

THE UNIVERSITY OF MINNESOTA

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# CATALOGUE

FOR THE YEAR

1895-'96

AND

# ANNOUNCEMENTS

FOR THE YEAR

1896-'97



BY THE UNIVERSITY

MINNEAPOLIS

1896

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*The Annual Catalogue, published at Commencement by authority of the Board of Regents, is a record of the membership and condition of the University for the current University year, and also contains the courses of study and other announcements for the University year following.*

*The Catalogue will be sent gratuitously, postage paid, to all persons who apply for it. Address the Registrar, care of the University of Minnesota, Minneapolis, Minn.*

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# CALENDAR FOR 1896-97.

1896.

1897.

## 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.

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	..	..	..	..	..

## SEPTEMBER.

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	..	..	..
..	..	..	..	..	..	..

## OCTOBER.

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
..	..	..	..	..	..	..

## NOVEMBER.

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	..	..	..	..	..
..	..	..	..	..	..	..

## DECEMBER.

S.	M.	T.	W.	T.	F.	S.
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	..	..	..	..	..	..

## FEBRUARY.

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	..	..	..	..	..	..
..	..	..	..	..	..	..

## MARCH.

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	..	..	..
..	..	..	..	..	..	..

## APRIL.

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	..
..	..	..	..	..	..	..

## MAY.

S.	M.	T.	W.	T.	F.	S.
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.

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	..	..	..
..	..	..	..	..	..	..

# University Calendar, 1896-97.

## FIRST TERM.

SEPTEMBER	1	T	Entrance examinations and registration.	
	2	W	" " " "	
	3	T	" " " "	
	4	F	" " " "	
	5	S	" " " "	
	7	M	Examinations end and registration continued.	1 W
	8	T	Registration completed and classes called at 10:45.	
	12	S	.....	2 W
	14	M	Literary Societies—7:30 P. M.	
	15	T	(First College classes organized, 1869).	
	19	S	.....	3 W
OCTOBER	26	S	.....	4 W
	3	S	.....	5 W
	5	M	Medical Department—Entrance examinations at 10 A. M. Condition examinations, 2 P. M. Opening lectures at 8:00 P. M.	
	6	T	School of Agriculture opens.	
	7	W	Medical lectures begin.	
	10	S	.....	6 W
	17	S	.....	7 W
	24	S	.....	8 W
	31	S	.....	9 W
NOVEMBER	7	S	.....	10 W
	9	M	Examinations for conditioned students.	
	14	S	.....	11 W
	16	M	Examinations for conditioned students.	
	21	S	.....	12 W
	23	M	Term Examinations. I and II hour work.	
	24	T	" " III and IV hour work.	
	25	W	" " V and VI hour work.	
	26	T	THANKSGIVING DAY.	
	27	F	Term Examinations. VII and VIII hour work.	
	28	S	.....	13 W

## SECOND TERM.

NOVEMBER	30	M	Registration for second term completed.	
DECEMBER	1	T	Classes called for regular work.	
	5	S	.....	1 W
	8	T	Annual Meeting of the Board of Regents.	
	12	S	.....	2 W
	19	S	Holiday Recess begins (no classes)	
	22	T	William Watts Folwell inaugurated as President, 1869.	
	25	F	CHRISTMAS DAY.	

University Calendar.

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

THIRD TERM.

MARCH	8	M	Registration for third term.	
	9	T	Classes called for regular work.	
	13	S	.....	1 W
	20	S	.....	2 W
	26	F	School of Agriculture closes.	
	27	S	.....	3 W
APRIL	3	S	.....	4 W
	10	S	.....	5 W
	17	S	.....	6 W
	24	S	.....	7 W
MAY	1	S	.....	8 W
	8	S	.....	9 W
	13	T	Examinations in the Medical Department begin.	
	15	S	.....	10 W
	18	T	Senior examinations begin.	
	22	S	.....	11 W
	25	T	Senior Examinations in the Law Department.	
	26	W	Term Examinations. I and II hour work.	
	27	T	“ “ III and IV hour work.	
	28	F	“ “ V and VI hour work.	
	29	S	“ “ VII and VIII hour work.	12 W

COMMENCEMENT WEEK.

SUNDAY	MAY	30	BACCALAUREATE SERVICE, - - -	3:00 P. M.
MONDAY	MAY	31	SENIOR CLASS EXERCISES—Announcement by the class.	
TUESDAY	JUNE	1	ALUMNI DAY—Meeting of Alumni.	
WEDNESDAY	JUNE	2	ADDRESS BEFORE COLLEGE OF LAW.	
THURSDAY	JUNE	3	COMMENCEMENT DAY—The Twenty-fifth Annual Commencement.	
			Graduating Exercises, - - -	9:00 A. M.
			President's Reception, - - -	8:00 P. M.
FRIDAY	JUNE	4	SUMMER VACATION BEGINS, - - -	13 W
	JUNE	11	Cyrus Northrop, inaugurated as President, 1884.	

The year 1897-98 will begin August 31, 1897.

## PROGRAM OF EXAMINATIONS, SEPTEMBER, 1896.

The number placed after the subjects, when given, indicate the room in which the examinations will be held. When no number is given, the examination will be held in the chapel—Library building.

DAY.	HOUR.	Subjects for admission to the freshman class.	For students conditioned in the work of first term freshmen and sophomore years.
TUESDAY,	8:00-10:30	English Grammar and Essay,	
SEPT.	10:45- 1:15	Composition.....	
1.	2:30- 5:00	Elementary Algebra....	
WEDNESDAY,	8:00-10:30	Higher Algebra.....	{ *Freshman Algebra..... 22 Sopomore Physics..... 22 Sopomore Chemistry..... 22
SEPT.	10:45- 1:15	U. S. History.....	{ *Freshman Latin..... 4 † Freshman and Sopomore English.
2.	2:30- 5:00	Plane Geometry.....	
THURSDAY,	8:00-10:30	Solid Geometry.....	{ *Sopomore French..... 29 *Sopomore German..... 21
SEPT.	10:45- 1:15	History of Greece and Rome.....	*Freshman and Sopomore Greek..... 20
3.	2:30- 5:00	Natural Philosophy.....	
FRIDAY,	8:30-10:30	Physiology .....	*Sopomore Mathematics..... 22
SEPT.	10:45- 1:15	{ *Greek..... 20 *German..... 21	*Sopomore Latin..... 4
4.	2:30- 5:00	Latin Grammar.....	*Sopomore History.
SATURDAY,	8:00-10:30	Cæsar.....	
SEPT.	10:45- 1:15	Cicero.....	
5.	2:30- 5:00	{ Vergil..... English.....	{ Sopomore Botany..... † Sopomore Zoölogy..... †
MONDAY,	8:00-10:30	Botany.....	†
SEPT.	10:45- 1:15	Chemistry.....	§
6.	2:30- 5:00	{ *French..... 29 Freehand Drawing.....	††

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; †† Mechanic Arts Building.

## Organization and Government.

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. No college work had been carried on until 1868, although at various times in the years intervening between 1851 and 1868, a very elementary kind of instruction had been offered at irregular intervals, which would not aggregate more than one-fourth of the time.

The act of the legislature of 1868 is the one under which the University, as now existing, was organized, and is as follows:

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 in 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 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 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 to 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 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 the 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.

THE ACTUAL BEGINNING.

One of the first acts of the Regents under the new organization was the purchase of a farm for the agricultural college. In September, 1868, a purchase of ninety-six acres was made. This land was situated southeast of the campus and only one-fourth of a mile from it.

In the report made by the Board of Regents, for the fiscal year ending December 22d, 1868, it appears that there were then five instructors employed and one hundred and nine students in attendance, all in the preparatory department.

The year 1869 marks the organization of the University proper; the election of William W. Folwell as president; the selection of a faculty; the beginning of University instruction (September 15th, 1869), and the enlargement of the University farm by the purchase of thirty acres of land. There were in attendance, during this year, thirteen students in the collegiate department and two hundred and seventeen in the Latin or preparatory school.

ORGANIZATION OF DEPARTMENTS.

The organization adopted by the Board of Regents, as required by law was as follows:

- "A Department of Elementary Instruction;
- "A College of Science, Literature and the Arts;
- "A College of Agriculture and the Mechanic Arts;
- "A College or Department of Medicine;
- "A College or Department of Law."

The college of agriculture and the mechanic arts was organized in two divisions, (1) that of agriculture, (2) that of mechanic arts.

The department of elementary instruction was represented by the collegiate department and the so-called Latin school, introductory to it.

UNIVERSITY SUPPORT.

The Legislature of 1893 passed an act giving to the University a State tax of three-twentieths of a mill. This act went into effect the first day of August, 1894. This gives an income of about \$95,000; fees, \$53,000; U. S. Government, \$38,000; University bonds and contracts, \$36,500; miscellaneous sources, \$13,000, making a total of \$235,500.

GOVERNMENT BY BOARD OF REGENTS.

The government of the University is vested in a board of twelve Regents; nine of these members are appointed by the Governor of the State and confirmed by the Senate, and hold office for six years. The other three members are *ex-officio*, the Governor of the State, the State Superintendent of Public Instruction, and the President of the University. This

Board has complete control over everything connected with the University.

