall, Dana H., Faribault.

FRESHMAN CLASS—309.

CLASSICAL SECTION—33.

Ackerson, Willard Henry, Minneapolis.
 Alcott, Morrison Eber, Minneapolis.
 Bonniwell, Harry Virgil, Long Prairie.
 Brown, Ella Ada, Aberdeen, S. D.
 Bruce, Clayton Simmons, Minneapolis.
 Buell, Pearl, Hudson, Wis.
 Butterbrodt, Frank Christian,
 Beaver Dam, Wis.
 Dunham, Anna Alice, Owatonna.
 Elliott, Grace Nelson, St. Paul.
 Fish, Helen Randal, Minneapolis.
 Freeman, Henry Jacob, St. Paul.

Harris, Bruce Franklin, Crookston.
 Helgeson, Herman Adolph, Ada.
 Hodges, Lorena Cross, Minneapolis.
 Howes, Lyman Joseph, Duluth.
 Hutton, Daisy, Aberdeen, S. D.
 Kellogg, Lee Olds, St. Paul.
 McGregor, Ella Eleise, Minneapolis.
 Moe, Oscar Alfred, Minneapolis.
 Morrison, Theresa Eleanor, Ryegate, Vt.
 Murphy, Myrtie Agnes, St. Paul.
 Newman, Marion Kate, Minneapolis.

Polk, Grace Elizabeth, Minneapolis.
 Prouty, Walter De Forest, Minneapolis.
 Quirk, J. Park, Minneapolis.
 Reed, John Homer, Minneapolis.
 Ryland, Albert, DeSmet, S. D.
 Saltness, Olga Emelie, Minneapolis.
 Schmidt, Carl Henry, Minneapolis.
 Siegmann, Alvina, Minneapolis.
 Silloway, George Elbridge, Minneapolis.
 Stein, George Charles William, St. Paul.
 Tolerton, Harry Hill, Toledo, O.

SCIENTIFIC SECTION—114.

Austin, Frank Clinton, St. Paul.
 Bean, Lanra Anna, New Prague.
 Berkman, Martha May, Rochester.
 Bessens, William Aaron, Albert Lea.
 Blasing, May Louise, Henderson.
 Bowen, Arthur Lawrence, Minneapolis.
 Boynton, Winifred, New Lisbon, Wis.
 Boardman, Carl, Minneapolis.
 Brand, Charles John, Big Stone City, S. D.
 Baandeis, Helen, Omaha, Neb.
 Brattland, Gilbert Anderson, Ada.
 Brown, Paul F. Pipestone.
 Cadwell, Chauncy, Le Sueur.
 Carlsen, Edwin Laurence, Albert Lea.
 Case, Mason Nutting, Waterville.
 Champlin, Birdie Hortense, Marshall.
 Chase, Lillian, Anoka.
 Coffin, Samuel David, Lyndale.
 Cole, Ruth Fitch, Minneapolis.
 Coombes, Lydia Elizabeth, Minneapolis.
 Crouley, Lulu Madeleine, Minneapolis.
 Delano, Lila Marie, St. Paul.
 Disem, Louise Kellogg, Grand Rapids, N. D.
 Dohm, Laura Anna, St. Paul.
 Drake, Benjamin Jr. Maple Plain.
 Durand, Jay Isaac, Crookston.
 Ertsgaard, Edwin, Fergus Falls.
 Evans, Maurice Vaughn, Mankato.
 Fahey, John Joseph, Green Isle.
 Farnsworth, Ezra, Jr., Minneapolis.
 Farnsworth, John Jay, Minneapolis.
 Feeney, Isabel Marie, Minneapolis.
 Feeney, Lena Millicent, Minneapolis.
 Finke, Pauline Henrietta, Minneapolis.
 Flannery, Henry Clay, Minneapolis.
 Gillfillan, Edward Smith, Washington, D. C.
 Gillette, Ralph Perkins, Minneapolis.
 Goodwin, Helen Marie, St. Paul.
 Goudy, Blanche Pauline, Anoka.
 Griffith, Charles Augustus, Minneapolis.
 Gunderson, Carl Oscar, Kensett, Ia.
 Hansen, Harold Godfrey, Benson.
 Hatch, Samuel Atherton, Pipestone.
 Hauck, Edward W., Minneapolis.

Hawley, Delia, Minneapolis.
 Higgins, Louis May, Minneapolis.
 Hillesheim, Catherine, Sleepy Eye.
 Hillesheim, Clara, Sleepy Eye.
 Hodgmore, Floy Edna, Minneapolis.
 Holt, Daisy E., Minneapolis.
 Hone, Daisy Sarah, Minneapolis.
 Horton, Homer Francis, Algona, Ia.
 How, Mary Willis, Sauk Center.
 Huff, Charlotte Myrtle, Minneapolis.
 Humphreys, Helen, Minneapolis.
 Hutchinson, John Corrin, Jr., Minneapolis.
 Iddings, Grace, Minneapolis.
 Jamison, Earl Porter, Minneapolis.
 Johnson, Antoinette Wallace, Minneapolis.
 Johnson, Hannah, Willmar.
 Johnson, Oscar Victor, Carver.
 Jones, Elizabeth Marie, Minneapolis.
 Kellogg, Karl Bradley, Rochester.
 King, Lillian Virginia, St. Paul.
 Knudson, Charles Ludwick, Minneapolis.
 Krauch, Karl, Arlington.
 Leedy, Zula Wolf, Rapid City, S. D.
 Little, Mabel Claire, Minneapolis.
 McClelland, Alice, Minneapolis.
 McNulty, Agnes Sarah, Forest City.
 Mayo, Carl Asa, Minneapolis.
 Moody, Halstead Carpenter, St. Paul.
 Morton, Willis Richmond, Pipestone.
 Moyer, Waldo Emerson, Montevideo.
 Murfin, Walter Henry, Sleepy Eye.
 Mussell, Katherine, Bayfield, Wis.
 Newgord, Julius Gerard, Minneapolis.
 Newton, Bessie, St. Paul.
 O'Brien, Charles Smith, St. Paul.
 O'Brien, Francis Marie Pansy, St. Paul.
 O'Neill, Frank William, Graceville.
 Passer, Adolph August, Le Lueur.
 Paulson, Clarence Alfred, Mayville, N. D.
 Paulson, Gustave, Minneapolis.
 Peterson, Henry Phillip, James, S. D.
 Phillips, Louis Alnam, Mazeppa.
 Phillips, Rossie Clara, Sioux Falls, S. D.
 Plummer, Horace Edwards, Minneapolis.

Powell, Chalmer Lucas, Minneapolis.
 Pullen, Lidia Carlton, Harrison.
 Ranson, Stephen Walter, Dodge Center.
 Reed, Frank Elisha, Glencoe.
 Rodlun, Mabel Cordelia, Willmar.
 Saunders, Percy Seavy, Minneapolis.
 Schrader, Herman Friedrich, St. Paul.
 Schwallbach, Amelia Otila, Menasha, Wis.
 Schwallbach, Flora Elizabeth, Menash, Wis.
 Smith, Justin Vander Velde, Pekin, Ill.
 Snoddy, Lillian Elizabeth, Resort, Pa.
 Solem, Louis, Minneapolis.
 Staples, Elbridge Cole, St. Paul.

Thirlwall, John Conrup, St. Peter.
 Thomas, Edith, Mignoll, Minneapolis.
 Thompson, Walter Roy, Albert Lea.
 Thorp, Henry Joseph, Clyde, Ohio.
 Tigie, Francis Henry, Coon Creek.
 Tuckey, Loren H., Eden Prairie.
 Tuohy, Edward, Leo, Chatfield.
 Wagner, Susie Amalia, Minneapolis.
 Ware, John Fleming, St. Paul.
 Weed, Benjamin Bartlett, St. Paul.
 Wennerbom, Earnest John, Hector.
 White, Vera Artensa, Chicago, Ill.
 Young, Charles Edward, Elgin, Ill.

LITERARY SECTION—89.

Abbott, Mabel Louise, Minneapolis.
 Alther, Arthur Eugene, Minneapolis.
 Avery, Charles Dwight, Minneapolis.
 Baker, Mae Myrtle, Red Wing.
 Benton, Harry Graham, Minneapolis.
 Blitz, Annice Dudley, Minneapolis.
 Braden, Ruth, Minneapolis.
 Bridgham, Leola Frances, Minneapolis.
 Burgess, Achsa, Minneapolis.
 Butler, Mary Belle, Minneapolis.
 Byrnes, Jane Catherine, Minneapolis.
 Cannon, Bernice May, St. Paul.
 Carpenter, Charles Edward, Minneapolis.
 Carroll, Alice Elizabeth, St. Paul.
 Covert, Bessie, E. Randolph, N. Y.
 Crosby, Louis Moore, St. Paul.
 Darrow, Mabel Caroline, Minneapolis.
 Davis, Grace Harriet, Minneapolis.
 Davis, Jessie Emeline, Anoka.
 Dickinson, Eleanor Barnum, St. Paul.
 Dougan, Alice, Denver, Col.
 Dunbar, Louise Estelle, Minneapolis.
 Elvebak, Albert Johnson, Willmar.
 Erckson, August George, Springfield.
 Estes, Gertrude Eugenia, Minneapolis.
 Farnham, Gratia, Minneapolis.
 Field Pauline, Minneapolis.
 Fosseen, Mabelle Helen, Minneapolis.
 Frederickson, Matt, Windom.
 Freeman, Charles Douee, St. Paul.
 Gilman, Glenora Luneatte, Minneapolis.
 Golden, Laura Elizabeth, Minneapolis.
 Goodrich, Florence Eva, Minneapolis.
 Harrington, Helen, Minneapolis.
 Harrington, Mary Miranda, Minneapolis.
 Hartzell, Margaret Sproat, Minnehaha.
 Hermann, Della, Minneapolis.
 Hermann, Edith Lillian, Minneapolis.
 Houston, Frank Zell, Winona.
 Hitchings, Jennie Alice, Sutherland, Ia.
 Hocanzon, Hemelia Lydia, St. Paul.
 Huntley, Marguerite, Minneapolis.

Jones, Mary Pearl, Minneapolis.
 Joy, Mary Gertrude, St. Paul.
 Kelley, Robert Lincoln, Minneapolis.
 Kindseth, Martin Severin, Hader.
 Kinsey, Jessie Flora, Minneapolis.
 Kluckholm, Verna Alice, St. Paul.
 Knoblauch, Ida, Minneapolis.
 Lewis, Sarah, St. Paul.
 Lindeke, Walter Frank, St. Paul.
 McBain, Mabel, Sleepy Eye.
 Macdonald, Gladys Ermytrude, Minneapolis.
 McDougal, Marjorie, Minneapolis.
 McKeehan, Tabitha Patterson, Minneapolis.
 McReavy, Marie, Minneapolis.
 Marshall, Gertrude Isabel, Minneapolis.
 Matchan, Edna May, Minneapolis.
 Mills, Nellie Elaine, Mankato.
 Nash, Katherine Williams, Lima, Ind.
 Northrop, George Norton, Platteville, Wis.
 Petran, Ethel May, Minneapolis.
 Pickard, Alice Enola, Minneapolis.
 Read, Charlotte May, Minneapolis.
 Rink, Kuno, St. Paul.
 Roberts, Ruth, Fargo, N. D.
 Rudolphi, Anna, Minneapolis.
 Sadley, Elizabeth Viola, Princeton.
 Sanford, Mary Frances, Minneapolis.
 Schriber, May Belle, St. Paul.
 Skaane, Andrew Olaus, Marindahl, S. D.
 Skjei, Martha Beatrice, Madison.
 Smith, Florence Ella, Minneapolis.
 Stinchfield, Nellie May, Rochester.
 Stoughton, Mary Luella, St. Paul.
 Swart, Emma Laurel, Fargo, N. D.
 Swett, Georgia Mitchell, Minneapolis.
 Towler, Lucy, Minneapolis.
 Van Evera, Florence, Minneapolis.
 Wakeman, Edna Gertrude, Minneapolis.
 Weber, Evangeline Marie, Minneapolis.
 Wells, Blanche Howard, Minneapolis.
 Wetmore, Robert Wallace, Minneapolis.
 Willard, Irma, Minneapolis.

Williams, Juanita, Duluth.
 Woodward, Mary Lydia, Langdon.
 Wyman, Mabel Jennie, St. Anthony Park.

Yarnell, Ethel, Minneapolis.
 Zehnter, Ruby Pauline, St. Paul.

CIVIC SECTION—51.

Alexander, Charles Lewis, Kasson.
 Anderson, Peter John, Helena, N. D.
 Andrews, Elizabeth Kidder, Faribault.
 Bomberger, Edna Olive, Minneapolis.
 Butler, Ovid McQuat, Irvington, Ind.
 Campbell, Henry Dow, St. Paul.
 Clark, Will Parkhurst, Galesville, Wis.
 Coates, Mabel Elizabeth, Minneapolis.
 Cook, Belle G., Minneapolis.
 Crysler, John, Minneapolis.
 Dahl, Inga, Minneapolis.
 Danelz, Herman A., Swift Falls.
 Des Lauriers, Alphonso Joseph, Minneapolis.
 Dills, Elmer Leslie, Clark's Grove.
 Edwards, Benjamin Kilbourne, St. Paul.
 Elder, David, Aurora, Ill.
 Fields, Perry Arthur, Blanchard, Ia.
 Fosseen, Arthur Benjamin, Minneapolis.
 Harris, Jane Marquis, Faribault.
 Higgins, Clarence W., Minneapolis.
 Hodnefield, Jacob John, Radcliffe, Ia.
 Hosmer, Ruth, Minneapolis.
 Lane, Charles Frank, Minneapolis.
 Lenox, Harriett, Minneapolis.
 Lind, Norman George, New Ulm.
 McFeeley, Madeleine Sarah, Minneapolis.

McKinley, Luis Herbert, St. Paul.
 McKinnon, Angus McDonald, Crookston.
 Phinney, Barney Orin, Sutherland, Ia.
 Pond, Frances Egleston, Minneapolis.
 Potter, Winnogene Dee, Aitkin.
 Robbins, Adelaide, Robbinsdale.
 Robinson, Eva Belle, Minneapolis.
 Roe, Ellen Florence, Minneapolis.
 Rossman, Willard Allen, Chatfield.
 Rowe, Mina Pearl, St. Paul.
 Schunert, Charles Adolph, Minneapolis.
 Seaton, Charles Henry, Winamac, Ind.
 Seaton, Frank Winslow, Minneapolis.
 Stanley, James Garfield, Minneapolis.
 Stevens, Fred Harding, Minneapolis.
 Stewart, Frederick Alexander, Minneapolis.
 Tondel, Peter, Minneapolis.
 Walker, Caleb Walter, Minneapolis.
 Webster, George Burbank, Minneapolis.
 Wedge, Ralph Charles, Plainview.
 Wennerdahl, John August, Minneapolis.
 West, Ruth, Minneapolis.
 Wheaton, Grace, Minneapolis.
 Winston, Fendal Gregory, Jr., Minneapolis.
 Wyman, James Claire, Minneapolis.

TEACHERS' SECTION—22.

Bird, James Beet, Epworth, Ia.
 Bush, William Emmet, Denmark, Minn.
 Camp, Helen Elizabeth, Minneapolis.
 Clemens, Mary Adeline, Jamestown, N. D.
 Fawcet, Edna Olive, St. Cloud.
 Frederickson, Carl, Windom.
 Fuhlbrugge, Anna Emily, Amithwick, S. D.
 Hawkins, Oscar Ferdinand, Minneapolis.
 Hosmer, Frank Henry, Farmington.
 Kramer, Minnie Idelle, Mondori, Wis.
 Lilley, Gene, Aberdeen, S. D.

McDonough, Julia Genevieve, Butterfield.
 McShane, Katherine, St. Paul.
 Myrick, Harriet Russell, Le Sueur.
 Potter, Stacy Smith, Montrose.
 Remshardt, Mollie, Red Wing.
 Rezin, Jennie Bernice, Rhinelander, Wis.
 Street, Mary Greely, St. Cloud.
 Thompson, Thorwald, Lake Park.
 Townsend, Mildred Mary, Pine Island.
 Watts, Effie Estelle, Minneapolis.
 Werner, Nels Lawrence, Diamond Bluffs, Wis.

UNCLASSED STUDENTS—112.

Adams, Emroy Cynthia, Faribault.
 Barker, Inez Mertia, Rock Creek, Ohio.
 Barnes, Mesa, St. Paul.
 Bartlette, W. Kay, Casselton, N. D.
 Blaisdell, Edward Ward, Albert Lea.
 Blodgett, May Adel, St. Paul.
 Brooks, L. May, Minneapolis.
 Brown, Walter L., Amboy.
 Burrett, Frances Eliza, Washburn Park.
 Burton, Hazel, Deephaven.

Cabell, Elvira D., Minneapolis.
 Caley, Catherine, Minneapolis.
 Chapman, Marion Norton, Minneapolis.
 Castner, Mrs. Minnie Eva, St. Paul.
 Clinton, Mrs. Fannie Loudon,
 Worcester, Mass.
 Cocke, Hildegard Perl, Duluth.
 Coleman, Edward Pierce, Wilder.
 Condit, Jessie Frances, Minneapolis.
 Connor, Earl Hugh, Minneapolis.

- Conway, Genevieve, Minneapolis.
 Cox, Edith May, Minneapolis.
 Cudhie, Emma, Minneapolis.
 Edmison, Margaret Grae, Sioux Falls, S. D.
 Ellis, Charles Sumner, Minneapolis.
 Flather, Mrs. Harriet Frances, Minneapolis.
 Flitner, Charles Edward, St. Paul.
 Fonkalsrud, A. Fred, Minneapolis.
 Foster, Rachel, Minneapolis.
 Fowble, Lucy C., St. Paul.
 French, Alice Winifred Gordan, Minneapolis.
 Fryckman, Bror Gustaf, Minneapolis.
 Fuller, Gertrude, St. Paul.
 Galvin, William Doane, West Liberty, Ia.
 Gowdy, Chestine, Minneapolis.
 Graham, Lizzie A., Epworth, Ia.
 Green, Mrs. Clara Hooker, Minneapolis.
 Gustin, R. D., St. Paul.
 Ilaan, Fray Barbara, Renville.
 Hall, Elizabeth, Minneapolis.
 Hanson, Lulu May, Webster, S. D.
 Hare, Ruth, Minneapolis.
 Harrington, Michael Joseph, Avoca.
 Harrison, Florence, Minneapolis.
 Hart, Lucy, Minneapolis.
 Hawk, Ella M., Redwood Falls.
 Heiser, Margarethe E., Minneapolis.
 Hilden, Hans Edward, Watson.
 Hillman, Minnesota Anne, St. Paul.
 Homan, Josephine, Minneapolis.
 Hospes, Mrs. Marion, St. Paul.
 Janes, Alex, Pipestone.
 Jargo, Mrs. Isabelle Boorman, Minneapolis.
 Jordan, Medora, Tomah, Wis.
 Kienholz, William Simon, Bellingham.
 Lenhart, Samuel, Minneapolis.
 Lewis, Narcissa, Minneapolis.
 Lohre, Nels John, Minneapolis.
 Lovejoy, Emma Adelaide, Nelson, N. Y.
 Lundeen, Cornelia Elizabeth, Minneapolis.
 McCarthy, Thomas Frank, Minneapolis.
 McDermott, Marie A., Minneapolis.
 McQueary, Mrs. Emma Harris, Minneapolis.
 Mahon, Margaret, Otumwa, Iowa.
 Marshall, Allan Knox, Westfield, Mass.
 Messner, Maude Evelyn, St. Paul.
 Miller, Lillian Augusta, Roscoe.
 Miller, Susan Rebecca, Minneapolis.
 Mills, Frank Junius, Minneapolis.
 Moore, Frank Lincoln, Minneapolis.
 Mousch, Genevieve Antoinette, Louisville, Ky.
 Murphy, Mary Emily, Wood River, Neb.
 Nealey, Walter Dana, Minneapolis.
 Norton, Charles John, Mapleton.
 Olson, Adolph, Minneapolis.
 Peakes, Emily Williams, Minneapolis.
 Pelton, Leona, Minneapolis.
 Penney, Florence J., Minneapolis.
 Perera, Edgard L., Alexandria.
 Perkins, Mary Ida, Minneapolis.
 Perry, Florence McCloud, St. Paul.
 Pettit, Bessie Tabitha, Minneapolis.
 Phillips, Flora Case, Sioux Falls, S. D.
 Pickett, Jennie Maud, Minneapolis.
 Porter, Mary, Minneapolis.
 Prosser, John William, Minneapolis.
 Prouty, Florence Evelyn, Minneapolis.
 Read, Sarah Juzi, Chandlerville, Ia.
 Rhodes, Mary, St. Paul.
 Rood, Majorie, St. Paul.
 Rysstad, Olav H., Minneapolis.
 St. Clair, Lillian Rachel, Minneapolis.
 Shellenberger, Mrs. Emma W., Minneapolis.
 Shepard, Blanch Arbella, Minneapolis.
 Shields, Alice, St. Paul.
 Stimpson, Edward Whitenell, Newport, Ore.
 Swanson, Lillian Blanche, Red Wing.
 Sylvester, Florence Mable, Berlin.
 Taylor, Carl Reed, St. Paul.
 Thompson, Blossom, Minneapolis.
 Thrall, Addie Frances, Janesville.
 Torella, Ellen, Marine.
 Trask, Grace Eugenia, Minneapolis.
 Upson, Arthur W., St. Paul.
 Valerius, Nels Erick, Minneapolis.
 Walker, Mrs. Louise A., Minneapolis.
 Warvelle, Francis Gurrie, Kenosha, Wis.
 Ware, Mrs. Kate Webster, Minneapolis.
 Warner, Alice Laura, Minneapolis.
 Weiser, Lillian Anne, Valley City, N. D.
 Wheeler, Carrie M., Minneapolis.
 Wood, Daza Edith, Minneapolis.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANICAL ARTS,

SENIOR CLASS—11.

CIVIL ENGINEERS—2.

- Anderson, John Gunerius, Minneapolis. Whitman, Edward Augustus, New Brighton.

MECHANICAL ENGINEERS—3.

- Bayless, Harry Cornelius, Minneapolis. Wennerlund, Elias Karl, Willmar.
 Richardson, Wilbur Percy, Lake City.

ELECTRICAL ENGINEERS—6.

Arzt, Emmanuel Arthur, St. Paul.	Mac Kusic, Elwood Mansfield,
Graling, Verney, Spring Valley.	Minneapolis.
Hilderbrandt, Henry August Gustave,	Parkhurst, Harleigh, Hartford, Conn.
St. Peter.	Pratt, Arthur Clarence, Anoka.

JUNIORS—26.

CIVIL ENGINEERS—8.

Brush, Carl Fletcher, Eyota.	Newell, Martin William, Minneapolis.
Grime, Edward Morrill, Minneapolis.	Prendergast, Paul Sebastian, St. Paul.
McKittrick, James, New Ulm.	Wardell, Ezra S., Tracy.
Midthun, Ole John, Bergen, Norway.	Yager, Louis, Preston.

MECHANICAL ENGINEERS—7.

Bailey, Campbell Lauran, Minneapolis.	Newhall, William B., Minneapolis.
Daniel, Lester, Minneapolis.	Sperry, Theodore Anson, Wasioja.
Johnston, William Wood, Detroit.	Tracy, Fred Glyndon, Glyndon.
Myrdal, John, Minneapolis.	

ELECTRICAL ENGINEERS—11.

Blake, Henry Barnard, St. Anthony Park.	Scofield, Frank Mertyn, Zumbrota.
Donaldson, William Thomas, St. Paul.	Thaler, Joseph Aukun, St. Paul.
Dow, James Chase, Faribault.	Thompson, Roy Edwin, Waubay, S. D.
Johnson, Frank Edward, Renville.	Warren, Joseph Henry, Minneapolis.
Kinsell, William Leonard, Minneapolis.	Wiltgen, Edward, Minneapolis.
Lawrence, Percy Jones, Minneapolis.	

SOPHOMORE CLASS—37.

CIVIL ENGINEERS—11.

Alee, David Arthur, Minneapolis.	Hill, Arthur Delos, Red Wing.
Chubb, Charles E., Algona, Ia.	Klemer, Frank Henry, Faribault.
Downing, Frank Eugene, St. Charles.	Ober, Walter Marion, Duluth.
Dugan, Edward J., Minneapolis.	Shepley, Charles Rogers, Minneapolis.
Everington, James Right, Minneapolis.	Stewart, Clarence Hockaday,
Gunstad, Iver, Detroit, Mian.	St. Anthony Park.

MECHANICAL ENGINEERS—9.

Bean, William Lloyd, Brainerd.	Schuetz, Darwin, New Ulm.
Buehler, William, Minneapolis.	Turner, Charles Huntington, Fenton, Mich.
Guffin, Clarence Elmer, Minneapolis.	Wilson, Eliel F., Minneapolis.
Robertson, Philip Waters, Minneapolis.	Wood, William Robert, St. Paul.
Rogers, Alfred Active, St. Peter.	

ELECTRICAL ENGINEERS—17.

Anderson, Martin E., Decorah, Ia.	Oftedal, Sven Gjertsen, Minneapolis.
Christiansen, Hans Johan, Calamus, Ia.	Quense, John, New Ulm.
Danner, Jake, Minneapolis.	Randall, Willard Steele, Camden Place.
Davis, Charles Ray, Minneapolis.	Reque, Styrk Gerhard, Spring Grove.
Ford, James William, Jr., Owatonna.	Rosok, Ingvald, Minneapolis.
Greiner, Harry S., Hastings.	Strate, Thomas Henry, Moorhead.
Houts, Guy Joseph, Minneapolis.	Thompson, Jacob Everett, Minneapolis.
McKinster, Harry James, Anoka.	Tullar, Charles Edward, Warren.
Nilson, Wilhelm, Fossum.	

FRESHMAN CLASS—49.

Acomb, William Edward, Minneapolis.	Monty, Frank, St. Paul.
Barthelemy, Paul Peter, St. Cloud.	Moore, William Cole, Minneapolis.
Bean, Guy Myron, Brainerd.	Pajmer, George Bushnell, Minneapolis.
Beaulieu, Richard Laurence, St. Paul.	Postlethwaite, Berkley King, Prescott, Wis.
Bille, Christian, Marshfield, Wis.	Ramstad, Edward Carl, Eau Claire, Wis.
Boland, Harry John, St. Paul.	Roney, James Chester.
Bolcom, Chandler Carroll, Winona.	Schulte, Ross, Santa Cruz, Cal.
Burns, Harvey Lynn, Merton.	Schwarz, John Nichols, Stillwater.
Carr, Harvey Chandler, St. Paul.	Segur, Benjamin Frank, Tracy.
Carter, Cyrus Joseph, Minneapolis.	Spence, William James, La Crosse, Wis.
Cook, Robertson, Minneapolis.	Stanton, Raymond Edward, St. Paul.
Davison, Joseph Henry, St. Paul.	Stone, Melvin Oscar, Minneapolis.
Eberhard, Otto Immanuel, Milaca.	Sudheimer, Edward Lawrence, St. Paul.
Erickson, Carl Gunnard, Minneapolis.	Taylor, Carl von Fridagh, St. Paul.
Fernald, Frank Osborne, St. Paul.	Taylor, Ralph George, Minneapolis.
Flynn, John Gerald, Lake City.	Van Duzee, Edward Maddock, St. Paul.
Freeman, Edward, Mankato.	Veharen, Arthus Ward, Spencer, Ia.
Grimshaw, William Elwood, Minneapolis.	Von Schlegell, Victor, Minneapolis.
Heinen, Emil Jennings, New Ulm.	Wagen, Jackie Charles, Mankato.
Herrick, Carl Albert, Minneapolis.	Waldron, Carl George, Minneapolis.
Heuston, George Somerville, Minneapolis.	Wiard, Samuel Edward, Litchfield.
Kinney, Carl Garfield, Red Wing.	Westlake, John Ellis, St. Paul.
Kreger, Alanson James, Le Sueur.	Wicks, John, Tyler.
McPherson, William Butler, Stillwater.	Wold, Eric, La Crosse, Wis.
Mairs, Samuel, St. Paul.	