*The General Faculty* of the University has control of all matters pertaining to the department of elementary instruction, and has power to direct and control all the general interests pertaining to the internal affairs of the University, (subject to the revision of the Board of Regents, to whom the action of the faculty upon all important matters shall from time to time be submitted).

*The Special Faculties* of the University have control and direction of the interests of their respective colleges or departments. The President of the University is the presiding officer of all the faculties.

*The President of the University*, as the chief executive officer of the University, sees that all the laws and regulations of the Board of Regents for the government of the University, and all the rules and regulations of the several faculties in accordance therewith, are carefully executed; in all cases when an emergency arises in the administration of the affairs of the University, the President may, in his discretion, adopt such measures as he may deem expedient and necessary for the best interests of the University; he may keep and use an official seal, and appoint a secretary; he communicates to any faculty any information they may require, unless in his opinion the interests of the University demand that it be withheld; he edits and publishes the annual catalogue, subject to the revision of the executive committee of the Board of Regents; and performs such other duties consistent with his office as the Board of Regents may prescribe.

Whenever the action of any faculty is, in the judgment of the President of the University, at variance with the plans and policy of the Board of Regents, or otherwise prejudicial to the welfare of the University, and he shall so declare in writing to the secretary of said faculty, the said action shall not take effect until it shall have been submitted to the Board of Regents, and shall have been approved by them; and it is the duty of the president of the University promptly to make a full report of the transaction, together with the reasons for his action, to the president of the Board of Regents.

*The Professors* have general superintendence of everything pertaining to instruction in their respective departments, and are responsible for the successful management of them; each professor has control and charge of the special apparatus of his department, and is responsible for the same.

*Assistant Professors and other Instructors* are responsible for the order and progress of their respective classes. Such general devotional exercises are held in the University as the general faculty directs.

The punishments used in the University are warnings or reprimands in private, in the presence of the offender's class or section, or in public; suspension, indefinitely or for a stated time, by the president, or by order of a faculty; expulsion by vote of the general faculty; and reduction to the ranks, of officers and non-commissioned officers in the military corps. In case of suspension the student has the right of appeal to the general faculty within twenty days after notice of suspension.



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OSCAR A. WEISS, D. M. D., Instructor in Operative Technics, College of Dentistry.	Minneapolis
FRANK R. WRIGHT, D. D. S., M. D., Lecturer on Anæsthesia and Chief of the Anæsthetic Clinic, College of Dentistry.	Minneapolis
ALICE YOUNG, Instructor in English.	Duluth
JOHN ZELENY, B. S., Instructor in Physics.	Minneapolis

UNIVERSITY SCHOLARS

GIVING INSTRUCTION AND ASSISTING IN LABORATORIES.

- In Anatomy*—Charles W. Hack, J. Frank Corbett.  
*In Animal Biology*—L. E. Griffin.  
*In Bacteriology and Pathology*—George G. Balcom.  
*In Botany*—Josephine E. Tilden, B. S.  
*In Chemistry*—William F. Kunze, Paul M. Glasoe.  
*In Civil Engineering*—Charles H. Kendall, C. E.  
*In Dispensary*—Gentz Perry.  
*In Drawing*—Arthur L. Abbott.  
*In Electrical Engineering*—Frank W. Springer, B. E. E.  
*In Geology*—Arthur H. Elftman, M. S.  
*In Histology*—Soren P. Rees, B. S., Carl Huhn, B. A.  
*In Materia Medica*—James S. Gilfillan.  
*In Medical Chemistry*—Ralph K. Keene, Frank E. Burch.  
*In Pharmacy*—B. O. Leubner.  
*In Physics*—Anthony Zeleny, M. S., C. Edward Magnusson.  
*In Physiology*—Harvey Parks Ritchie, Jr., Mortimer R. Wilcox.

## The University.

THE UNIVERSITY OF MINNESOTA comprises the following named colleges and departments.

THE GRADUATE DEPARTMENT.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

THE COLLEGE OF AGRICULTURE.

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 three courses of study, the classical, scientific and literary. 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 regular courses are of four years' duration. The completion of the courses leads respectively to the degrees: Bachelor of Arts, Bachelor of Science and Bachelor of Literature.

*A Summer School for Teachers.* A four week's 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, METALLURGY AND THE MECHANIC ARTS offers courses of study of four years each, in civil, mechanical, electrical engineering; mining, metallurgy and chemistry, leading to the bachelor's degrees in civil, mechanical, electrical engineering; mining, metallurgy and chemistry.

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

THE SCHOOL OF AGRICULTURE is a training school for practical farm life, and for the college of agriculture if the student desires to pursue the subject further.

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

*A Summer School for Women*. Instruction is offered in cooking, dairying, sewing, chemistry, English, entomology, horticulture and hygiene.

THE COLLEGE OF LAW offers a three years' course of instruction leading to the degree of Bachelor of Laws. There is an evening course (of three years) in this college leading to the same degree.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY each offer 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 eight 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 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.

## Material Equipment.

### LANDS.

The campus is situated in the City of Minneapolis, about a mile below and in full view of the falls of St. Anthony. The grounds are about fifty-five acres in extent, undulating in surface, well wooded with native trees, and by reason of the natural advantages and contour, very attractive; it is valued at \$600,000.

The experimental farm, consisting of two hundred and fifty acres of valuable land, is located between St. Paul and Minneapolis, adjoining the State fair grounds. It contains every variety of soil and exposure required for illustrative and experimental work; it is valued at \$500,000.

The Minnetonka experimental fruit farm of one hundred and sixteen acres and situated on the peninsula dividing the upper and lower lakes, is valued at \$12,000.

Of the lands granted by Congress, the University still possesses about forty-two thousand acres. These lands are constantly increasing in value and when sold the proceeds will go to increase the permanent endowment of the University.

### LIBRARIES.

The following is a list of the libraries easily accessible to University students:

#### MINNEAPOLIS.

The University Library . . . . .	40,000 volumes
The Public Library . . . . .	55,000 volumes
Minneapolis Bar Association Library . . . . .	9,000 volumes
Guaranty Loan Law Library . . . . .	9,000 volumes
N. Y. Life Insurance Law Library. . . . .	8,000 volumes

#### ST. PAUL.

State Historical Library . . . . .	56,000 volumes
State Library . . . . .	20,000 volumes
Public Library . . . . .	32,000 volumes
Total . . . . .	229,000 volumes

The general library of the University contains about forty thousand bound volumes, beside 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.

The library is open to students and the public from 8 a. m. to 9 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 department 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, is located in the Capitol, St. Paul, and is thus within easy reach of the students.

To all these library facilities must 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; the art gallery, containing many masterpieces of painting, and a large number of casts from antique sculpture.

#### MUSEUMS.

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

(a) *In Geology and Mineralogy*: The Kunz collection of minerals, purchased of Mr. 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 crystalline rocks and economic products of Minnesota, gathered by the geological survey of the State; a series of the paleozoic fossils of Minnesota and Wisconsin, gathered by the department of geology and mineralogy; a series of thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material, comprising crystals, economic minerals and the crystalline rock.

(b) *In Zoology*: All the material collected by the State Zoölogist; 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, moluscan 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 numerously represented, and are receiving annual additions from the Zoölogical 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 woolen goods, earthenware, pottery, etc.

(e) *The Classical Museum*, a beginning of which has been made, comprises material illustrating classical geography, topography, chronology, mythology, archæology and art, such as plans of ancient cities, temples, battle-fields, camps, etc.; busts (original and plaster casts); coins and medals; specimens (original and plaster casts) of ancient sculpture, friezes, capitals, columns, vases, etc.; books and plates of costumes, military weapons, armor, household and agricultural affairs, and naval illustrations, etc.; architecture; ancient books and manuscripts; specimens of inscriptions and implements used in writing and in the arts.

(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.

#### 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 three-inch transit circle and chronograph by Fouth; a Howard Astronomical clock.



## General Information.

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### THE UNIVERSITY YEAR.

The University year embraces 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. See calendar, pages four and five.

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### 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, which is used for various purposes; it provides a course of lectures and holds a prayer meeting once a week. 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 active membership is composed of members of good standing in evangelical churches; and any young man of good moral character may become an associate member.

The association rents the S. C. A. building and keeps it open at all times, maintains a reading room and baths, and employs a general secretary. 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.

*A Students' 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.

On the first Saturday evening of the college year a reception is given to young men, and on the second Saturday evening the association, uniting with the Young Women's Christian Association, holds a general reception for all students; and various other informal receptions are held during the year. Religious meetings are held every Sunday afternoon; there are also devotional meetings and bible classes during the week.

Address all inquiries to the General Secretary of the Young Men's Christian Association, University of Minnesota, Minneapolis, Minn. Often a personal letter to him will secure information not otherwise obtainable.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION is the center of christian life among the young women of the college, 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 active membership consists of students and professors of the University who are members of an evangelical church. Any young woman may become an associate member. The association has been granted a room in the library building, which they have furnished. The room 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 held with closed doors. Any one wishing to join should make early application to some member of the society he prefers. The membership is limited and there are usually more applications than vacancies.