ART COURSE—8.

Baxter, Wilma Kathryn, Minneapolis.	Firkins, Orra, Minneapolis.
Derickson, Clara May, Minneapolis.	Fowle, Florence, Minneapolis.
Dodson, Lillian F., Minneapolis.	Janney, Ellen Annette, Minneapolis.
English, Edith Florence, Minneapolis.	Woodman, Alice Elizabeth, St. Paul.

UNCLASSED STUDENTS—20.

Andrews, George Luther, Green Valley.	Houlton, Amos, Elk River.
Bedford, James Irving, Rushmore.	Jerome, Charles W., Minneapolis.
Boyce, Charles Frederick, Duluth.	Libby, Lloyd Dekol, Minneapolis.
Gillum, Rose, Minneapolis.	Moran, Nellie Agnes, Minneapolis.
Glover, Edna M., Minneapolis.	Rosok, Petter Adolph Marius, Minneapolis.
Greely, Mrs. Altia, Minneapolis.	Satrum, Gilbert G., Canton, S. D.
Grimes, Mary Agatha, Minneapolis.	Spaulding, Percy Snoad, Chicago, Ill.
Hallan, Christian, Underwood.	Story, Sarah Margaret, Epworth, Ia.
Higbee, Helen Anna, Minneapolis.	Walker, Robert George, Chicago, Ill.
Higgins, Charles Campbell, Aurora, Ill.	Woodson, James, Helena, Mont.

SCHOOL OF MINES.—62.

SENIOR CLASS—3.

Bass, William Carroll, Minneapolis.	Warren, Frank Merton, Minneapolis.
Peterson, Andrew, Red Wing.	

JUNIOR CLASS—15.

Callaway, Frederick William, Minneapolis.	Davenport, Lee Butler, Minneapolis.
Campbell, William Lloyd, Merriam Park.	Egleston, Oliver J., Wykoff.
Chandler, Eugene Derwood, Minneapolis.	Hunt, Walter Edward, St. Paul.
Conant, Waldgrave Lester, Minneapolis.	Jewett, Frank Greenwood, Minneapolis.

McCarthy, Edward Prosper, Good Thunder. Teague, Harold W., Detroit.
 Merrill, Roy Willard, Minneapolis. Toll, Rensselaer Hyde, Clinton. Ia.
 Stratton, Morris, Minneapolis. Webber, Frederick Walter, B. S., St. Paul.
 Sumner, Rutherford Burchard, Northfield.

SOPHOMORE CLASS—19.

Burgess, Thomas Oakes, Minneapolis.	Johnson, Ralph Ingersoll, Minneapolis.
Clapp, W. Howard, Oronoco.	Mella, Fritz, St. Paul.
Clark, Carl Dawes, Minneapolis.	Morris, Charles Riggs, Porcupine, S. D.
Cook, William, Chillicothe, Ohio.	Queneau, Augustin, Leon, Paris, France.
Devereux, John Albert, Minneapolis.	Rogers, Clarence Raymond, B. A., Minneapolis.
Donovan, Percy William, Madison.	Sanderson, Henry Stephen, Minneapolis.
Eddy, Albert Clark, Minneapolis.	Smith, Elmo Vincent, Minneapolis.
Gholz, Arthur Lawrence, Roscoe.	Taresh, John, B. S., Sauk Center.
Johnson, Austin Goodrich, Minneapolis.	Tolman, John Dudley, Minneapolis.
Johnson, Bertram, Minneapolis.	

FRESHMAN CLASS—20.

Bissell, Angelo Allen, Redwood Falls.	McCall, Roy, Minneapolis.
Cargill, Robert Guy, Minneapolis.	Morris, Charles Statham, Duluth.
Dann, Marcus Howard, Minneapolis.	Ober, Raymond Everett, Duluth.
Everts, Charles Peck, St. Paul.	Overmire, Charles Carsen, Eureka.
Harrison, Guy Elmer, Excelsior.	Smith, Carl James, Cambridge.
Holden, Henry Hall, Duluth.	Sowle, Lawrence Kimball, Minneapolis.
Hoyt, Charles Cameron, St. Paul.	Spencer, Clark, White Sulphur Springs, Mont.
Jones, Robert Clarence, Minneapolis.	Truesdell, William Howard, St. Paul.
Kramer, Harold W., Webster, S. D.	Van Bergen, Robert Evans, Minneapolis.
Lovett, Henry Steele, Minneapolis.	Woolnough, James Barton, Minneapolis.

UNCLASSED STUDENTS—5.

Ewing, Davis, Bloomington, Ill.	Reno, Howard, Minneapolis.
Mock, Hugo, St. Paul.	Thompson, Mackey James, La Crosse, Wis.
Potter, Winfield S., Minneapolis.	

SCHOOL OF CHEMISTRY—9.

SENIOR—1.

Leedy, John Wentworth, Rapid City, S. D.

SOPHOMORE CLASS—2.

Baxter, Herbert Thornton, Brooklyn, N. Y. Gray, Shirley E., Minneapolis.

FRESHMAN CLASS—6.

Corey, Milton Burnett, Minneapolis.	Rice, Edgar Whitman, Minneapolis.
Fox, George Everett, Minneapolis.	Roe, Edward, So. Sudbury, Mass.
Lando, Maximillian Nandor, St. Paul.	Rose, Anton Richard, Marine, Minn.

THE DEPARTMENT OF AGRICULTURE—409.

SENIOR CLASS—5.

Chapman, Herman Haupt, B. S., Grand Rapids.	Hummel, John Adolph, St. Anthony Park.
Glover, Arthur James, Zumbrota.	Major, Ernest William, St. Anthony Park.
	Sorkness, Henry Oscar, Ashby.

JUNIOR CLASS-5.

Clark, Robert Wallace, Northfield. Wheeler, William Archie, Winnebago Valley
 Houlton, Samuel Randolph, Elk River. Wilson, James Alexander, Lake City.
 Scofield, Carl Schurz, Bloomington.

SOPHOMORE CLASS-8.

Aune, Beyer, Starbuck. Riley, Edward Henry, Hammond
 Bull, Coates Preston, Edina Mills. Tasa, Helge Ludwig, Holden.
 Mackintosh, Roger Sherman, St. Anthony Park. Thompson, Mortimer Lee, LaCrosse, Wis.
 Washburn, Robert Mann, Monticello.
 Palmer, William Carl, Somers, Wis.

FRESHMAN CLASS-3.

Buell, Max Whitney, St. Anthony Park. Taylor, Charles Philip, Hamline.
 Ryder, Frank James, Buffalo.

SCHOOL OF AGRICULTURE.

GRADUATE STUDENTS-2.

Hoyt, Ben Terril, St. Paul. Hunter, Clarence Clement, St. Anthony Park.

A CLASS-34. — 3

Allard, Eugene Kingsley, Spring Valley. Lang, Nellie May, London.
 Andrews, Grace Bacon, Faribault. Lund, Melvin Bethuell, Vining.
 Carlyle, Adam, Lynd. Luger, Humboldt, St. Anthony Park.
 Cooley, Robert Faulkner, Otsego. Marshall, Frank Foskett, Crow River.
 Cross, John Frederick, Childs. Malberg, Sidney John, Cannon Falls.
 Cross, Orville William, Childs. McGuire, Clinton Eugene, Stillwater.
 Clark, Bertram Galen, Hankinson, N. D. Olson, Oscar Edward, Welch.
 Denison, Martha, Faribault. Powell, Steven Rutherford, Stillwater.
 Gaumnitz, Daniel Asher, St. Cloud. Raveill, Edgar Eaton, Heron Lake.
 Gray, Benjamin Asbury, Lintonville. Roberts, Wilson Clay, Roberts.
 Graham, Francis, Roberts, Wis. Sick, Fred Martin, Duluth.
 Guthrie, Francis Burrell, York, N. Y. Tallé, Christen Johan, Kenyon.
 Hale, Charles Willey, Kedron. Tanner, Forrest Oscar, Brownsdale.
 Halverson, Bernard, Norway Lake. Ulland, Lewis, Moscow.
 Howe, John George, Kellogg. Widmoyer, Leslie Rudolph, Dresbach.
 Krum, Henry Garfield, Minneapolis. Wilson, Archie Dell, Davies.
 Kamrud, Edward Theodore, Starbuck. Ziegler, Warren, Minneapolis.

B CLASS-33. — 4

Anderson, Alvin Theodore, Rush City. Olstad, Casper, Hanska.
 Boutwell, Edwin, Kasota. Olson, Bennie, Corring.
 Brewster, John Ronney, New Lisbon, Wis. Peters, Theodore Andave, Thielman ()
 Briggs, Ealy Grannis, Houston. Pfeiffer, ~~Albert~~ Lawrence, Olivia. Albert
 Cady, Leroy, Buffalo. Pratt, Celia Jane, Bethel.
 Eaton, Heber Wheeler, Ludden, N. D. Pratt, Sumner, Bethel.
 Erickson, Oscar, Minneapolis. Praught, Donald, St. Michael Station.
 Gronewald, Arthur John, Faribault. Pryor, Howard William, Glencoe.
 Hoagland, Ralph, Wayzata. Sandburg, Victor, St. Anthony Park.
 Hodnett, Royal William, Stillwater. Solem, Ola, Brighton.
 Lamb, Elton Ray, Oak Centre. Tanner, Alice, Brownsdale.
 Ley, Joseph Henry, Smithfield. Thompson, James, Lanesboro.
 Loughlin, John, De Graffe. Thompson, Mortimer Leo, LaCrosse, Wis.
 Liggett, Alfred Russell, St. Anthony Park. Ueland, Justus, Edgeley, N. D.
 Matthews, Mary Lockwood, Cambridge Wells, James Eugene, Monticello.
 City, Ind. Wilcox, Estella Willa, Hugo.
 Mossman, Isaac, Birch Lake. Wilson, William Phillips, Lake City.

C CLASS—110. — 28

- Anderson, Arthur Henry, Rowland.
 Andrews, Lewis Frederick, Green Valley.
 Apple, Frank James, Thielman.
 Atz, Howard, Hancock.
 Atz, Asterley, Hancock.
 Amidon, Perry Nelson, Houston.
 Bakken, Louis Andrew, Granada.
 Biery, Elizabeth Anna, Wasioja.
 Boerner, Emil Gottlieb, Buffalo.
 Boss, Alex, Zumbro Falls.
 Boushka, Joseph, Silver Lake.
 Boyle, William Henry, Stillwater.
 Buell, May Whitney, St. Anthony Park.
 Busian, Gerhard, Dover.
 Carel, Annie Cora, St. Paul.
 Cosgrove, Beth Cora, Le Sueur.
 Chowen, Lewellyn, Minnetonka.
 Cutting, Fred Ervestine, Byron.
 Czner, Harold, Minneapolis.
 Clute, Rose, Dundas.
 Danielson, George Adolph, Goodhue.
 Davison, Charles Bradley, Granada.
 Dean, George Edward, Bloomington.
 Denison, Mary Agnes, Faribault.
 De Vaney, Dominick, Hegbert.
 Dickerson, Loren Bixby, Stately.
 Emmans, George Martin, St. Francis.
 Erickson, Agnes, Hector.
 Evenson, Robert Benjamin, Strout.
 Evenson, Hans Olaf, Strout.
 Fellows, Ernest Melvin, Smiths Falls.
 Firmin, Alfred Fouracre, Minneapolis.
 Frank, James, Warren.
 Frear, Jennes Boughton, Minnetonka Mills.
 Gibson, Robert Cary, Merriam Park.
 Giesmann, August Rudolph, St. Paul.
 Giesmann, Elma Alice, St. Paul.
 Grafft, Clarence Curtis, St. Paul.
 Grant, Arthur Dow, Walcott.
 Grant, Donald, Hudson, Wis.
 Hanson, Andrew, Sleepy Eye.
 Haynes, Calvin, Winnecoune, Wis.
 Held, Ella, St. Anthony Park.
 Hilleman, Lizzie Anna, Arlington.
 Holen, Edward Christian, Pelican Rapids.
 Holteen, Homer Benjamin, St. Peter.
 Hompe, Bernard Antony, Deer Creek.
 Hompe, Howard Ernest, Deer Creek.
 Howland, Jesse, Northfield.
 Humphrey, Alice, St. Paul.
 Hunt, William, Minneapolis.
 Huntington, Aurelia Louise, Windom.
 Ingals, Herbert Benjamin, Blooming Prairie.
 Jackson, Gilbert, Litchfield.
 Johnson, Algot, Minneapolis.
 Judd, Clarence, Morris.
 Kimball, Arthur Hazon, Albee, S. Dak.
 King, Clarence Everett, Washington.
 Koch, Carrie, White Willow.
 Laingen, Chester, Butternut.
 Lane, Leon, Minneapolis.
 Lawrence, Alva, Brooklyn Centre.
 Lawrence, William, Brooklyn Centre.
 Leinen, Mary, St. Paul.
 Lemke, Ernest, St. Paul.
 Lenhart, Edna Matilda, Minneapolis.
 Lorenz, Sophie, St. Paul.
 Lund, Henry Carl, Lansing.
 McLaren, Harley Edward, Buffalo Lake.
 Major, Herbert Edward, Jersey, Jersey Islands.
 Meloney, Linn Franklin, Minneapolis.
 Monson, Bessie, Pomme de Terre.
 Mueller, Adolph, Mankato.
 Nelson, Christine Pearl, St. Anthony Park.
 Newton, William Daniels, Utica.
 Oberg, Edgar Theodore, Watertown.
 Oehler, Orlando, St. Paul.
 Palmer, Mabel, Como, Wis.
 Pennington, Alfred, Cottage Grove.
 Peterson, Chase Oscar, Cottage Grove.
 Peterson, Peter Godtfried, Hector.
 Perkins, Ross Brankstom, Houston.
 Redman, Earle Wayne, Omaha, Neb.
 Robinson, Edward William, St. Paul.
 Robinson, Evalena Maria, Minneapolis.
 Roohr, Edna Margaret, Warwick.
 Roohr, Frank Lewis, Warwick.
 Rowe, Minnie, Hewitt.
 Sampson, Theodore Joshua, Strout.
 Sandell, Lyle, New Brighton.
 Sanderson, Theodore, Rockdell.
 Schrader, Udo, Minneapolis.
 Simon, Charles, Benson.
 Smith, George Nelson, Minnetonka Mills.
 Smith, Minnie Margeret, Minnetonka Mills.
 Snyder, Leo Harter, Herkimer, N. Y.
 Spilman, Peter, Elizabeth.
 Strunk, Alice, Faribault.
 Sweeney, Eugene, Garfield.
 Swenson, Thea Pauline, Minneapolis.
 Taplin, Frank Everets, Hancock.
 Tingley, William, Stillwater.
 Veldey, L. O., Hanley Falls.
 Walther, Lucy, St. Paul.
 Ward, Fred, Buffalo.
 Washburn, Lura Mabel, St. Michael Station.
 Wickstrom, Clara Lois, Oak Grove.
 Wolner, Julius, St. Anthony Park.
 Woodward, George Eugene, Langdon.
 Young, William Ralph, Holloway.