*Federated Literary Societies* include the Delta Sigma, University Congress, Shakopean, Law Literary, Forum and Minerva literary societies. Organized for the promotion of general literary and rhetorical work, and for supporting the interstate debates.

*Delta Sigma*—Membership limit, 25; gentlemen. The oldest society in the University. Meets every Saturday evening in room 27, main building.

*Shakopean*—Membership limit, 35; gentlemen. Meets Saturday evenings in front room, third floor of the main building.

*Forum*—Membership limit, 30; gentlemen. Meets Saturday afternoons, room 43, main building.

*Minerva*—Membership limit, 30; ladies. Meets Saturday afternoons in front room, third floor, main building.

*Law Literary*—Unlimited; law students. Meets Saturday evenings in the auditorium of the law building.

*The University Congress*—Organized in accordance with the rules of the National House of Representatives. Meets once a week during the winter term. Devoted to parliamentary practice.

*Society for Psychological Research*—This society is organized for the purpose of psychological investigations and discussions.

*The Knights of English Learning*—This is an organization in the English department, having a two-fold object, viz., literary and social culture. It is in no sense a general literary society, entering into competition with students' literary societies. It has a specific field as an auxiliary of the English department. Inspiration is gained through the addresses of invited guests and instruction is broadened by the hearing and discussion of the results of special work by the students. In connection with each meeting an informal reception is held to give the members an opportunity to become acquainted with their guests, with their instructors and with each other. The membership comprises graduate students, seniors and juniors pursuing the study of English in the University.

*The Philological Society*—The object of the Philological Society of the University of Minnesota is to promote philological investigation and study. Professors, instructors and graduate students engaged in philological work in the University, and alumni of this and other universities and colleges may be elected to membership in the society by a three-fourths vote of the members present at a regular meeting of the society.

*The Fortnightly Scientific Club* is a society organized for the purpose of scientific investigation and discussion. The meetings are often addressed by specialists, the addresses being followed by discussions.

*Societas Latina*, is a society in the department of Latin, having for its special aim the securing greater proficiency in reading and speaking Latin. While the work of the society does not exclude the literary and philological side of the study of language, the linguistic side is made prominent. Some author is read at sight in the original and synopses then given and explanations and criticisms made, in Latin. The society meets weekly.

*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.

#### ATHLETICS.

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

## ALUMNI SOCIETIES.

### ALUMNI ASSOCIATION.

This association was organized in 1875. The graduates of the several colleges of the University are members; the members of the Board of Regents and the general faculty are honorary members. The annual meeting is on the day proceeding commencement, at 10 o'clock a. m. The alumni dine together after the public exercises on commencement day. Judge Stephen Mahoney, '77, is president of the association.

### FELLOWSHIP ASSOCIATION.

This association was incorporated March 10th, 1888. Its object is to encourage graduate students in special lines of study, and for that purpose to raise a fund by endowment gift, grant, bequest, or annual contribution of its members,

Alumni, former students and other friends of the University, become members of the association by pledging financial support of not less than five dollars annually for five years. Life membership tickets are issued upon payment of \$100. The annual meeting is held at the University during the forenoon of the day preceding commencement. C. J. Rockwood is president of the association.

## 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 and approval of the general faculty,
2. The executive committee has power to declare a scholarship vacant at any time; and may or may not elect a new appointee to the place made vacant.
3. Recipients of scholarships may be either graduate or undergraduate students.
4. 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.
5. 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.
6. The scholarships may be suspended or increased in any department as the need for services and the amount of work may vary.

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## 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. James B. Gilfillan offers \$75, in three prizes, for the best specimens of English prose.

Friends of the University have offered \$25 for the best specimen of English verse.

#### 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, metallurgy 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.

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### HONORS.

AWARDED AT COMMENCEMENT 1895,

UPON THE BASIS OF SCHOLARSHIP.

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#### COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

JULIUS J. BORAAS,	- - - - -	<i>Valedictorian.</i>
CLARENCE BENJAMIN MILLER,	- - - - -	<i>Salutatorian</i>

#### PHILOSOPHICAL ORATIONS

*Awarded to—*

Francis Ramaley, Soren P. Rees, Joan Thorunn Peterson, Rose Winifred Eaton, Mary Maud Case, William Alexander Godward, Willard Crosby Lyon.

## ORATIONS

*Awarded to—*

Benjamin Samuel Wells, Clarence Ellithorpe, Olaf Olson Stageberg, William Fuller Thwing, Mary Tuttle Brewer, Carl Huhn, Lillian Randell Moore, Josephine Elizabeth Tilden, Arthur M. Murfin, Minnie Evangeline Stone, Ada Belle Hillman, Susie Felch, Alexander Woods Caldwell, Jonina Rose Peterson, Erick Anton Peterson, Anna Henshaw Holbrook, MacLaughlin White, Isabelle Wenona Welles, Charles Hitchcock Fowler.

## DEPARTMENT SEMINARS

Honors for special excellence of work in department seminars. Seminar work is entirely voluntary and does not count in the course for a degree. These honors are awarded only to students whose average general scholarship is also of high grade.

*Honors in English*—Julius J. Boraas, Rose Winifred Eaton, Benjamin Samuel Wells, Clarence Ellithorpe, Minnie Evangeline Stone.

*Honors in Greek*—William Fuller Thwing.

*Honors in Latin*—Rose Winifred Eaton, Isabelle Wenona Welles, William Fuller Thwing.

*Honors in History*—Lillian Randell Moore, Joan Thorunn Peterson, Clarence Ellithorpe, William Alexander Godward, Arthur M. Murfin, Rose Winifred Eaton, Alexander Woods Caldwell, Erick Anton Peterson.

*Honors in Philosophy*—Clarence Benjamin Miller, William Alexander Godward, Willard Crosby Lyon, Benjamin Samuel Wells, Carl Huhn, Lillian Randell Moore, MacLaughlin White, Charles Hitchcock Fowler.

*Honors in Political Science*—Alexander Woods Caldwell, Arthur M. Murfin, MacLaughlin White.

*Honors in German*—Minnie Evangeline Stone.

*Honors in Military Science and Tactics*—The following is a list of the cadet officers from the senior class whose names have been sent to the Adjutant-General of the State as being well fitted for the duty and available in case the government is compelled to organize troops: Cadet Major E. Fay Smith, Cadet Captain Fred M. Rounds, Cadet Captain T. Robert Elwell, Cadet Captain Erick A. Peterson, Cadet Captain Burchard P. Shepherd, Cadet First Lieutenant Carl O. A. Olson.

## DEPARTMENT OF MEDICINE

The following is a list of students receiving the degree of Doctor of Medicine, "*cum laude*:"

*College of Medicine and Surgery*—Mary Elizabeth Bassett, Judd Goodrich, George Douglas Head, Muhlenberg Kellar Knauff, Gustavus Adolphus Newman.

*College of Homeopathic Medicine and Surgery*—William David Kirkpatrick.

## COMMENCEMENT SPEAKERS.

The choice of valedictorian and salutatorian is based upon scholarship. Philosophical orations and orations are awarded on the basis of scholarship but the persons to whom this honor is awarded do not appear on the commencement program unless they earn the position in a competition which is open to the whole class.

The contest is open to all seniors of the University except the professional schools, and occurs Saturday afternoon, the eleventh week of the second term. The maximum length of orations for this contest is one thousand words and they must be handed to the department of rhetoric the sixth week of the second term.

The medical department is represented by one speaker on the commencement program, chosen by competition.

## PRIZES.

*The '89 Memorial Prize in History* was awarded to Alexander W. Caldwell for his thesis on "The Chief Executive in the States of the Union."

*The Paige Prize* (law department) of \$40 was awarded to Thomas F. Wallace for his thesis, "The Police Power and the Obligation Clause."

*The Gillette-Herzog Prizes*—(College of engineering, metallurgy and the mechanic arts.)

The first prize was awarded to Leslie Howard Chapman for a design of swing bridge.

The second prize was awarded to Harry L. Tanner for a design for an induction motor and a poly-phase generator.

*The Moses Marston Fellowship in English* was awarded to Edward Ringstad.

*The Prize for English verse* was not awarded, but honorable mention was made of the following: "The Skating Song," by Edmund Gale Jewett. "Life's Mysteries," by Lydia May Plummer; "Rythm," by Iva B. Robinson.

*The Hon. J. B. Gilfillan Prizes for English Prose* were awarded as follows.

The first prize to Arthur L. Helliwell for "English Puritanism."

The second prize to MacLaughlin White for "The Sociological Function of Art."

The third prize to Edwin Hawley Hewett for "The Art Impulse."

*The Albert Howard Scholarship* was awarded to Josephine E. Tilden.

*The University Fellowship* was not awarded.

## PUBLICATIONS.

## THE QUARTERLY BULLETIN.

The Quarterly Bulletin is an official publication devoted to University news and the publishing of synopses of papers on original investigations carried on by professors, alumni and students.