PREPARATORY CLASS—95. — 23

- Aaker, Olaf, Kenyon.
 Adams, Theodore, Luverne.
 Anderson, Albert, Butternut.
 Anderson, Anker, Big Swamp.
 Anderson, Ben, Rowland.
 Anderson, Emil Hendrick, Sacred Heart.
 Anderson, Frank Oscar, Strout.
 Anderson, Julius, Fairfax.
 Armstrong, Charles Francis, Louriston.
 Baker, Albert Ole, Kenyon.
 Billingsley, Chester, Campbell.
 Biederman, Hugo, Wells.
 Bjertson, Bennie, Hanska.
 Boss, David, Zumbro Falls.
 Bracket, George, Long Isle.
 Brudeli, Olaf, Madelia.
 Busse, Maud, Station A, Minneapolis.
 Busse, Harry, Station A, Minneapolis.
 Christenson, Oscar William, Farmington.
 Dahl, Albert, Harrison.
 Dalbotten, Ida, Nansen.
 Davenport, Ashley William, Western.
 Davenport, Roy Jay, Western.
 Deters, Louis Frederick, Eitzen.
 Duff, William Don, Hampton.
 Keller, Lizzie, St. Paul.
 Laastnen, Martin, Elbow Lake.
 Laate, Gurid, Radcliffe, Iowa.
 Larson, Albert Gaphius, Bradford.
 Larson, Alfred Gothard, Winthrop.
 Leach, Ray, Excelsior.
 Ley, John Edward, Smithfield.
 Lind, Emma, Houston.
 Lindem, Martin, Hoffman.
 Livrud, Halvor, Belview.
 Lockwood, Harry Jay, Grand Meadow.
 Ludtke, Henry Adolph, Willow Creek.
 Mahla, Huning Rudolph, Evansville.
 MacComber, George Embert, Barnum.
 Mather, Walter, Faribault.
 Melhus, Martin, Nansen.
 Monson, Willie, Pomme de Terre.
 Naegeli, Herman Gustav, Elizabeth.
 Ness, Mary, Providence.
 Nugent, Michael Joseph, Hegbert.
 Nugent, Patrick James, Hegbert.
 Nugent, Michael Francis, Hegbert.
 Peterson, Fred Olaf, Minneapolis.
 Edberg, Jennie Victoria, Rush City.
 Embertson, Oscar Frederick, Green.
 Enestvedt, Engebert German, Belview.
 Ferch, Lizzie, Odessa.
 Ferch, Lydia, Odessa.
 Ferch, Susie, Odessa.
 Fingerson, Gilbert Jorgen, Swift.
 Forstrom, Edward, Christiana.
 Fox, Joseph John, Minneapolis.
 Frandsen, Nels, Minneapolis.
 Frederick, Maximillion, New Ulm.
 Grafe, Roy, Hancock.
 Hall, Ethel, Buffalo Lake.
 Hall, Lester Lewis, Morris.
 Hallickson, Emil, Ostrander.
 Haggerty, Arthur, Hammond.
 Hawley, Jenney, Faribault.
 Held, Natalie Margarette, Minneapolis.
 Heinze, Roselia Hulda, Kellogg.
 Herbrandson, H. O., Brooten.
 Hermes, Clara, St. Paul.
 Holmquist, Alice Wilhelmina, Dawson.
 Hesford, Charles Edward, Nashua.
 Hosford, John Benjamin, Nashua.
 Keller, Hattie, Dundas.
 Peterson, Maud Christine, Minneapolis.
 Peterson, Thora, St. Anthony Park.
 Price, Arthur, Beaver Creek.
 Quale, Ove, Swift.
 Quist, George Leonard, New Sweden.
 Roberts, Henry Leslie, Cottage Grove.
 Rudolph, Amy, Annandale.
 Schumacher, Clara, St. Anthony Park.
 Sheldon, Horace Fuller, Paynesville.
 Sheldon, Merton Luther, Paynesville.
 Seltz, William, Waconia.
 Smith, George Alix, Cottonwood.
 Stanley, Henry Martin, Maine Prairie.
 Sletten, Hans Magnus, Willmar.
 Swenson, Halvor, Lamberton.
 Thompson, Edna, Christiana, ward
 Thoreson, Julia, Neby.
 Torbenson, Oscar, Christiana.
 Voxland, Clara, Norway.
 White, Allen, Twin Lakes.
 White, Ferris, Twin Lakes.
 Wickstrom, Fred, Oak Grove.

SPECIAL 39. — 5

- Abraham, Alex, Houston.
 Anderson, Martinus, Cottonwood.
 Andreason, Dinal, Tuen.
 Annexstad, Jens, Norseland.
 Benson, Elmore, Houston.
 Blake, Mrs. Jennie Minnie, Minneapolis.
 Brown, Alex Hjolmer, Hallock.
 Burkness, Nels, Willmar.
 Burtman, Elmer Otenus, Lester Prairie.
 Carlsson, Archibald, Vasa.

Christenson, Julius Thorwald, Elbow Lake. Nelson, Norman, Montevideo.
 Dokken, Albert Oliver, Swift. Ormbreck, Alick, St. James.
 Engel, George Adolph, New Prague. Pederson, Nels Chester, Tyler.
 Fjelstad, Theodore, Minneapolis. — Peterson, Hattie Louise, Minneapolis.
 Frederickson, Frederick Olson, Wilder. Pikop, Knute, Elbow Lake.
 Gray, Mrs. Jennie May, Minneapolis. Renquist, Theodore Emil, Cannon Falls.
 Hellickson, Anton, Ostrander. Schreffer, John, St. Paul.
 Johnson, Charles John, Sacred Heart. — Staples, Gertrude, St. Paul.
 Kiichli, Joseph Henry, Minneapolis. Svensgaard, Sverre, Elizabeth.
 Kjos, Martin, Arendahl. Swaren, Alfred Andrew, Alexandria.
 Lockwood, Jay, Grand Meadow. Tennes, Louis Alfred, Bird Island.
 Marston, Ole, St. James. Thimijon, Bernard, Lake City.
 Mattson, George Allen, Red Wing. — Wheeler, Mrs. Edna Susie, St. Paul.
 Moen, Peter Alexander, Litchfield. Wilson, Henry, Hazel Run.
 Nelson, Herman Benneth, White Rock.

DAIRY SCHOOL STUDENTS—75.

Anderson, Geo., Faribault. Lindall, Geo., Gaylord.
 Anderson, Jacob E., Lyle. McConnell, W. W. P., Mankato.
 Anderson, N. E., Gibbon. Miller, Peter, Georgeville.
 Anderson, Walter, Washburn. Mortenson, M. P., Cokato.
 Arneson, Peter, Cologne. — Norgard, P. J., Minneapolis.
 Bennett, C., Montevideo. Olsen, H. P., Duellin.
 Benoon, B. G., Lamberton. Olson, Hartwell, Ham Lake.
 Berkness, N. B., Willmar. Ouren, Oscar, Hanska.
 Blank, Edwin J., Nicollet. Pederson, Ludvig L., Fairfax.
 Blomquist, Oscar W., Spencer Brook. Pennie, R. R., Villard.
 Butler, O. B., Villard. Peterson, C. W., Welcome.
 Carpenter, J. C., Shieldsville. Peterson, Fred, Providence.
 Case, D. R., Minneapolis. Peterson, J. O., Constance.
 Fish, Geo. W., Millersburg. Petrich, H. F., Biscay.
 Flaten, O. W., Granite Falls. Rasmussen, James, Hayward.
 Flint, R. F., Royalton. Rugland, Gilbert, Silver Lake.
 Fraser, Robert, Austin. Sandberg, Nels G., Delano.
 Gahl, Theodor, Lester Prairie. — Sandberg, V. A., Albert Lea.
 Goodsell, Geo., Meriden. Schrepel, W. F., Ottawa.
 Gowland, J. E., Mankato. Scott, Oscar, East Union.
 Gunnarson, Fanny, Minneapolis. Slater, Edw. K., Fairmont.
 Halvorson, O. J., Minneapolis. Stromquist, A. E., Shafer.
 Hammar, Joseph, Biscay. Smith, F. F., Sioux Falls, S. Dak.
 Hauge, Henry, Voss. Suter, H. C., Welcome.
 Hedjke, Herman, Victoria. Svenggaard, S., Elizabeth.
 Heimer, F. A., Sarggant. Swanson, Charlie, Grove City.
 Hillman, Ferd, Sac City, Iowa. Tennesen, J. C., Nowthen.
 Holt, Elof, Chisago City. Tepley, F. W., Glencoe.
 Hubbard, Roy E., New Auburn. Thorkelson, J. H., Belgrade.
 Iverson, Iver G., Watson. Thorson, Thomas, Canby.
 Jaeb, Michael, St. Michael. Uglen, Jno. O., Madison.
 Jensen, Jacob, Rush River. Uglow, S., Litchfield.
 Johnson, E., Shafer. Wartenberg, J. H., Blooming Prairie.
 Johnson, Elmer, Barrett. Waugen, Jno. P., Cannon Falls.
 Kvetensky, J. H., Waverly. Waugen, Jno. A., Cannon Falls.
 Laite, Geo., Clark's Grove. Weber, Oscar, Owatonna.
 Larson, Edward, Carver. Wolesky, J. F., Steele Center.
 Lifquist, Andrew, Wadena.

THE COLLEGE OF LAW.

GRADUATE STUDENTS.

DOCTOR OF CIVIL LAW—11.

Bates, William Earl, <i>LL. M.</i> , Minneapolis.	Mercer, Hugh Victor, <i>LL. M.</i> , Minneapolis
Carroll, Walter N., <i>LL. M.</i> , Minneapolis.	Moore, Albert R., <i>L. L. M.</i> , St. Paul.
Coombs, Lee A., <i>LL. M.</i> , Minneapolis.	Olson, Carl O. A., <i>B. S., LL. M.</i> , Minneapolis.
Denegre, James D., <i>LL. M.</i> , St. Paul.	Sweet, John C., <i>LL. M.</i> , Minneapolis.
Dever, Charles S., <i>LL. M.</i> , Minneapolis.	Whitcomb, Walter B., <i>LL. M.</i> , Minneapolis.
Hermann, Arthur L., <i>LL. M.</i> , Minneapolis.	

MASTER OF LAWS—10.

Cameron, Donald Monroe, <i>LL. B.</i> , Minneapolis.	Somsen, Stephen Herbert, <i>LL. B.</i> , Minneapolis.
Clark, Henry C., <i>LL. B.</i> , St. Paul.	Thompson, Robert Mitchell, <i>B. S., LL. B.</i> , Minneapolis.
Grace, Thomas Peter, <i>LL. B.</i> , St. Paul.	Weber, Albert, <i>LL. B.</i> , Minneapolis.
Hullback, Oliver, <i>LL. B.</i> , St. Paul.	Wright, Edward Stevens, <i>LL. B.</i> , New York.
Jellico, Elmer James, <i>LL. B.</i> , Minneapolis.	
Krelwitz, Edmund Henry, <i>LL. B.</i> , Duluth.	

UNDERGRADUATE STUDENTS.

SENIORS (NIGHT)—37.