## 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. This paper holds a very high rank among similar papers published in the colleges of the country.

## THE JUNIOR ANNUAL.

The Junior Annual is a book published annually by the junior class of the University. The book represents the student's side of college life. Copies may be had by addressing the business manager of the Junior Annual, care of the University.

THE YEAR BOOK OF THE SOCIETY OF ENGINEERS.

This 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, metallurgy 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

Ten dollars of this amount was earned by the young man by working in a store during a part of the holidays; this amount was spent for presents for friends and is put down in the above list as sundries.

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 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 student roomed and boarded at a fraternity house, and his statement concerning board and room, etc., cannot very well be divided up with accuracy, so they are given as a total. This statement includes all expenses incident to graduation and commencement week.

In the foregoing cases the students were allowed their incidental fee of \$5 for keeping their accounts for this purpose.

These students are fairly representative students; 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.

Student number two is a skillful printer and thus easily found work at more remunerative wages than the ordinary student can obtain. 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 by taking care of lawns, furnaces, horses etc., and have made good records at the same time. Other students have done so much of this 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.

Student number two, although he earned his entire expenses, was one of the best students in the sophomore class. Student number three was a freshman and a good student; he paid for his board by waiting on the table at the W. C. T. U. coffee house in this city.

Students who want work seldom fail to find it. In coming to the University, if the student contemplates earning his way, in whole or in part, he should bring enough money with him so that he can live comfortably for a few weeks until he can find something to do.

## EXPENSES OF YOUNG WOMEN.

The following is a 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 organizations.....	20.19
Sundries.....	19.48
Total for the year.....	\$355.60

## The Graduate Department.

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This department affords an extension of the work of the college of science, literature and arts, the college of engineering, metallurgy and the mechanic arts, and the college of law. It meets the threefold purpose of extending general culture, for which masters' degrees are offered; of encouraging the mastery of 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.

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## 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 presents 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 prescribe 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. Table of studies offered to candidates:

- A. Classical philology:
  1. Greek.
  2. Latin.
  3. Sanskrit.
  4. Semitic languages.
  5. Archaeology.
- B. Modern philology:
  1. English.
  2. French.
  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.

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 a 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.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

All regulations governing candidates for the Masters' degree shall apply to the candidates for second degrees in the college of engineering, metallurgy and the mechanic arts, 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 examinations.

Graduate work is offered, leading to second degrees as follows:

- |                         |                         |
|-------------------------|-------------------------|
| Civil Engineer.         | } or Master of Science. |
| Mechanical Engineer.    |                         |
| Electrical Engineer.    |                         |
| Mining Engineer.        |                         |
| Chemical Engineer.      |                         |
| Metallurgical Engineer. |                         |

These courses are a continuation of the lines of undergraduate work in that department which has conferred upon the student a baccalaureate 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, a graduate course of one year is offered. Among the subjects considered are:

- General Jurisprudence.
- Political Science.
- International Law.
- Constitutional Jurisprudence and History.
- Taxation.
- Medical Jurisprudence.
- Minnesota Practice.

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. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects pursued, will be entitled to the degree of Master of Laws. Tuition in this course is \$10 per term or \$30 per year, and diploma fee of \$10.

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 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 the 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 this 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. Each 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.

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THE COLLEGE OF

SCIENCE

LITERATURE AND

THE ARTS

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# 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., *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., *Associate Professor of Greek.*  
JOHN S. CLARK, B. A., *Professor of Latin.*  
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics and Astronomy.*  
MARIA L. SANFORD, *Professor of Rhetoric and Elocution.*  
CHARLES W. BENTON, B. A., *Professor of French.*  
O. J. BREDÁ, *Professor of Scandinavian.*  
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology.*  
FREDERICK S. JONES, B. A., *Professor of Physics.*  
CONWAY MACMILLAN, M. A., *Professor of Botany.*  
FREDERICK J. E. WOODBRIDGE, B. 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.* [History.  
JAMES RICHARD JEWETT, Ph. D., *Weyerhaeuser Professor of Semitic Languages and*  
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.*  
E. EUGENE McDERMOTT, B. S., *Assistant Professor of Rhetoric and Elocution.*  
FRANCIS P. LEAVENWORTH, M. A., *Assistant Professor of Astronomy and Director of*  
*the Observatory.*  
CHARLES L. WELLS, Ph. D., *Assistant Professor of History.*  
D. T. MACDOUGAL, M. S., *Assistant Professor of Botany.*  
WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*  
SAMUEL G. SMITH, D. D., *Lecturer on Sociology.*  
FREDERICK KLAEBER, Ph. D., *Assistant Professor of English Philology.*  
CHARLES F. McCLUMPHA, *Assistant Professor of English.*  
AMELIA I. BURGESS, *Instructor in Freehand Drawing.*  
MARIE SCHÖN, *Instructor in German.*  
ENMA BERTIN, *Instructor in French.*  
JOHN ZELENY, B. S., *Instructor in Physics.*  
LOUISE G. KIEHLE, *Instructor in Physical Culture.*  
CHARLES P. BERKEY, M. S., *Instructor in Mineralogy.*

HARLOW S. GALE, B. A., *Instructor in Psychology.*  
 CHARLES M. ANDRIST, B. L., *Instructor in French and German.*  
 FRANK M. ANDERSON, B. A., *Instructor in History.*  
 EDWARD E. NICHOLSON, B. S., *Instructor in Chemistry.*  
 EVERHART P. HARDING, M. S., *Instructor in Chemistry.*  
 ALICE YOUNG, *Instructor in English.*  
 ALBERT I. CALAIS, B. es. L., *Instructor in French.*  
 NELLIE M. CROSS, B. L., *Instructor in Physical Culture.*  
 OSCAR W. OESTLUND, M. A., *Assistant in Animal Biology.*  
 OSCAR W. FIRKINS, B. A., *Assistant in Rhetoric.*  
 HANNAH R. SEWALL, M. A., *Assistant in Political Science.*  
 WINNIFRED SCHUREMAN, *Assistant in Rhetoric.*  
 FRANK M. MANSON, M. S., *Assistant in Animal Biology.*  
 ARTHUR L. HELLIWELL, *Assistant in Rhetoric.*  
 WILLIAM F. KUNZE, *Assistant in Chemistry.*  
 PAUL M. GLASOE, *Assistant in Chemistry.*

## SCHOLARS.

*Animal Biology*—L. E. Griffin. *Physics*—Anthony Zeleny. *Botany*—Josephine E. Tilden, B. S. *Geology*—Arthur H. Elftman, M. S.

## ADMISSION.

Examination for admission will be held at the beginning of the year. See calendar on page six and program of examinations on page eight.

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 earnestly requested 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 examination and registration.

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.

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

Albert Lea,	Hutchinson,	Rochester,
Alexandria,	Lake City,	St. Cloud,
Anoka,	Litchfield,	St. Paul,
Austin,	Mankato,	St. Peter,
Crookston,	Minneapolis—Central,	Sauk Center,
Duluth,	Minneapolis—East Side,	Spring Valley,
Faribault,	Minneapolis—North Side,	Stillwater,
Fergus Falls,	Minneapolis—South Side,	Winona,
Glencoe,	Minneapolis Academy,	Worthington,
Hastings,	Northfield,	Owatonna,
Henderson,	Pillsbury Acad., Owatonna,	Red Wing.

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

3. 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 certificate mentioned above may be obtained from the registrar of the University. *No other form of certificate will be accepted.* The diplomas will be accepted for all that they really represent of work completed. If important 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.

4. 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.

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 reserve 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 certificate of principals of first-class high schools, and other recognized schools, will not be accepted for persons who have not completed the course prescribed by the said schools and been regularly graduated.

The enrollment committee will meet, to examine candidates with partial records, on the first three 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 Aug. 31st, Sept. 7th and 14th, in room 25, main building, at 9 o'clock a. m.

#### ADVANCED STANDING.

The University is accustomed to accept records from all reputable colleges for credits 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.

The result—it is sufficient to state that the subject was creditably completed.

## CHOOSING OF COURSES.

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

## DAILY ROUTINE.

As a general rule each student has sixteen exercises a week, besides rhetorical work, which comes but once in the week. Monday is taken as a holiday. The morning session begins at 8:30 o'clock. A general assembly of students and faculty 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 unsuccessfully pursue a subject are reported by the instructor as "incomplete," "conditioned," or as having "failed." "Incomplete" work must be made up, within one term, at the convenience of the professor concerned; "conditions" may be made up within two terms; "failures" must be taken over 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. Conditions that are not made up before the subject is again offered become failures and must be taken over in class.

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

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

## FEES.

All students in the college are required to pay a yearly incidental fee of five dollars. No reduction is made for late entrance or for leaving before the end of the year. 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.

## REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS.

*Some changes in the requirements for admission have been made. These will take effect beginning with the years 1897-'98, 1898-'99. A detail statement concerning the changes will be found in appendix A, in the last part of this catalogue. All students preparing for admission should consult that statement.*

## CLASSICAL COURSE.

Three books of the Illiad will be accepted in place of any two subjects required for admission to the classical course, except Latin and mathematics.