Brubaker, Guy B., Waseca.	Lohren, Henry Nichols, Waseca.
Caldwell, George Washington, Minneapolis.	Loye, Albert Bushnell, Minneapolis.
Chamberlain, Howard Boardman, Minneapolis.	Miner, J. Burt, <i>B. S.</i> , Berlin, Wis.
Clinton, Agnes B., Minneapolis.	Monroe, Henry Albert, St. Paul.
Costello, William James, Willmar.	Murphy, William John, St. Paul.
Covell, George Lincoln, Minneapolis.	Ochsner, Edward A., St. Paul.
Ellsworth, Chester Hitchings, Cannon Falls.	Ofis, Willis Clarke, <i>B. S.</i> , Janesville, Wis.
Gray, George Merton, Du Bois, Pa.	Redfield, Frank Dewey, Minneapolis.
Hallstrom, John L., Minneapolis.	Reh, Herbert Kemper, St. Paul.
Harris, Bernhard S., Minneapolis.	Reohr, Charles D., Minneapolis.
Hastings, Robert A., Minneapolis.	Riordan, Philip James, Solomon, Kan.
Hayden, Nels, St. Paul.	Rogers, Clyde Eugene, Minneapolis.
Helmes, Emil William, St. Paul.	Smith, James William, St. Paul.
Keith, John Webster, St. Paul.	Smith, Stelle S., Minneapolis.
Kimball, Parker W., Austin.	Spear, George Hancock, <i>B. S.</i> , Minneapolis.
Krook, Carl Gustaf, New Ulm.	Todd, George Eugene, Kendallville, Iowa.
Leary, Daniel James, Austin.	Trabert, Charles Luther, Minneapolis.
Lemon, Walter Thomas, Minneapolis.	Wergedahl, Edward Oscar, Minneapolis.
Lewis, Harry R., Vincennes, Ind.	

SENIORS (DAY)—46.

Anderson, Samuel Gilmore, Jr., Hutchinson.	Dresser, Alfred, Minneapolis.
Arness, Conrad Angel, Fisher.	Eckman, Frank A., Cokato.
Ball, Frank Algernon, Fargo, N. D.	Ewert, William Franklin, Pipestone.
Beek, Clarence W., Larimore, N. D.	Fleming, John Henry, Minneapolis.
Berg, John Nelson, Minneapolis.	Foster, Wesley Sherman, <i>B. S.</i> , Dover.
Brill, Hascal Russel, Jr., St. Paul.	Frankel, Louis Rudolph, St. Paul.
Brockett, Norwood Waite, Minneapolis.	Gibbons, John Francis, St. Paul.
Buck, George Washington, Jr., Hamline.	Goodfellow, William Eastman, Minneapolis.
Clifford, Elmer L., Lake City.	Hallum, Louis, Highland.
Conrow, Mark, Livingston, Mont.	Harrison, John M., Minneapolis.
Cornish, Perl C., Delavan.	Higgins, Alexander, Eagle River, Wis.

Hill, Emery Schuyler, St. Paul.
 Imer, Harry A., Sauk Center.
 Johnson, Adolph E. L., Minneapolis.
 Keyes, Charles Frederick, Minneapolis.
 Knapp, Edward Arms, St. Paul.
 Lane, James Henry, Lowville, N. Y.
 Manley, John E., Menomonie, Wis.
 Maybury, James Henry, St. Cloud.
 Mills, Ernest B., St. Paul.
 Mueller, Robert M., West St. Paul.
 Murphy, John J., St. Paul.
 Norton, Alfred Andrew, Minneapolis.

Polk, Frank Hayes, Minneapolis.
 Puffer, Lorenzo Nathan, Guelph, N. D.
 Rhame, Albert Eugene, Minneapolis.
 Richardson, Will Burdette, Rochester.
 Rome, Dr. R. R., Minneapolis.
 Stewart, McCants, Brooklyn, N. Y.
 Swenson, Harry Sylvester, Minneapolis.
 Thompson, Anton, Fergus Falls.
 Thwing, Alfred Luther, Duluth.
 Walsh, Clarence Frank, Dickens, Ia.
 Warren, Edward Morris, La Moure, N. D.
 Wilson, Wirt, Minneapolis.

MIDDLE (NIGHT)—50.

Ackerson, George L., Minneapolis.
 Allen, Hugh Neill T., B. S., Minneapolis.
 Anderson, Alexander Lawrence, Minneapolis.
 Anderson, Andrew E., Minneapolis.
 Anderson, Arthur C., St. Paul.
 Appleby, Stephen C. M., St. Paul.
 Barton, C. Albert, Minneapolis.
 Bearman, Abraham N., Minneapolis.
 Berghem, Nels N., Bergen, Norway.
 Bull, Roy Taylor, Redfield, S. D.
 Burrows, William, St. Paul.
 Castberg, Benjamin, Minneapolis.
 Coffey, James Alexander, Drain, Oregon.
 Cravens, John Edward, Middle Creek, Ill.
 Dowdall, Augustus Sylvester, Minneapolis.
 Evans, Harry Wright, Fergus Falls.
 Germo, Thomas, Mapleton.
 Green, James H., Minneapolis.
 Griffin, Jay Moses, Minneapolis.
 Harrison, Allen Overton, Fulton, Mo.
 Hevener, Frank Darius, St. Paul.
 Hill, George Van Buren, Minneapolis.
 Jahn, Peter, St. Paul.
 Knoblauch, Charles, Minneapolis.
 Lajord, Tosten Michael, Minneapolis.

Lewis, Albert Edward, Minneapolis.
 Lewis, Ernest, W., St. Paul.
 Lloyd, Albert V. S., Minneapolis.
 McDermott, Thomas I., St. Paul.
 McElwee, Charles Clarkson, St. Paul.
 McElroy, Earl William, St. Paul.
 Mattimore, James, St. Paul.
 Metcalfe, George Frederick, Minneapolis.
 Moore, Herbert Stephen, St. Paul.
 Morey, Arthur Giles, Minneapolis.
 Morley, Frank J., Minneapolis.
 Nichols, Malcolm Emory, St. Paul.
 O'Brien, Richard Dillon, St. Paul.
 Purcell, John James, Klontarf.
 Rea, James E., Minneapolis.
 Reid, Joseph C., Minneapolis.
 Risser, C. Daniel, St. Paul.
 Roe, Otto Erickson, Minneapolis.
 Royal, Irving David, Minneapolis.
 Simpson, James Hervey, St. Paul.
 Vasaly, Stephen C., St. Paul.
 Wedge, Arthur G., St. Paul.
 West, Harry Clarke, Clearwater.
 Wolff, Otto, St. Paul.
 Zehnder, John C., St. Paul.

MIDDLE (DAY)—110.

Adams, Charles Edward, B. S., Minneapolis.
 Adams, William Henry, Fergus Falls.
 Barry, Arthur Richard, Phillips, Wis.
 Bates, Charles Roswell, Little Rock, Ark.
 Bean, Francis Atherton, New Prague.
 Benedict, Thomas Jefferson, Sterling Center.
 Berg, Albert, Center City.
 Bird, John A., Fairmont.
 Boardman, Ralph T., Minneapolis.
 Bond, Marie, Minneapolis.
 Bosworth, Roy Dexter, Utica.
 Braggans, William Onzlo, Milbank, S. D.
 Burgess, John, Winona.
 Burkey, Levi Melville, Montevideo.
 Buttz, Charles Wilson, Jr., Lisbon, N. D.

Cameron, Frank, Minneapolis.
 Carpenter, Fred H., Minneapolis.
 Chamberlin, Joseph Clarence, Overton, Neb.
 Child, Lewis Henry, Glencoe.
 Coates, Harry S., St. Cloud.
 Coleman, John Ambrose, Livingston, Mont
 Crawford, William Noble Miles, Minneapolis.
 Cresswell, Harry H., B. A., Grand Forks, N. D.
 Daggette, Thomas Clarence, Elysian.
 Daly, James Jerome, Assumption.
 Dampier, Edward Richard, Fergus Falls.
 Day, Floyd Hamilton, Duluth.
 Downey, Frank Elbert, Waupun, Wis.
 Eagan, Joseph James, Minneapolis.
 Ecklund, Edward Alfred, Minneapolis.

- Ferch, Michael, Jr., Odessa.
 Frankson, Thomas, York.
 Gray, Andrew G., Preston.
 Greenman, Fay William, Austin.
 Guilford, Paul Willis, B. A., Minneapolis.
 Hagen, Erick O., Crookston.
 Hanson, Alfred P., Benson.
 Hanson, Hans Joe, Phillipsburg.
 Haug, Lars O., Minneapolis.
 Heffelfinger, Charles Edwin, Minneapolis.
 Heimark, Peter, Clarkfield.
 Henningsen, Christian, Stillwater.
 Hookway, Chancellor William,
 St. Thomas, N. D.
 Hopp, George Morton, Welcome.
 Hursh, William L., B. S., Long Lake.
 Hyland, James Anderson, Madison, S. D.
 Johnson, Bert James, Fergus Falls.
 Johnson, Frederick, Byron.
 Johnson, Herman Phillip, Minneapolis.
 Johnson, Reuben Johannes, Granite Falls.
 Kane, William Victor, Green Isle.
 Keith, Albert Jackson, Sioux Falls, S. D.
 Kirk, John Howarth, B. S., Niagara, N. D.
 Leighton, W. Morris, Crow Agency, Mont.
 Lind, Klas Erland, B. A., Minneapolis.
 Maas, Andrew H., Le Sueur.
 McCarthy, James Edward, Granite Falls.
 Macdonald, Hilda, Ashland, Wis.
 McGlennon, William Alonzo, Winona.
 McInerney, Thomas H., Elk Point, S. D.
 Mattecheck, Matthias Walter,
 Webster, S. D.
 Mayo, Walter Lewis, Leavenworth, Kan.
 Miller, Clarence Benjamin, B. S.,
 Minneapolis.
 Miller, William Henry, Valley City, N. D.
 Minier, Ethan Baldwin, New Richmond, Wis.
 Moore, Edward Vincent, Buffalo Lake.
 More, Russell Andrew, Winona.
 Myhre, Martin G., Walcott, N. D.
 Nicoulin, Claude, Algona, Ia.
 Olson, Julius John, Lake Park.
 Owens, William G., Sleepy Eye.
 Pfaender, Albert, New Ulm.
 Plymat, Harry Eldon, Mankato.
 Porter, Sumner Frank, Adrian.
 Poseley, Henry Edward, Bird Island.
 Powell, Chester Hoyt, Winona.
 Radcliffe, Jonas, Eagle River, Wis.
 Radcliffe, Samuel J., Larimore, N. D.
 Rexford, Wilbur Lane, St. Anthony Park
 Robinson, Bertram Henry,
 Bloomington, Ill.
 Robinson, Net James, Tracy.
 Rogers, George W., St. Paul.
 Rossberg, William Fred, Minneapolis.
 Rustad, Edward, Wheaton.
 Sasse, Frank G., St. Charles.
 Scandrett, Henry Alexander, Faribault.
 Sawyer, Murray G., Minneapolis, Minn.
 Schmidt, Herman Carl, New Ulm.
 Schmitt, John William, Minneapolis.
 Schulz, Rudolph Fred, Montevideo.
 Shaw, John E., Minneapolis.
 Sheldon, Dell Clark, Rochester.
 Simonson, Helmer Ingval, Minneapolis.
 Smith, Walter Wyman, A. B.,
 Lower Cabot, Vt.
 Soares, Victor E., Minneapolis.
 Sperry, Lloyd Garrison, Wasioja.
 Spiller, Hiler B., Kelso, N. D.
 Sprague, Monroe Horr, Minneapolis.
 Stewart, Robert Carlyle,
 Santa Barbara, Cal.
 Stewart, Robert Decatur, St. Paul.
 Stong, Edwin Harry, St. Thomas, N. D.
 Todd, Walter W., Breckenridge.
 Todd, Kay, Sheldon, Wash.
 Twichell, August Allen, Minneapolis.
 Vasaly, Louis W., Little Falls
 Webber, Benjamin Frank, New Ulm.
 Whitcomb, Carlos F., Alexandria.
 Whittemore, Guy L., Park River, N. D.
 Wickersham, Price, Leavenworth, Kan.
 Young, Eugene, Chaska.

JUNIOR (NIGHT)—58.

- Bannon, Festus Lucian, St. Cloud.
 Bessesen, Henry John, Albert Lea.
 Carroll, John Joseph, Minneapolis.
 Chase, Walter S., St. Anthony Park.
 Christofferson, Arthur, Hudson, Wis.
 Downs, John Martin, Willmar.
 Fish, Frank Miner, St. Paul.
 Gaylord, S. M., Casselton, N. D.
 Goddard, William Taylor, Utica, N. Y.
 Green, George Heigert, St. Peter.
 Halsey, Charles Woodruff, Ithaca, N. Y.
 Harker, Bert, Linden, Wis.
 Heino, John Rudolph, St. Paul.
 Hern, Angie King, St. Paul.
 Hern, Ethel T., St. Paul.
 Hollihan, Daniel James, Stillwater.
 Irwin, John Borland, Richfield,
 Jarman, Thos. Jones, Minneapolis.
 Johnson, Charles Anton, Sauk Center.
 Johnston, Charles Edward, Minneapolis.
 Johnson, Julius H., Minneapolis.
 Johnson, Paul, St. Paul.
 Joy, Charles P., St. Paul.
 Judson, Harry Carlton, St. Paul.