*English Grammar*—The examination will cover, in general, the essentials of grammar as indicated in the following particulars: the classification of letters, and derivation and composition of words; the inflection of words, declensions, and synopsis of conjugation; the classification of words according to their offices, as parts of speech, their definitions, and their properties and attributes. The syntax; the relation of agreement and government; the various kinds of sentences, simple, compound or complex as to form and declarative, etc., as to meaning. Sentential analysis; definitions of parts or elements of a given sentence, whether primary or secondary elements, and whether words only or phrases or clauses, and the office of each of these elements. In short, the candidate should be prepared to parse, including the etymology and syntax, each word, and to analyze each sentence in a given exercise. He should be trained to illustrate by specimen words, phrases, clauses and sentences selected or composed by himself. He should be able to correct grammatical errors and give reasons for the corrections.

\**English Composition*—The candidate should have such knowledge of form, penmanship, orthography, punctuation, syntax and construction as will enable him to write with ease and elegance any letter of business or friendship; to draft resolutions and petitions; to prepare for the press, reports of meetings and brief reports of current events. Accuracy upon these fundamental points will cover three-fourths of the examination. In addition to this, some knowledge of English composition as a fine art is expected; of the power and beauty gained by the right use of rhetorical figures; of what is meant by purity, precision, brevity and harmony and style; and this not merely by committing to memory definitions and rules, but by studying the English classics and learning to appreciate the life and vigor of the great masters of English poetry and prose.

\**Essay*—The essay will be on a subject to be announced at the examination, preparation for which will require the careful reading of Shakspeare's Merchant of Venice, Lamb's Tales from Shakspeare, Defoe's Robinson Crusoe, Scott's Marmion, Hawthorne's Twice Told Tales.

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\*See appendix A, in last part of this catalogue, for requirements in these subjects, beginning in the year 1897-'98.

- Elementary Algebra**—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**—Factoring, highest common divisor, lowest common multiple, fractions, involution, evolution, theory of exponents and radicals (including imaginaries).
- Plane Geometry**—Olney's text book, or equivalent, including the unsolved problems.
- Solid Geometry**—Olney's text book, or equivalent, including the exercises.
- History of the United States**—The text book of Montgomery, Fiske, Johnson or Scudder is recommended. The examination will give more attention to the development of the United States since the revolutionary war than to the story of the colonial period. The main features of the constitution should be clearly understood, and its practical working as interpreted by the supreme court, and seen in operation in the growth of the nation. The chief object of this study should be that the student may understand the institutions of the republic, by learning how they came to be as they are.
- History of Greece and Rome**—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. Applicants for admission may offer an equivalent in *English history* or in the *history of Europe in the Middle Ages*.
- Physiology**—The candidate should be thoroughly familiar with as much anatomy, histology and physiology of the human body as is given in Martin's "Human Body," briefer course. As much knowledge of hygiene and the effect of stimulants and narcotics on the human body as can be gained from both the general text and the special chapter on narcotics and stimulants in the briefer course of the "Human Body," is also required. An equivalent amount of *botany* or *zoology* will be accepted in lieu of *physiology*.
- Physics**—The text books of Carhart & Chute, Appleton, Avery, Gage, etc., or the laboratory manuals of Hall & Bergen, Chute, etc., with the candidate's original note book. A year's work in *chemistry* will be accepted in lieu of *physics*.
- Latin Grammar**—This will include the subjects of orthography, etymology and syntax, as found in Harkness, or etymology and syntax as found in Allen & Greenough'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**—First three 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.
- Beginning with the year 1899-2000, four books of Cæsar will be required.*
- Cicero**—Six orations: four against Catiline, and any two or three following: "Poet Archias," "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**—Six books of Aeneid. 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*—Brooks' Attic Greek or other grammar.

*Zenophon's Anabasis*—Three books.

Beginning with the year 1898-99, four books of the *Anabasis* will be required.

SCIENTIFIC COURSE.

*English Grammar.*

*English Composition.*

*Essay*

*Elementary Algebra.*

*Higher Algebra.*

*Plane Geometry.*

*Solid Geometry.*

*History of the United States.*

*History of Greece and Rome, or equivalents.*

*Physiology or Zoology.*

*Physics.*

*Drawing*—Freehand sketching of simple objects and geometric forms, instrumental drawing, ornament, and the elements of perspective. The National Drawing Books, up to book seven, represent the work required. If other books are used, selections can be made which will be equivalent.

*Chemistry*—The non-metallic elements, as presented in the elementary text books, such as Remsen's, Williams', etc.

*Botany*—Phanerogamic, Gray's Lessons and Manual.

For more extended statement of the work covered by these subjects, see statement of the requirements for admission to the classical course.

\**English*—(a) The Latin element in English.

(b) 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 requirements 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 1897-'98—Chaucer, "Prologue" and "Knight's Tale;" Spenser, "Faery Queen," book 1, cantos 1 to 4; Marlow, "Dr. Faustus;" Bacon, "Essays;" Shakspeare, "The Tempest;" Milton, "L' Allegro" and "Il Penseroso."

For the year 1898-'99—Chaucer, "Prologue" and "The Nonne Priestes' Tale;" Spenser, "Faery Queen," book 1, cantos 1 to 4; Shakspeare, "As You Like It" and "Julius Cæsar;" Bacon, "Essays;" Moore, "Utopia;" Milton, "Lycidas" and "Comus;" Johnson, "Rasselas."

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.

*Latin*—As in classical course OR

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

## LITERARY COURSE.

*English Grammar.*  
*English Composition.*  
*Essay.*  
*Elementary Algebra.*  
*Higher Algebra.*  
*Plane Geometry.*  
*Solid Geometry.*  
*History of the United States.*  
*History of Greece and Rome, or equivalents.*  
*Physiology or Botany or Zoology.*  
*Physics or Chemistry.*

For more extended statement of the work covered by these subjects, see requirements for admission to the classical course.

*\*English—(a)* The Latin element in English.  
*(b)* History of English literature. The applicant 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 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 thorough study of the following English classics:

For the year 1897-'98—Chaucer, "Prologue to Knight's Tale;" Spenser, "Faery Queen," book i, cantos i to iv; Marlow, "Dr. Faustus;" Bacon, "Essays;" Shakspeare, "The Tempest;" Milton, "L'Allegro and Il Penseroso."

For the year 1898-99—Chaucer, "Prologue" and "The Nonne Priestes' Tale;" Spenser, "Faery Queen," book i, cantos i to iv; Shakspeare, "As You Like It" and "Julius Cæsar;" Bacon, "Essays;" Moore, "Utopia;" Milton, "Lycidas" and "Comus;" Johnson, "Rasselas."

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

*\*German—(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.

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

\*The work in each of these subjects is supposed to cover two years in the high school.

*Latin*—as in the classical course,  
 and

{ *\*German*  
 or  
 { *\*French.*

OR



## Courses of Study.

### FRESHMAN YEAR—FIRST TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>Higher Algebra, 5.</i>	<i>Higher Algebra, 5.</i>	<i>Higher Algebra, 5.</i>
<i>Greek, 5.</i>	<i>Freehand Drawing, 5.</i>	
* <i>(a) Memorabilia or (b) Homer's Iliad; history: composition and sight reading.</i>		
<i>Latin, 5.</i>	<i>Latin, 5.</i>	<i>Latin, 5.</i>
Livy; sight reading; composition; history.	Livy; sight reading; composition; history.	Livy; sight reading; composition; history.
	or	or
	<i>English, 5.</i>	<i>English, 5.</i>
	Old English—Anglo-Saxon; grammar and prose masterpieces.	Old English—Anglo-Saxon; grammar and prose masterpieces.
	or	
	<i>German A, 5.</i>	<i>German A, 5.</i>
	Schiller's Jungfrau von Orleans, or Braut von Messina.	Schiller's Jungfrau von Orleans, or Braut von Messina.
	or	or
	<i>French A, 5.</i>	<i>French A, 5.</i>
	Grammar; Feuillet, Scribe, Dumas.	Grammar; Feuillet, Scribe, Dumas.
† <i>Military Drill, 2.</i>	† <i>Military Drill, 2.</i>	† <i>Military Drill, 2.</i>
‡ <i>Physical Culture, 3.</i>	‡ <i>Physical Culture, 3.</i>	‡ <i>Physical Culture, 3.</i>
Delsarte method.	Delsarte method.	Delsarte method.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Composition.	Composition.	Composition.
<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>
Personal hygiene.	Personal hygiene.	Personal hygiene.
‖ <i>English, 5.</i>	‖ <i>English, 5.</i>	‖ <i>English, 5.</i>
Applied etymology.	Applied etymology.	Applied etymology.

\**(a)* For those who have completed the Homer. *(b)* For those who have not read Homer. † Required of men. ‡ Required of women. ‖ This subject is not required of anyone, but is provided as an option for foreign-speaking students.

## FRESHMAN YEAR—SECOND TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>Plane and Spherical Trigonometry, 5.</i>	<i>Plane and Spherical Trigonometry, 5.</i>	<i>Plane and Spherical Trigonometry, 5.</i>
<i>Greek, 5.</i>	<i>German B, 5.</i>	
(a) Memorabilia and Demosthenes' Olynthiacs or (b) Xenophon's Symposium; composition and sight reading.	Meissner's German Grammar; Whitney's German Reader.	
	or	
	<i>French B, 5.</i> Chardenal's French Grammar; Blouet's French composition; translation.	
<i>Latin, 5.</i>	<i>Latin, 5.</i>	<i>Latin, 5.</i>
Livy; sight reading; composition; history.	Livy; sight reading; composition; history,	Livy; sight reading; composition; history.
	or	or
	<i>English, 5.</i> Old and Middle English poetry,	<i>English, 5.</i> Old and Middle English poetry,
	or	
	<i>German A, 5.</i> Goethe's Italienische Reise and Gedichte, or Egmont,	<i>German A, 5.</i> Goethe's Italienische Reise and Gedichte, or Egmont.
	or	or
	<i>French A, 5.</i> Luquien's Prose of popular science, and composition.	<i>French A, 5.</i> Luquien's Prose of popular science, and composition.
<i>Military Drill, 2.</i>	<i>Military Drill, 2.</i>	<i>Military Drill, 2.</i>
or	or	or
<i>Physical Culture, 3.</i> Delsarte method.	<i>Physical Culture, 3.</i> Delsarte method.	<i>Physical Culture, 3.</i> Delsarte method.
<i>Rhetorical Work, 1.</i> Reading or composition.	<i>Rhetorical Work, 1.</i> Reading or composition.	<i>Rhetorical Work, 1.</i> Reading or composition.
* <i>English, 5.</i> Applied syntax.	* <i>English, 5.</i> Applied syntax.	* <i>English, 5.</i> Applied syntax.

\*This subject is not required of anyone, but is offered as an option for foreign-speaking students.

FRESHMAN YEAR—THIRD TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<p><i>Chemistry, 4.</i> The non-metallic elements; lectures; some laboratory work,</p>	<p><i>Chemistry, 4.</i> The non-metallic elements; lectures and laboratory work,</p>	<p><i>Chemistry, 4.</i> The non-metallic elements; lectures; some laboratory work.</p>
or	or	or
<p><i>Physics, 4.</i> General physics with experimental lectures.</p>	<p><i>Physics, 4.</i> Elementary Mechanics with laboratory practice.</p>	<p><i>Physics, 4.</i> General physics with experimental lectures.</p>
<i>Greek, 4.</i>	<i>German B, 4.</i>	
(a) Demosthenes on the Crown (b) Lysias; history; composition and sight reading.	Whitney's German Reader; Meissner continued,	
	or	
	<i>French B, 4.</i>	
	Harris' French Course; Blouet's French Composition; translation.	
<i>History, 4.</i>	<i>Botany, 4.</i>	<i>History, 4.</i>
Course I—Europe in the Middle Ages.	General plant morphology; lectures; laboratory work; collateral reading.	Course I—Europe in the Middle Ages.
	or	
	<i>Zoology, 5.</i>	
	General animal biology; lectures; laboratory and field work.	
<i>Latin, 4.</i>	<i>Latin, 4.</i>	<i>Latin, 4.</i>
Plautus and Terrence; study of the early Latin language and literature; development of the drama; composition.	Horace; a study of his times, style and works; outline history of Roman literature.	Plautus and Terrence; study of the early Latin language and literature; development of the drama; composition.
	or	or
	<i>English, 4.</i>	<i>English, 4.</i>
	History of Old and Middle English literature,	History of Old and Middle English literature.
	or	
	<i>German A, 4.</i>	<i>German A, 4.</i>
	Scientific prose selections,	Heine's Harzreise und Buch der Lieder,
	or	or
	<i>French A, 4.</i>	<i>French A, 4.</i>
	Le génies de la Sciences, Daudet's Nabob; Mrs. Stowe's Comedies translated into French.	Le génies de la Sciences, Daudet's Nabob; Mrs. Stowe's Comedies translated into French.
<i>Military Drill, 2.</i>	<i>Military Drill, 2.</i>	<i>Military Drill, 2.</i>
or	or	or
<i>Physical Culture, 3.</i> Delsarte method.	<i>Physical Culture, 3.</i> Delsarte method.	<i>Physical Culture, 3.</i> Delsarte method.
<i>Rhetorical Work, 1.</i> Composition.	<i>Rhetorical Work, 1.</i> Composition.	<i>Rhetorical Work, 1.</i> Composition.

## SOPHOMORE YEAR—FIRST TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>German B, 4.</i>	<i>German B, 4.</i>	<i>German B, 4.</i>
Meissner's German Grammar; Whitney's German Reader,	Gore's Scientific Prose Selections,	Trömling's German Grammar; Whitney's German Reader,
or	or	or
<i>French B, 4.</i>	<i>French B, 4.</i>	<i>French B, 4.</i>
Chardenal's French Course; or Brachet's Historical Grammar; composition, translation.	Chardenal's French Course; Blouet's French Composition translation; Life of Pasteur.	Chardenal's French Course; or Brachet's Historical Grammar; composition translation; Bossuet, Fénelon.
<i>Chemistry, 4.</i>	<i>Chemistry, 4.</i>	<i>Chemistry, 4.</i>
The metallic elements; lectures; laboratory work,	The metallic elements; lectures and laboratory work,	The metallic elements; lectures; laboratory work,
or	or	or
<i>Physics, 4.</i>	<i>Physics, 4.</i>	<i>Physics, 4.</i>
General physics with experimental lectures.	Sound and light with laboratory practice	General physics with experimental lectures.
<i>Greek, 4.</i>	<i>History, 4.</i>	<i>French A, 4.</i>
Plato; Apology and Crito; thesis, composition and sight reading.	Course I—Europe; in the Middle Ages.	Advanced Grammar; Duval's history of French literature,
		or
		<i>German A, 4.</i>
		Rapid reading from Schiller, Mueller, Sybel and Becker.
<i>Latin, 4.</i>	<i>Botany, 4.</i>	<i>Latin, 4.</i>
Horace; study of the Latin language and literature.	General plant morphology; a continuation of the previous term,	Horace; study of the Latin language and literature,
	or	or
	<i>Zoology, 4.</i>	<i>English, 4.</i>
	Animal biology begun with the protozoa.	History of the English language.
<i>*Military Drill, 2.</i>	<i>*Military Drill, 2.</i>	<i>*Military Drill, 2.</i>
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Composition.	Composition.	Composition.

\*Required of men only.

SOPHOMORE YEAR—SECOND TERM.

CLASSICAL	SCIENTIFIC.	LITERARY.
<i>English, 4.</i>	<i>English, 4.</i>	<i>English, 4.</i>
Old English (Anglo-Saxon), elements and outline history of the English language.	(a) Chaucer and his age, or (b) as in the classical section.	(a) Chaucer and his age, or (b) as in the classical section.
<i>Latin, 4.</i>	<i>History, 4.</i>	<i>History, 4.</i>
Tacitus and Pliny' social life of the Romans in the late republic and early empire.	Course II—English constitutional history.	Course II—English constitutional history.
<i>Botany, 4.</i>	<i>Botany, 4.</i>	<i>Botany, 4.</i>
General botany, lectures; demonstrations; laboratory work; collateral reading,	General plant morphology; a continuation of the work of the previous term,	General botany; lectures; laboratory work; demonstrations; collateral reading,
or	or	or
<i>Zoology, 4.</i>	<i>Zoology, 4.</i>	<i>Zoology, 4.</i>
General zoölogy; lectures; demonstrations.	Animal biology continued.	General zoölogy; lectures; demonstrations.
<i>German B, 4.</i>	<i>Chemistry, 4.</i>	<i>German B, 4.</i>
Whitney's German Reader; Meissner continued,	Qualitative analysis.	Harris' German Reader; Meissner continued.
or	or	or
<i>French B, 4.</i>	<i>Physics, 4.</i>	<i>French B, 4.</i>
Whitney's French Course, and Blouet's composition; translation; La Fontaine.	Heat with laboratory practice.	Chardenal's French Course; Blouet's Composition; translation; La Fontaine.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Voice building; interpretation.	Voice building; interpretation.	Voice building; interpretation.
* <i>Military Drill, 2.</i>	* <i>Military Drill, 2.</i>	* <i>Military Drill, 2.</i>
<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>
Family hygiene.	Family hygiene.	Family hygiene.
*Required of men only.		