Kenyon, Louis N., Minneapolis.
 Lains, Harold G., St. Paul,
 Lang, Fred Clarence, Haverhill, Mass.
 Levy, Sam Julian, Minneapolis.
 Lundborg, Hugo, Minneapolis.
 Mabey, Perl William, Lake City.
 McGinnis, Edward F., Benson, Minn.
 McIntyre, James, Manannah.
 McIntyre, William Adelbert, Minneapolis.
 McLaughlin, Hugh Raymond, Minneapolis.
 McNamara, Thomas P., St. Paul.
 Martin, George W., Minneapolis.
 Mengel, Alfred J., Minneapolis.
 Metcalfe, John B., Louisville, Ky.
 Minor, Clement J., Minneapolis.
 Morgan, Jessie Thayer, Minneapolis.
 Morrison, John A., Minneapolis.
 Ogren, John William, Minneapolis.
 Olson, Berndt, St. Paul.
 Osborn, Louis M., Mankato.
 Pratt, L. K., St. Paul.
 Reimestad, George Ingvald, Minneapolis.
 Schmidt, Carl Bernhard, St. Paul.
 Sennett, Lincoln Henry, Maple Lake.
 Sinai, Alexander, Minneapolis.
 Smith, G. Foster, Minneapolis.
 Smith, Helen, Aurora, Ia.
 Squires, LeRoy Victor, St. Paul.
 Steele, Henry Herbert, Minneapolis.
 Thornton, John James, St. James.
 Tone, Aad. Gilman, Ia.
 Voorhees, Victor W., Jr., Minneapolis.
 Wagner, Roy Haven, Minneapolis.
 Wittmaack, John Henry, Minneapolis.

JUNIOR (DAY)—124.

Anderson, Andy Norman, Cumberland, Wis.
 Berge, Herbert John, Jackson.
 Billson, Harford Lemuel, Duluth.
 Blomberg, Chas. August Louis., *A. B.*,
 St. Peter.
 Bowler, Frank Leslie, Bird Island.
 Boyer, Carl Adam, St. Paul.
 Bradford, Benjamin Harold, Milbank, S. D.
 Breen, Maurice J., Ghent.
 Burglehaus, Theron Woolson, Minneapolis.
 Caldwell, Guy Lowell, St. Paul.
 Callahan, James A., Minneapolis.
 Cameron, Donald Alexander, LaCrescent.
 Campbell, Fred Clinton, St. Charles.
 Canis, William Bret, Elkhart, Ind.
 Card, William Harry, *D. M. D.*, Minneapolis.
 Cole, Paul, St. Paul.
 Cooper, Paul Curtis, Jackson.
 Confer, Samuel Calvin, Minneapolis.
 Costello, Thomas James, Graceville.
 Cox, Edwin Francis, Lowry.
 Dah'en, Knut T., Wendell.
 Darby, Benjamin Edmon, Minneapolis.
 Davis, Thomas J., Mankato.
 Dickerman, Charles Kent, St. Paul.
 Dinehart, Clarence Christopher, Slayton.
 Edwards, Harry Elmer, Ashland, Wis.
 Ellis, Lawrence O., Hixton, Wis.
 Ellsworth, Frank Fowler, St. James.
 Erickson, Oscar Gustav, Canby.
 Erickson, Newman Llewellyn, Beaver Falls.
 Fagan, Walter Earle, Minneapolis.
 Fitch, Lester John, Minneapolis.
 Flannery, Charles S., Minneapolis.
 Geraghty, Thomas P., St. Paul.
 Gergen, John Bernard, New Frier, Dak.
 Gilfillan, John B., Jr., Minneapolis.
 Gipson, Eugene Henry, Faribault.
 Glover, Fred, Minneapolis.
 Gowan, George William, Minneapolis.
 Grattan, Peter Joseph, Waverly.
 Gray, Archibald D., Preston.
 Gray, Claude Fillmore, Minneapolis.
 Gray James E., Fergus Falls.
 Gridley, Eby Grant, Duluth.
 Griffith, Bertram B., Sleepy Eye.
 Grove, Julius O., Glenwood.
 Gurney, Henry Dwight Forest, St. Paul.
 Haas, Alfred, Holstein, Ia.
 Hartman, Harry Hale, Indianola, Ia.
 Henry, George, St. Paul.
 Higgins, Daniel H., Neillsville, Wis.
 Holdahl, Ole T., Roseau.
 Howell, Robert Morris, Wilmot, S. D.
 Hubachek, Louis A., Racine, Wis.
 Hurley, Michael Bernard, Pine City.
 Ingerman, Martin Nels, Howard, S. D.
 Jensen, Olaf Theodore, Benson.
 Kaldor, Theodore, Hillsboro, N. D.
 Kelsey, Robert Goodnow, Clinton, N. Y.
 Kenney, Michael James, Delevan, Wis.
 Kinmore, Eugene S., Tracy.
 Koeneke, Arthur Wilson, Beleville, Ill.
 Korsvick, Guttorm Hansen, Galchutt, N. D.
 Kvello, Alfred Marius, Lisbon, N. D.
 Ladd, James Burdick, Sanborn.
 Laycock, Ernest, New Bedford, Mass.
 Lee, Engbret A., Minneapolis.
 Lindquist, Ernest, Minneapolis.
 Lyche, Charles Albert, Hatton, N. D.
 McDonald, John Alexander, Minneapolis.
 McKenney, Richard Irving, No. St. Paul.
 McKesson, Robert Franklin,
 Council Bluffs, Ia.
 Malone, Daniel Thomas, Jackson.
 Markham, Claron Arthur, Independence, Wis.

Markham, John Albert, Independence, Wis.
 Merrick, Ernest M., Little Falls.
 Miller, William Hal, Jackson.
 Murtha, Thomas Francis, Hersey, Wis.
 Neander, Victor Theophilus, Marine Mills.
 Nelson, Iver Cornelius, Grand Forks, N. D.
 Nickerson, John E., Garden City.
 Noyes, Eugene Clement, Minneapolis.
 Odell, Clinton Moreau, Minneapolis.
 O'Keefe, Daniel J., River Falls, Wis.
 Paddock, George A., Minneapolis.
 Pederson, Sivert, Appleton.
 Pitkin, Charles Alfred, Euclid.
 Plymat, Walter Ashton, Mankato.
 Redding, Paul Secor, Windom.
 Richards, Charles Wesley, Stewart.
 Richardson, Harold James, Rochester.
 Rindahl, John Holm.
 Rogers, Claude, Minneapolis.
 Schnorenberg, John Henry, Hartford, Wis.
 Scribner, J. S., Maine.
 Severance, William, Beldenville, Wis.
 Sheran, John Francis, Alma City.
 Siemens, Julius, St. Paul.
 Stanford, Bernard Abbott, Kandiyohi,
 Spicer, Marion Clifford, Osceola, Wis.
 Stenhaug, John, Dennison.
 Strom, Carl Sigvert, Lake Crystal.
 Sutherland, Renne, Minneapolis.
 Teisberg, Carl Alfred, St. Paul.
 Thompson, Paul Jennings, B. S.,
 Rosendale, Wis.
 Thompson, William Thomas, B. S.,
 St. Croix Falls, Wis.
 Tiffany, Fred L., Mason City, Ia.
 Todd, Jay, Sheldon, Wash.
 Tweet, Henry Christopher, Tracy.
 Wachuta, Charles Frank, Excelsior.
 Wagner, Harry Milton, Minneapolis.
 Walso, John, Fergus Falls.
 Ward, Earl Whipple, Waseca.
 Warren, Charles Parker, Iroquois, S. D.
 Webb, George Taylor, Minneapolis.
 Webber, Howard Arthur, St. Paul.
 Weeks, A. L., Minneapolis.
 Whitney, Arthur Byron, Slayton.
 Willis, Hugh E., M. A., Yankton, S. D.
 Wilson, Elmer Young, Minneapolis.
 Wilson, George Stead, Minneapolis.
 Woodard, Orlando F., Marshall.
 Woods, Roy Charles, Corrull.
 Wright, John Henry, Marshalltown, Ia.

COLLEGE OF MEDICINE AND SURGERY.

FOURTH YEAR—39.

Agnew, Annie Marie, Hudson, Wis.
 Avery, Jacob Fowler, Minneapolis.
 Batcheller, Oliver, Madelia.
 Best, Robert, Freeport, Ill.
 Bratrud, Theodore, Spring Valley.
 Burgan, James Homer, Milbank, S. D.
 Condit, William Henry, Jersey, Ohio.
 Culver, Charles Frank, New Rockford, N. D.
 Endress, Carl John, St. Paul.
 Ferguson, William John, Minneapolis.
 Forrest, Charles George, Minneapolis.
 Gaines, Everett Columbia, Minneapolis.
 Geyerman, Peter, Worthington.
 Grafton, Guy, Winona.
 Grout, Sam Eugene, Eau Claire, Wis.
 Hall, Charlotte Chance, St. Paul.
 Haskell, A. Dair, Minneapolis.
 Haynes, Frederick Eugene, Minneapolis.
 Henry, Anna Mae, Ann Arbor, Mich.
 Henry, Fannie Jae, Ann Arbor, Mich.
 Hotvedt, Ingvald Josephson, Minneapolis.
 Ilstrup, Orlando, Buffalo.
 Lenont, Charles B., Northfield.
 Litzenberg, Jennings Crawford, Minneapolis.
 Ludtke, Gustave Herman, Amboy.
 Mackel, Bertha Katharine, Ada.
 McNerthney, John, Red Lake Falls.
 Manson, Frank Melville, Minneapolis.
 Prim, Joseph Andrew, Minneapolis.
 Ramstad, N. Oliver, Eau Claire, Wis.
 Reed, Harry Kirk, Richland, Mich.
 Schoonmaker, Edward C., Minneapolis.
 Shaw, Albert William, Minneapolis.
 Sorenson, Antony Niles, Kasson.
 Steward, Benjamin Gadsden,
 Fort Missoula, Mont.
 Strathern, Fred Paul B. S., Rich Valley.
 Tennant, Russel Welcome, Wayzata.
 Tripp, George Arthur, Northfield.
 Woods, Ernest Arthur, Chicago.

THIRD YEAR—55.

Ahlstrom, Alfred Emmanuel, St. Peter.
 Allen, Harry Winslow, M. S., Red Wing.
 Andrist, James Walter, Roscoe.
 Baker, Mrs. Mary, St. Anthony Park.
 Benedict, Earl Edison, Minneapolis.
 Bennett, Oscar Everett Hallam, Minneapolis.
 Benson, George Edward, Minneapolis.
 Bingham, Josephine, Ruthton.

Bloom, William Drew, St. Paul.
 Brooks, George Frank, Faribault.
 Caley, Guy Ross, Minneapolis.
 Campbell, Charlotte Phila, Mantorville.
 Carman, James Edwin, Detroit.
 Cook, Paul Burns, Rochester.
 Cutts, George A. Custer, Litchfield.
 Dean, Sidney Walter, Camden Place.
 Drew, George Francis, Ardoch, N. D.
 Ellis, Benjamin James, Minneapolis.
 French, Edwin John, Dover.
 Garrison, J. Frank, Kasson.
 Geist, Emil Sebastian, St. Paul.
 Hare, Earle Russell, Minneapolis.
 Hazletine, Harry H., Minneapolis.
 Hoff, Peder Andreas, St. Paul.
 Huxley, Fred, Plainview.
 Hyslin, Evan, Elizabeth.
 Irish, Palmer Horace, Minneapolis.
 Kankel, Otto William, B. A., Fertle.
 Kennedy, Mrs. Jane Frances, Minneapolis.
 LeVasseur, Irma, Quebec.
 Linton, Laura, Minneapolis.
 Mayer, Laurence Philip, Farmington.
 Miles, Robert S., Glencoe.
 Nelson, Kent, Litchfield, Ill.
 Nevitt, Orme Richardson, Minneapolis.
 Norton, Harvey Gordon, Marsha I.
 Olson, John William, Dassel.
 Osborn, Anna Lida, Mankato.
 Owen, George St. Bernard, Livingston, Mont.
 Parker, Owen William, North Branch, Ia.
 Rankin, Arthur Augustus, Minneapolis.
 Richards, Henry Raoul, Little Falls.
 Serkland, John Christian, St. James.
 Simon, Benjamin Franklin, St. Paul.
 Stuhr, Henry C., Euclid.
 Swedenburg, Francis G., Maiden Rock, Wis.
 Swenson, Geoger Bertram Menomonie, Wis.
 Taylor, William W., B. S., U. of Mich.
 Tirrell, John Mahlon, Minneapolis.
 Titus, Jerome Hill, Montevideo.
 Valentine, Walter Henry, Cannon Falls.
 Wells, Ray Sumner, Butte, Mont.
 Weyrens, Peter James, St. Nicholas.
 Wheelon, Frank Edwin, Cummings, N. D.
 Williams, Archie Elton, B. A., Minneapolis.
 Wolski, Robert Albert, Winona.

SECOND YEAR—85.

Adair, Fred L., B. S., Anamosa, Ia.
 Adams, Betram Sage, B. S., Lisbon, N. D.
 Argue, Geo. William, Carlisle, N. D.
 Armstrong, John M., St. Paul.
 Arzt, Herbert, B. S., St. Paul.
 Aurand, William Henry, Bowdle S. D.
 Babcock, George Lucius, Minneapolis.
 Baldwin, William Prendergast,
 Michigan City, N. D.
 Barton, Edgar Reginald, Minneapolis.
 Beckman, E. Hessel, Minneapolis.
 Beise, Rudolph A., Mapleton.
 Bickford, Frank J., Alma City.
 Blackmun, Ernest Linwood, Alden.
 Blake, James, Minneapolis.
 Boyd, Frank P.
 Burns, Floyd William, St. Paul.
 Campbell, John Elisha, M. S., Minneapolis.
 Carmen, Russell Daniel, St. Paul.
 Cassel, Rufus Joshua, Dassel.
 Chamberlin, Henry Ward, La Crosse, Wis.
 Chilton, Leo W., Howard Lake.
 Cleveland, Hiram Edward, Northfield.
 Cohen, Harry Archibald, Minneapolis.
 Cole, Danforth C., Minneapolis.
 Dart, Leslie O., Litchfield.
 Davis, Luther Alvin, Burtram.
 Day, Floyd McArthur, Preston.
 Dickman, Lester Albert, Westgate, Ia.
 Donovan, John Joseph, Minneapolis.
 Doyle, John W., Minneapolis.
 Eberlein, Edward August
 Eisengraeber, Gustav Adolph, St. Paul.
 Evans, Owen, La Crosse, Wis.
 Ewing, C. Francis, Angola, Ind.
 Farmer, Sidney Stewart, Owatonna.
 Farrish, Robert Cyrus, St. Paul.
 Ferguson, James Cory, Olivia.
 Fligman, Louis Henry, Minneapolis.
 Foster, Alson James, St. Paul.
 Fuiton, Thomas C., White Bear.
 Goldblum, George Joseph, Minneapolis.
 Goldblum, Jacob, Minneapolis.
 Hanson, Martin O., Lemond.
 Holst, Claud Frederick, Red Wing.
 Hopkins, Mary Parker, St. Paul.
 Houghton, Percy, St. Paul.
 Houston, Charles, Kasson.
 Johnson, Herman, Pelican Rapids.
 Jones, Herbert W., Berlin, Wis.
 Kiehle, Frederick Andrews, B. A., Minneapolis.
 Koren, Finn, B. L., Montevideo.
 La Rose, Victor Joseph, St. Paul.
 Lees, Robert Bruce, Minneapolis.
 Levinson, Ezekiel, Minneapolis.
 McCloud, Charles Nauman, St. Paul.
 McGuigan, Henry Thomas, Milville.
 MacKenzie, D. Stuart, Wabasha.
 Maloney, Thomas James, St. Paul.
 Olson, Sterling Herbert, Austin.

Parker, Harvey Gamaille, Waseca.
 Parry, Iven, St. Paul.
 Prinzing, Jacob, St. Paul.
 Putnam, Catherine Eliza, St. Paul.
 Rose, Frank, Minneapolis.
 Sanford, James Alfred, Alderley, Wis.
 Savage, Francis Joseph, Minneapolis.
 Schmidt, Samuel Christian, Minneapolis.
 Schneider, Henry, Deerfield.
 Shaw, Bertrand William, Tracy.
 Stemsrud, Arne A., Madison.
 Stierle, Adolph, St. Paul.
 Stolpestad, Harald Lauritz, St. Paul.

Storey, Ernest P., Minneapolis.
 Strout, G. Elmer, St. Paul.
 Sweitzer, Samuel Edward, Minneapolis.
 Tofte, Albert August, Fisher.
 Truscott, Joseph Robert, Minneapolis.
 Vallely, Rose, Fairhaven.
 Warren, Mary Julia, Minneapolis.
 Weible, Ralph Emerson, Weible, P. O., N. D.
 Wells, H., Journeyay, Minneapolis.
 Whitacre, John Clifford, St. Paul.
 Williams, Boyd T., Hudson, Wis.
 Woodruff, Claud Whiting, Elgin.
 Woodworth, Elizabeth, Minneapolis.

FIRST YEAR—58.

Abbott, Claude Upton, Minneapolis.
 Alger, Edmund Whitney, Minneapolis.
 Arey, Hugh Custer, St. Paul.
 Barsness, Nellie Olea N., Starbuck.
 Bennion, Percival Hale, Litchfield.
 Bissell, Frank Simmons, Litchfield.
 Bohland, Ernest Herman, St. Paul.
 Brigham, Charles Fay, St. Cloud.
 Brown, Wm. George, Park River, N. D.
 Brown, Walter Murray, Grand Rapids, Mich.
 Budworth, Benjamin Franklin, Minneapolis.
 Bussen, Leonard Henry Anthony, Torak.
 Cameron, John A., Hillsboro, N. D.
 Carlson, Alfred Clarence, Marine Mills.
 Catlin, Jno. J., Delano.
 Chandler, George Ling, Litchfield.
 Coulter, Charles Francis, New York Mills.
 Cumming, John Henry, St. Paul.
 Dahl, Jacob Olson, St. Paul.
 Dalager, Norman Olaf, Austin.
 Davis, Eugene A., St. Joseph.
 Doe, LeRoy, Minneapolis.
 Drechsler, Herman August, Stillwater.
 Dumas, Delbert Frederick, Minneapolis.
 Eckman, Albert, Cokato.
 Erb, Fred Alexander, Minneapolis.
 Ernst, Arthur Albert, St. Paul.
 Fjeldstad, Jacob Conrad, Norway Lake.
 Friedman, Aaron, Minneapolis.
 George, James Woodward, Rockford.
 Goodman, Minerva, Inkster, N. D.
 Gullixon, Andrew, Bode, Ia.
 Guthrie, Charles E., B. A., Minneapolis.
 Hamre, Albert Leonard, Preston.
 Hanson, Edward, Thor, Ia.
 Harroun, William Arthur, Minneapolis.
 Haugseth, Enoch, Minneapolis.
 Heidekker, Arne, St. Paul.
 Hermann, Edward Julius, Duluth.
 Hill, Eleanor Jane, Minneapolis.
 Holliday, Courtland E., Minneapolis.
 Iddings, Howard Wiley, Grand Forke, N. D.

Ivers, Martin U, Minneapolis.
 Jensen, J. Marius, Minneapolis.
 Jewell, Emre Lee, Pine Island.
 Johnson, John Arvid, Minneapolis.
 Johnston, Will Walter, Byron.
 Judd, Edward Stan, Rochester.
 Kierland, Peter E., Rushford.
 Kittleson, Theodore, Canby.
 Knudson, Knute Otto, Benson.
 Koch, John C., Eergus Falls.
 Lamb, Harold Ladd, Sauk Center.
 Larsen, Harry Albert, Minneapolis.
 Larson, Frank Emelius, Winthrop.
 Lewis, William W., St. Paul.
 Lewison, Eli, Vermillion, S. D.
 Liedloff, Adolph Gustav, Mankato.
 Limburg, Albert Milton, Hunter, N. D.
 Linneman, Nicholas Louis, Brainerd.
 Lohrbauer, Ejnar, Northwood, N. D.
 McClure, Jno. O., St. Cloud.
 McCreery, Charles Reuben, Northfield.
 McCreery, William Barker, Northfield.
 Macdonald, Irving, Buxton, N. D.
 Mathwig, Richard C., Owatonna.
 Merritt, Walter Dwight, Minneapolis.
 Meyerding, Edward August, St. Paul.
 Millett, Josiah Libbey, Graceville.
 Moore, John William, Stewart.
 Morey, Charles Berry, Winona.
 Norred, William Asbury, Minneapolis.
 Ohnstad, Jens, Morrisonville, Wis.
 Olson, Olof August, Dassel.
 O'Malley, William Patrick, Minneapolis.
 Orme, Frank John William, St. Paul.
 Peabody, Percy Dickinson, Webster, S. D.
 Peck, Lewellington D., Rochester.
 Poehler, Frederick Carl, Henderson.
 Prill, Herman Frederick, Augusta, Wis.
 Ritchie, Cyrus K., Bloomington.
 Rolfson, Carl, Hazel Run.
 Ryan, Margaret, Ashland, Wis.
 Schmitt, Aaron Franklin, Mankato.

Shaleen, Arthur William, Lindstrom.	Tyrrell, John Boyd, Waterville.
Smith, Author Mason, Minneapolis.	Vinje, Syver, Dalton.
Schmidt, Walter Richard, Rochester.	Vistaunet, Peter Lorents, Fargo, N. D.
Sessions, John Chandler, Minneapolis.	Warner, Eugene Frederick, St. Paul.
Stewart, Malcom A., Elora, N. D.	Wenger, Ferdinand Alonzo, St. Paul.
Thompson, Albert S., Mt. Horeb, Wis.	Wilcox, Van Hurlburt, Spokane, Wash.
Theilan, William Peter, Stillwater.	Wolner, Oscar Herbert, St. Paul.

SPECIAL—3.

Clement, Lucian Orville, Waseca.	Vibrance, Gustav Chas., Farmington.
Cornish, Edwin Joseph, Myrna.	

GRADUATE—1.

Richardson, W. E., M. D., Elgin.

COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

FOURTH YEAR CLASS—4.

Albert E. Booth, Minneapolis.	Glenn R. Matchan, Minneapolis.
Arthur T. Caine, Stillwater.	Wesley G. Matchan, Zumbrota.

THIRD YEAR CLASS—7.

Oscar Bertleson, Fergus Falls.	Clifford C. Leck, Owatonna.
Ferdinand Gramenz, Posen, Germany.	Charles M. Niles, Fergus Falls.
Herman A. Hartung, Cottage Grove.	Edwin H. Smith, Minneapolis.
Annah Hurd, Phm. D., Minneapolis.	

SECOND YEAR CLASS—5.

H. Gray Bickford, Maine.	William B. Roberts, B. S., Minneapolis.
Roy E. Mitchell, Porter's Mills, Wis.	Hugh J. Turnstead, Minneapolis.
	Paul Wallace, St. Paul.

FIRST YEAR CLASS—4.

Earl Hall, Eau Claire, Wis.	Norman M. Smith, Monticello, Ia.
Fred D. Rogers, St. Paul.	Ella Suydam, St. Paul.

SPECIALS—2.

Carl V. Cole, Fergus Falls.	Harry E. Sutton, Minneapolis.
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COLLEGE OF DENTISTRY.

SENIOR CLASS—20.

Argue, John Ephraim, Carlisle, N. D.	Kelly, James Lawrence, St. Anthony Park.
Benton, Clarence Daniel, Minneapolis.	King, Nelson Madison, Rochester.
Campbell, Alexander Silas, Ortonville.	Marston, Harold Foster, Chattanooga, Tenn.
Foote, Charles Percival, St. Paul.	Phelps, Elton Henry, St. Paul.
Gallagher, Ray Harrold, Emporia, Neb.	Thomas, Harry Estus, Ellendale, N. D.
Gorgen, Edward, New Richland.	Torrance, Charles Murt, Minneapolis.
Hagaman, Edwin Alexander, Rochester.	Updyke, Robert Patten, Waseca.
Hall, George Everett, Rat Portage, Ont.	Wells, James Osborne, Newberry, S. C.
Henderson, Hugh S., Spicer.	Whitmore, Sanford Eugene, Montevideo.
Hertz, Franklyn Eugene, St. Paul.	Whittemore, Morse Kittredge, Glenwood.

JUNIOR CLASS—44.

Adams, Eugene Franklin, Grand Forks, N. D.	Munns, Edward Ernest, Minneapolis.
Anderson, Frederick Edward, Red Wing.	Nelson, Harold James, Glencoe.
Bertram, Harry Wallace, Monticello.	Nelson, Louis, Lake Park.
Busse, Theo Christian, Shakopee.	Norris, George Washington, Tracy.
Carlson, Hanphen Henry, Grove City.	Olson, Adolph,
Christianson, Edward William, Fargo, N. D.	Olson, Carl G., Minneapolis.
Clarke, Joseph, Green Isle.	Owre, Aneas, Minneapolis.
Cooper, Herbert Charles, McCauleyville.	Patterson, John F., St. Paul.
Costain, Elbert Pryor, Moorhead.	Revell, Aris LeEoy, Minneapolis.
Gloyd, William, Minneapolis.	Riley, Frank Freeman, Lakefield.
Hallenberg, Albert, Fargo, N. D.	Roberts, Oscar Edwin, Cottage Grove.
Hintz, Charles August, Courtland.	Scholberg, Martin Hans,
Horn, Karl H., Red Wing.	Sommermeier, E. F., Eau Claire, Wis.
Howell, Herbert Roosevelt, Minneapolis.	Sprague, Dan Eugene, Minneapolis.
Hutchin, Robert Clement, So. St. Paul.	Staiger, Frank Joseph, Red Wing.
Jaehning, Herman S., New Richland.	Stone, Gilbert Ferdinand, St. Paul.
Jensen, Charles Alfred, Brighton.	Swanson, Anton W., Vasa.
Knudson, John F., Pelican Rapids.	Thorsen, Adolph, New Centerville, Wis.
Krohler, Benjamin George, Mound Prairie.	Thorsen, Axel, Rock Dell.
Lamphere, Ralph Leo, Moorhead.	Tyler, Homer Amos, Simpson.
Larson, Henry Charles, Hastings.	Wilson, Robert Barnes, St. Paul.
Lockhart, Harvey John, Pelican Rapids.	Zieger, Otto Charles Edward, Owatonna.

FRESHMAN CLASS—46.