## SOPHOMORE YEAR—THIRD TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>English, 4.</i>	<i>English, 4.</i>	<i>English, 4.</i>
General introduction to the history of modern English literature.	General introduction to the history of modern English literature.	General introduction to the history of modern English literature.
<i>Botany, 4.</i>	<i>Botany, 4.</i>	<i>Botany, 4.</i>
General botany; a continuation of the work of the previous term,	General plant morphology; a continuation of the work of the previous term.	General botany; a continuation of the work of the previous term,
or	or	or
<i>Zoology, 4.</i>	<i>Zoology, 4.</i>	<i>Zoology, 4.</i>
General zoölogy; lectures; demonstrations.	Animal biology; concluded with the embryology of the chick.	General zoölogy; lectures; demonstrations.
<i>Greek, 4.</i>	<i>Chemistry, 4.</i>	<i>German A, 4.</i>
Tragedy—Sophocles' <i>Antigone</i> , or one play of the other dramatists; history; theses; sight reading.	Qualitative analysis,	Rapid reading from Schiller, Mueller, Sybel and Becker.
	or	or
	<i>Physics, 4.</i>	<i>French A, 4.</i>
	Static electricity with experimental lectures.	Advanced grammar; Lamartine, Musset, Merimée.
		or
		<i>Latin, 4.</i>
		Tacitus and Pliny; social life of the Romans in late republic and early empire.
<i>History, 4.</i>	<i>Mathematics, 4.</i>	<i>German B, 4.</i>
Course II—English constitutional history.	Analytical Geometry.	Continuation of the work of the previous term.
		or
		<i>French B, 4.</i>
		Continuation of the work of the previous term.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Speeches, toasts, etc.	Speeches, toasts, etc.	Speeches, toasts, etc.
<i>*Military Drill, 2.</i>	<i>*Military Drill, 2.</i>	<i>*Military Drill, 2.</i>
*Required of men only.		

JUNIOR YEAR.

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

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

(b) Not more than nine-twenty-fourths of the work of the two years can be elected 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).

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

*Botany* [4]—(a). General plant physiology.

(b) Elements of archegoniate and metaspermic taxonomy.

(c) General algology.

(d) General mycology.

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

(b) Water analysis.

*Drawing* [4]—(a). Crayon and charcoal; (b) sketching; (c) design. Open to students who have completed as much drawing as is required for entrance to the freshman class scientific course.

*Elocution* [1]—Interpretation and expression.

*English* (a)—[4]. Elizabethan lyrics and selections from Spenser's *Faerie Queene* (3); the English Bible and Elizabethan prose (1).

(b)—[4]. English Phonology. Outline of phonetics; history of the English sounds; history of the English spelling, with an excursus on spelling reform.

*French* [4]—Lavissee, *Histoire de France*; Pelissier, *Le mouvement litteraire au dix siecle*. Howell's *Evening Dress*, translated into French.

*German* [4]—(a). Schiller, life and works; *Wilhelm Tell*.

(b) *Faust*.

*Greek* [4]—Archæology of Greek art; open to students of all courses.

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

*History* [4]—England after the accession of Henry VIII; the English constitution traced through the Revolution of 1688. Open to those who have completed the history of the sophomore year.

*Latin* [4]—Oratory—Tacitus and Cicero.

*Mathematics* [4]—Analytical geometry.

*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.

*Philosophy* [4]—General psychology; anatomy and physiology of the nervous system.

*Physics* [4]—(a). Magnetism with laboratory practice.

(b) Theory of electrical measurements.

*Political Science* [4]—The elements of private economics.

*Rhetoric* [4]—Literary criticism. Open to those who have completed the rhetorical work of the freshman and sophomore years.

*Scandinavian* [4]—(a). Smith's Grammar; Bennett's Phrase-Book; Rolfsen's Laesebog.

(b) History of Scandinavian languages; Scandinavian archæology; Norse mythology; history of the Viking age; history of old Scandinavian literatures [2]; critical reading of masterpieces of Scandinavian literatures [2].

(c) Icelandic; Sweet's Icelandic primer; Nygaard's Udvalg af den Norroene literatur.

#### JUNIOR YEAR—SECOND TERM.

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

(b) Animal physiology and histology. Martin's The Human Body; lectures and demonstrations. This course is intended for those who do not wish to pursue morphological studies and yet desire more than is provided for in course (b) of the previous term.

(c) Comparative anatomy of vertebrates—continued.

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

*Botany* [4]—(a). General plant physiology.

(b) Elements of archegoniate and metaspemic taxonomy.

(c) General algology.

(d) General mycology.

A continuation of the work of the previous term.

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

(b) Theoretical chemistry,

(c) Gas analysis.

*Drawing* [4]—(a) Crayon and charcoal—continued; (b) instrumental; (c) design—continued.

*Elocution* [1]—Interpretation and expression.

*English* (a)—[4]. Shakspeare; The Tempest, with general introduction to the comedies (3); the English Bible and Elizabethan prose (1). A continuation of the work of the previous term.

(b)—[4]. Interpretation of Béowulf, with studies in English antiquities.

*French* [4]—Pelissier, Le Mouvement littéraire au xix siècle; Histoire de France, Lavisse; Julius Cæsar, translated into French.

*German* [4]—(a). Lessing—Laocoön.

(b) Goethe, life and works; Egmont.

*Greek* [4]—Archæology of Greek art; open to students of all courses.

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

*History* (a)—[4]. The beginning of modern European history. (b) [4].—The political and constitutional history of the United States, to the adoption of the constitution. Both of the courses are open to those who have completed the courses in history of the sophomore year.

*Latin* [4]—Tacitus, history and annals.

*Mathematics* [4]—Differential calculus.

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

*Pedagogy* [4]—Methodology.

*Philosophy* [4]—General psychology. A continuation of the work of the previous term.

*Physics* [4]—(a). Voltaic electricity with laboratory practice.

(b) Heat, with laboratory practice. Open to those who did not take this course in the sophomore year.

*Political Science* [4]—The State and the Government.

*Rhetoric* [4]—Literary criticism. A continuation of the work of the previous term.

*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 work of the previous term.

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



JUNIOR YEAR—THIRD TERM.

- Animal Biology* [4]—(a). Animal histology—continued.  
(b) Animal physiology and histology—continued.  
(c) Comparative anatomy of vertebrates—continued.
- Astronomy* [4]—General astronomy. Open to those who have completed the freshman mathematics.
- Botany* [4]—(a). General plant physiology.  
(b) Elements of archegoniate and metaspermic taxonomy.  
(c) General algology.  
(d) General mycology.  
A continuation of the work of the previous term.
- Chemistry* [4]—(a). Quantitative analysis (volumetric).  
(b) Organic chemistry.  
(c) Industrial chemistry.  
(d) History of chemistry.
- Drawing* [4]—(a). Crayon and charcoal—continued.  
(b) Sepia and water color.  
(c) Design—continued.
- Elocution* [1]—Shakspeare; dramatic recitation or oratory.
- English* [4]—(a). The Epic and Milton's Paradise Lost (3); the English Bible and Elizabethan Prose (1)—continued.  
(b)—[4]. English morphology. History of word formation and inflection.  
(c)—[2]. William Langland's Vision of Piers the Plowman. [2] Advanced work in Chaucer.
- French* [4]—Victor Hugo's Notre Dame de Paris; Les Feuilles d'automne, Quatre Vingt Triefze; Idioms; lectures on the literary movement of the six century.
- German* [4]—(a). History of German literature; lyrical poetry.  
(b) Lessing, life and works; Nathan der Weise; rapid sight reading of narrative prose.
- Greek* [4]—Lyric and bucolic poets; collateral reading; theses; dialect; lectures.
- Hebrew Syntax* [4]—Reading of selected portions of the historical books and of the Psalms.
- History* [4]—Political and constitutional history of the United States since 1789. A continuation of the work of the preceding term in American history.
- Latin* [4]—Outlines of Roman law.
- Mathematics* [4]—(a). Integral calculus.  
(b) Descriptive geometry.
- Mineralogy* [4]—(a). Quantitative mineralogy; the assay of gold and silver ores.  
(b) Physical mineralogy; investigations with the goniometer and stauroscope, or micro-chemical methods and applications.
- Pedagogy* [4]—School administration.
- Philosophy* [4]—(a). Logic.  
(b) Special psychology. Lectures and laboratory work.
- Physics* [4]—(a). Special problems in electrical measurements.  
(b) Static electricity, for those who did not take this course in the sophomore year.
- Political Science* [4]—The law and the constitution.
- Rhetoric* [4]—Essays upon art subjects. Open to those who have completed the rhetorical work of the freshman and sophomore years.
- Sanitary Science* [1]—Open to both juniors and seniors. The subject will be 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) Icelandic—a continuation of the work of the previous term.

## 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; ornithology and entomology.

Open to those who have the necessary preparation.

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

*Botany* [4]—(a). Special problems in plant physiology.

(b) Special taxonomy.

(c) Special plant morphology and embryology.

*Chemistry* [4]—(a). Organic chemistry; lectures and laboratory work.

(b) Chemistry of carbohydrates.

(c) Colloquium.

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

*Elocution* [1]—Oratory or dramatic recitation. Open to students who have completed junior elocution.

*English* (a)—[4]. Literature at the opening of the six century.

(b)—[4]. English Phonology. Outlines of phonetics; history of the English sounds; history of the English spelling, with an excursus on spelling reform.

*French* [4]—Brunetiere's History of Criticism; lectures on the history of the French language in Medieval literature. Italian [2] Ahn: Premier cours d' Italian; Goldoni, Il Vero Amico. Spanish [2] Edgren's Spanish grammar; Knapp's Modern Spanish Readings.

NOTE. Any two of these may be chosen during the senior year.