Alther, Arthur Eugene, Minneapolis.	Kershaw, Albert LaFayette, St. Paul.
Ball, William Harrison, Morgan.	McNerthney, Michael, Red Lake, Falls.
Beede, Thad S., Aurora, Ill.	Martin, William Leslie, Wood Lake.
Billings, Wall Marion, Minneapolis.	Moody, Adolph F., Minneapolis.
Bolstad, Ole, Colfax, N. D.	Nelson, Alexander, Minneapolis.
Brodeen, Albin, Minneapolis.	Nelson, Orrin Chauncey, Manannah.
Child, Harry Burr, Minneapolis.	Osterberg, Alfred, Stockholm.
Cox, Norman J., Wasioja.	Owens, John Evan, Sleepy Eye.
Crandall, Charles Ray, Etter.	Pepper, Frederick William, Minneapolis.
Creelman, Ernest Everett, Parker's Lake.	Peregrine, Harry Granger, Winona.
Dahlgren, Bror Eric, Gothenburg, Sweden.	Reinhart, Richard, Duluth.
Doheny, James Edward, Green Isle.	Rhame, Walter Stevens, Minneapolis.
Fiset, Charles Frederick Elner,	Sansum, Oliver Wendell, New Orleans.
Grand Forks, N. D.	Sargent, Will Ernest, Lowell, Mass.
Flanigan, Charles Patrick, Minneapolis.	Smith, Ai Biley, Minneapolis.
Fletcher, Freeman Fowler, Red Lake Falls.	Smith, Harvey C., Rochester.
Frodeen, Henry Emanuel, Minneapolis.	Stoudt, Frank Lawrence, Hastings.
George, Everett Clark, Chippewa Falls, Wis.	Sweet, Cyril Fairman, Mankato.
Gillett, Guy Leroy, Lake City.	Thiebaud, James Earle, Minneapolis.
Holmberg, John Louis, St. Peter.	Thompson, Thomas L., Peterson.
Holmgren, Carl John, Minneapolis.	Trelstad, Peter B., Zumbrot.
Jargo, Adam Boorman, Luverne.	Van Evera, John B., Minneapolis.
Johnson, Martin Calvin, Minneapolis.	Yates, Cecil Fred, New Ulm.
Kennedy, John Duncan, Tracy.	

COLLEGE OF PHARMACY.

SENIORS—30.

Biscoe, Thomas, Cottage Grove.	Carpenter, Dwight T., Westfield, Wis.
Buttz, William Lloyd, Lisbon, N. D.	Congdon, Jno. Chauncy, Jr., Brainerd.
Clark, Guy C., Augusta, Wis.	Cool, George Henry, Faribault.

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| Crosby, Charles Coran, Langdon, N. D. | Hong, Adolph, Willmar. |
| Day, Perry Richard, Owatonna. | Jacobson, David Lorenz, Decorah, Ia. |
| Dillner, Emmanuel T., Grove City. | Landeen, Arthur Ferd., Garfield. |
| Drechsler, Frank Xavier, Minneapolis. | Molstad, Emil Caspar, Spring Valley. |
| Dorr, Gertrude Nell, Simpson. | Onstad, John, Wastedo. |
| Elick, DeRoy Rayme, Minneapolis. | Schwab, Benjamin, St. Paul. |
| Evans, David, Delavan. | Scholten, John Peter, Winnebago City. |
| Fairbank, Cora Mabel, Lanesboro. | Seaquist, Oscar, Jordan. |
| Francis, William Edward, New Auburn. | Stultz, Edna Belle, Owatonna. |
| Gunz, Abe N., Austin. | Stoutemyer, William Bernhart, Worthington. |
| Hart, Frank, Harmony. | Swanson, Claus August, St. Paul. |
| Hays, Robert Boyd, Vernon Centre. | Vallencey, Eldred Pottinger, Graceville. |

JUNIORS—32.

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|---|--|
| Bachman, Gustav, Avoca. | Hynes, John Eldon, Winnebago City. |
| Bell, John Michael, Glencoe. | Juliar, Richard Otto, St. Clair. |
| Bock, Rolland, St. Paul. | Lewis, Edwin L., Minneapolis. |
| Brenner, Carl, Stillwater. | Lyon, Charles George, Elgin. |
| Cleveland, Zina N., Northfield. | McCormick, Leslie James, Owatonna. |
| Clough, Charles Foster, Minneapolis. | McDaniels, Frank, Minneapolis. |
| Coughlin, William Thomas, Carthage, N. D. | Milne, George Washington, Minneapolis. |
| Carter, Roy, Norfolk, Neb. | Milne, Henry John, Canton. |
| Cowin, George Augustus, Minneapolis. | Moran, Martin Thomas, Minneapolis. |
| Danielson, Charles Olaf, Minneapolis. | Moskop, Albert, Arlington. |
| Dreis, Henry Joseph, St. Paul. | Nisbit, Mae, Rochester. |
| Engman, John Axel, | Peterson, Charles Emil, Litchfield. |
| Fonda, Earl Avery, Graceville. | Scarf, Henry, Pipestone. |
| Hanson, Peter Hans, Lake Park. | Schmidt, Emil Trangott, Buffalo. |
| Haskell, Edward Earl, Minneapolis. | Spielman, Alois Joseph, Shakopee. |
| Hurley, William, Pine City. | Story, Charles Lewis, Minneapolis. |

Summary of Students

THE GRADUATE DEPARTMENT.

	Men	Women	Total
Candidates for the degree of doctor of philosophy.....	41	4	45
doctor of civil law.....	11		11
master of arts.....	23	4	27
master of science.....	20	1	21
master of literature.....	10	8	18
electrical engineer.....	1		1
master of laws.....	10		10
Others doing graduate work.....	31	31	62
Total.....	147	48	195-195

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

	Men	Women	Total
<i>Senior class.</i>			
classical section.....	9	13	22
scientific section.....	38	18	56
literary section.....	9	44	53-131
<i>Junior class.</i>			
classical section.....	18	12	30
scientific section.....	62	17	79
literary section.....	15	35	50
civic section.....		2	2-161
<i>Sophomore class.</i>			
classical section.....	16	8	24
scientific section.....	49	33	82
literary section.....	19	46	65
teachers' section.....	4	9	13
civic section.....	1		1-185
<i>Freshman class.</i>			
classical section.....	18	15	33
scientific section.....	64	50	114
literary section.....	18	71	89
civic section.....	34	17	51
teachers' section.....	8	14	22-309
Uuclassified students.....	36	76	112-112
Total.....	418	480	898-898

THE COLLEGE OF ENGINEERING, AND THE MECHANIC ARTS.

	Men	Women	Total
<i>Senior class.</i>	civil engineering section	2	2
	mechanical engineering section.....	3	3
	electrical engineering section.....	6	6-11
<i>Junior class.</i>	civil engineering section.....	8	8
	mechanical engineering section.....	7	7
	electrical engineering section.....	11	11-26
<i>Sophomore class.</i>	civil engineering section.....	11	11
	mechanical engineering section.....	9	9
	electrical engineering section.....	17	17-37
<i>Freshman class.</i>	all sections	49	49-49
	art course.....		8-8
Unclassed students.....	13	7	20-20
	136	15	151-151

THE SCHOOL OF MINES.

	Men	Women	Total
Senior class.....	3		3
Junior class.....	15		15
Sophomore class.....	19		19
Freshman class.....	20		20
Unclassed students.....	5		5
Total.....	62		62-62

SCHOOL OF CHEMISTRY.

	Men	Women	Total
Senior class.....	1		1
Sophomore class.....	2		2
Freshman class.....	6		6
Total.....	9		9

THE DEPARTMENT OF AGRICULTURE.

	Men	Women	Total
Senior class.....	5		5-5
Junior class.....	5		5-5
Sophomore class.....	8		8-8
Freshman class.....	3		3-3
The school of agriculture—graduate students.....	2		2
class A.....	31	3	34
class B.....	29	4	33
class C.....	83	27	110
preparatory class.....	73	22	95
the dairy school.....	75		75
special students.....	35	4	39
Total.....	349	60	409-409

COLLEGE OF LAW.

	Men	Women	Total
Graduate class—for doctor of civil law.....	11		11
for master of laws.....	10		10
Senior class.....	82	2	84
Middle class.....	159	1	160
Junior class.....	178	4	182
Total.....	440	7	447-447

Summary of Students.

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THE DEPARTMENT OF MEDICINE.

THE COLLEGE OF MEDICINE AND SURGERY.

	Men	Women	Total
Graduate students	1		1
Senior class	34	5	39
Junior class	48	7	55
Sophomore class	80	5	85
Freshman class	94	4	98
Special students	3		3
Total	260	21	281-281

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

Senior class	4		4
Junior class	6	1	7
Sophomore class	5		5
Freshman class	4		4
Special students	2		2
Total	21	1	22-22

THE COLLEGE OF DENTISTRY.

Senior class	20		20
Junior class	44		44
Freshman class	46		46
Total	110		110-110

THE COLLEGE OF PHARMACY.

Senior class	26	4	30
Junior class	30	2	32
Total	56	6	62-62

SUMMER SCHOOL FOR TEACHERS.

University section	141	239	380
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SUMMARY OF TOTALS.

	Men	Women	Total
Graduate students	147	48	195
The college of science, literature and the arts	418	480	898
The college of engineering, metallurgy and the mechanic arts	136	15	151
The school of mines	62		62
The school of chemistry	9		9
The department of agriculture	349	60	409
The college of law	440	7	447
The department of medicine	448	27	475
The summer school—University section	141	239	380
Total	2150	876	3026
Duplicates	26		26
Duplicates in summer school	25	50	75
Total excluding duplicates	2099	826	2925

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Appendices.

A.

TEACHERS' CERTIFICATE.

Students who complete the teachers' course and all who complete courses for degrees in the college of science, literature and the arts, and have also completed the required courses in pedagogy, will receive upon the vote of the faculty this certificate, which by State law authorizes them 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 perpetual by the endorsement of the state superintendent of public instruction and the president of the University.

The University Teacher's Certificate was granted to the following named persons duridg the year ending June 1st, 1899.

Arne O. Aaberg.
A. P. Andrews.
John M. Arneson.
Walter L. Benedict.
Edwin B. Bothe.
Harriette Brown.
Lena E. Brokaw.
Clemma Buck.
James Buer.
Mrs. Lillian Carleton.
Fannie B. Chapman.
Mrs. Bertha Child.
D. E. Cloyd.
Bret E. Cooley.
Grace E. Comstock.
Hattie Conser.
May Daniel.
Ester L. DeCoster.
A. H. Dunlap.
Halsten O. Eggen.
M. G. Fanning.
Ora Featherstone.
Frances B. Felch.
Elizabeth Foss.
Stella E. Gray.
George H. Green.
Olive N. Hallock.
Albert Hart.
Sophie S. Holt.

Foi. Hotchkiss.
Charles Huff.
Jennie M. Jackson.
Effie M. Jacobson.
Georgena F. Kennedy.
Daniel J. Lothrop.
Alma M. Lundgren.
Kyle F. Marlow.
Sophie H. Martin.
Helen A. Moody.
Lydia Messerschmidt.
Abbie Morgan.
Fannie S. Newman.
Alice M. Nickerson.
Grace O'Hair.
Mary S. Olson.
Isabel D. Parker.
Adolph Peterson.
Jennie C. Phillips.
Janet Priest.
Annie I. Riggs.
Harry Roe.
Winifred Snow.
Harriet P. Wales.
Amy Weber.
Jennie S. Webster.
A. B. Whitney.
Bessie A. Williams.
Essie W. Williams.

B.

According to the provisions of the law of the State of Minnesota, regarding permanent teachers' certificates, the following named persons have been granted such certificates, their teachers' certificates, granted by the University have been approved by the President of the University and by the Superintendent of Public Instruction.

Ella M. Austin.
Lloyd B. Austin.
Inga Beebe.
Bertha R. Bradford.
Georgia A. Burgess.
Lucy K. Case.
Maud M. Case.
Maud C. Colgrove.
Agnes E. Doherty.
Lucy B. Dunham.
Clarence Ellithorpe.
Henrietta G. Fox.
Caroline Fullerton.
Eugene K. Green.
Frank E. Green.
Frank Hanft.
George A. Hanson.
Eleanor Holtz.
Rhodella Kirtland.
Clara Knippis.

Elizabeth L. Koehler.
Lydia T. Lagerstrom.
Lou N. McWhorter.
Jennie M. Means.
Clarence B. Miller.
Grace H. Miller.
Wells J. Mosher.
Mary Plant.
Elias Rachie.
Jessie E. Stevens.
Mabel Sylvester.
Gertrude E. Tibbetts.
Millicent Tengwall.
Mabel Thomas.
Aad A. Tone.
Alfred W. Uhl.
Florence M. Weston.
Adelaide Winton.
Agnes Y. Woodward.
Ella T. Wright.

C.

COMMITTEES FOR THE YEAR 1899-1900.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

- On Graduate Studies and Degrees*—Professors Brooks, Eddy, Breda, Nachtrieb, Wells, Benton.
On the Library—Professors Folwell, Frankforter, Benton, MacMillan, Jewett.
On Enrollment—Professors Hutchinson, Leavenworth, MacDougal.
On Unclassed Students—Professors Nachtrieb, Wilkin, Pike.
On Conditioned Students—Professors Clark, Sidener, Sigtoots.
On Program—Professors West, Frankforter, Wilkin.
On the Teachers' Course—Professors Kiehle, Jones, Leavenworth, McClumpha, Klæber.
On the Summer School—Professors Clark, Sanford, McClumpha.
On Athletics—Professors Woodbridge, Jones, Hinton.
On Military Affairs—Professors Leonhäuser, Folwell, McDermott, Hibbard.
On Curriculum—Professors Brooks, Jones, Moore, Nachtrieb, West, Woodbridge, Downey.
On Gymnasium—Professors Kiehle, MacMillan, Wells, Haynes, Constant.
On Accredited Schools—Professors West, Kiehle, Downey.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

- Library*—Professors Smith, Constant, Shepardson.
Enrollment—Professors Constant, Haynes, Benton.
Unclassed Students—Professors Kirchner, Sidener, Leavenworth.
Conditioned Students—Professors Flather, Hoag, Sidener.
Program—Professors Shepardson, Kirchner, Frankforter.
Athletics—Professor Hoag.
Military Affairs—Professor Flather.
Graduate Studies and Degrees—Professor Eddy.
Curriculum—Professors Eddy, Hoag, Shepardson, Smith, Jones, Kirchner, Haynes.
Degrees—Professors Hoag, Smith, Shepardson.