*Geology* (a)—[4]. Elements of geology; physiographic, structural, and dynamic.

(b)—[1]. An outline of general geology.

*German* [4]—(a). Faust.

(b) History and literature of the reformation in Germany.

*Greek* [4]—Tragedy and Epic poetry; alternate courses, see Greek course x.

*History* [4]—The French revolution and France in the six century. Open to the students who have completed the history of the sophomore year.

*Latin* [4]—Lucretius, Cicero, Ovid, Roman mythology.

*Mathematics* [4]—Mechanics.

*Oriental History* [4]—From earliest time to birth of Mohammed.

*Pedagogy* [2]—Ancient education.

*Philosophy* [4]—(a). History of philosophy, Part I; ancient philosophy.

(b) Ethics—principles and methods.

(c) Experimental psychology—laboratory work.

(d) Physiological psychology.

*Physics* [4]—Special problems in mechanics, elasticity, force of gravity, etc.

*Political Science* [4]—Economic history.

*Rhetoric* [4]—Literary criticism.

*Sanskrit* [4]—Grammar and Reader. Not offered in 1896-'97.

*Scandinavian* [4]—Courses (a, b, c) of the junior year are open to seniors. Lectures on Danish, Norwegian and Swedish literatures in connection with the history of the respective countries; critical reading of masterpieces of Scandinavian literatures.

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; ornithology, ichthyology and entomology—continued.

*Astronomy* [4]—Practical astronomy. A continuation of work of the previous term.

- Botany* [4]—(a). Special problems in plant-physiology.  
(b) Special taxonomy.  
(c) Special plant morphology and embryology.  
A continuation of the work of the previous term.

- Chemistry* [4]—(a). Electro-chemical analysis.  
(b) Analysis of iron.

*Elements of Torts and Second Book of Blackstone* [4]—The statement concerning the elements of contracts—see first term—will apply to this subject also.

*Elocution* [1]—Continuation of the work of the previous term.

- English* [4]—(a). Shakspeare; six plays read and discussed.  
(b)—[4]. Prose writers of the sixteenth century.  
(c)—[4]. Interpretation of *Béowulf*, with studies in English antiquities.

*French* [4]—French (2) Corneille's *le Cid*; Racine's *Andromaque*; Moliere's *les Precieuses Ridicules*; lectures on the literature of the French Renaissance. Italian (2) *Ahn*, second course in Italian; Silveo Pellico *le mie Prigione*. Spanish (2) Edgren's grammar; Knapp's modern Spanish readings.

- Geology* [4]—(a). Stratigraphic and historical geology [2]; (b) introduction to paleontology [2]. Open to those who have completed course i.  
(b) Introduction of petrology. Open to those who have completed course i in geology and course ii in mineralogy.

*German* [4]—Goethe's *Faust*.

*Greek* [4]—Neo-Hellenic; grammar; conversation exercises; readings.

*History* [4]—Western Europe in the sixteenth century. Open to those who have completed the work of the previous term.

*Latin* [4]—Roman satire; elements and development of satire; study of different Roman authors.

- Mathematics* [4]—(a). Method of least squares.  
(b) Mechanics.  
(c) Determinants.

*Military Science* [4]—The elements of modern tactics and the art of war.

*Oriental History* [4]—From birth of Mohammed to the end of the Crusades.

*Pedagogy* [2] Medieval and modern theories.

- Philosophy* [4]—(a). History of philosophy, Part II, the Middle Ages and xvii century.  
(b) Aesthetics.  
(c) Experimental psychology; laboratory work.

*Physics* [4]—Heat; thermometry and calorimetry.

*Political Science* [4]—Public international law.

*Sanskrit* [4]—Story of Nala. Not offered in 1896-'97.

*Rhetoric* [4]—Literary criticism.

*Scandinavian* [4]—Courses (a, b, c) of the junior year are also open to seniors. Lectures [2], critical reading [2] in the history of Danish, Norwegian and Swedish literatures—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; ornithology, ichthyology and entomology—continued.
- 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]—(a). Special problems in plant physiology.  
 (b) Special taxonomy.  
 (c) Special plant morphology and embryology.
- Chemistry* [4]—(a). Domestic chemistry.  
 (b) Photographic chemistry.  
 (c) Micro-chemical analysis.  
 (d) Colloquium.
- Elements of Crimes* [4]—The statement concerning the elements of contracts—see first term—will apply to this course also.
- Elocution* [1]—Oratory. Open to seniors preparing for commencement.
- English* (a)—[4]. Poets of the second half of the six century.  
 (b) [4] English morphology. History of word formation and inflection.  
 (c) [2] William Langland's *Vision of Piers the Plowman*.  
 (d) [2] Advanced work in Chaucer.
- French* [4]—French (2). DeVigny, Merimée, Taine, Ste. Beuve; lectures on the various schools of French criticism.  
 (c) Italian [2]—Dante.  
 (d) Spanish [2]—Cervantes' *Don Quijote*.
- Geology* [4]—(a). Paleontological studies. Open to those who have completed courses i and iii.  
 (b) Petrological studies. A continuation of the work of the previous term.  
 (c) Applied geology. Open to those who have completed the geology of the first term.
- German* [4]—(a). Nibelungenlied.  
 (b) History of German literature; lyrical poetry.
- Greek* [4]—Later Greek writers. See course xii.
- History* (a) [4]—Eastern Europe and "Greater Europe" in the six century; a continuation of the work of the previous term in six century history.  
 (b) [4] Philosophy of history. Open to those who have completed four terms' work in history.
- Isaiah*—[2]—A critical study.
- Latin* [4]—Elegiac poetry.
- Mathematics* [4]—(a). Co-ordinate geometry of three dimensions.  
 (b) Mechanics.
- Pedagogy* [2]—Medieval and modern theories.
- Philosophy* [4]—(a). History of philosophy, Part III, the xviii and six centuries.  
 (b) Experimental psychology; laboratory work.
- Physics* [4]—Light; refraction, interference and polarization.
- Political Science* [4]—American public economy.
- Rhetoric* [4]—Literary criticism.
- Sanskrit* [4]—Selections from Rig-Veda. Not offered in 1896-97.
- Scandinavian* [4]—Course (a, b, c,) of the junior year are also open to seniors; lectures [2]; critical readings [2] in the history of Danish, Norwegian and Swedish literatures—continued.
- Social Science* [3]—History, principles and elements of sociology.

## Courses of Instruction.

All courses of instruction, unless otherwise specified, include four exercises per week, during the terms through which the course runs.

### ANIMAL BIOLOGY.

#### FOR UNDERGRADUATES.

- Course I. Animal Biology.* Lectures and laboratory work. *Freshman iii. Sophomore i, ii, iii. Sc.* Also open as an elective to those who have completed the long or short course in botany.
- Course II. General Zoology.* Text-book, lectures and demonstrations. *Sophomore ii, iii. Cl. and Lt.* Also open as an elective to those who have completed the long or short course in botany.
- Course III. Animal Histology.* Sterling's Outlines of Practical Histology as a text-book. Lectures and laboratory work on the cell, tissues and organs; methods and technique. *Junior or senior, i, ii, iii.* Open to those who have completed course i.
- Course IV. Animal Physiology and Histology.* Martin's The Human Body; lectures and demonstrations. *Junior or senior, ii, iii.* Open to all.
- Course V. Comparative Anatomy of Invertebrates.* Laboratory and reference work; Lang's text-book of Comparative Anatomy. *Junior or senior, i, ii, iii.* Open to those who have completed course i and course iii.
- Course VI. Comparative Anatomy of Vertebrates.* Wiedersheim's Lehrbuch der vergleichenden Anatomie der Wirbelthiere. Laboratory and reference work. *Junior or senior, i, ii, iii.* Open to those who have completed course i, and course iii if it is intended to pay special attention to microscopic anatomy.
- Course VII. Embryology of Invertebrates.* Laboratory and reference work, with the ontogeny of some invertebrate as a center. Haddon's An Introduction to the Study of Embryology, and Korschelt und Heider's Lehrbuch der vergleichenden Entwicklungsgeschichte der Wirbellosen Thiere as text-books. *Junior or senior, i, ii, iii.* Open only to those who have completed courses i and ii.
- Course VIII. Embryology of Vertebrates.* Laboratory and reference work, with the ontogeny of some vertebrate as a center. Hertwig-Mark's text-book of the Embryology of Man and Mammals, and Marshall's Vertebrate Embryology as text-books. *Junior or senior, i, ii, iii.* Open only to those who have completed courses i and iii.
- Course IX. Philosophical Zoology.* Occasional lectures to those pursuing courses v, vi, vii, viii.
- Course X. Taxonomy: Ornithology, Ichthyology and Entomology.* Lectures, laboratory, museum and reference work. *Junior or senior, i, ii, iii.* Open to those sufficiently prepared.

#### FOR GRADUATES.

*Research.* Advanced studies and certain undergraduate courses.

## THE JOURNAL CLUB.

This club meets once a week throughout the year to listen to abstracts of the current zoölogical literature. The attendance is voluntary; all those pursuing any course above course IV are, however, expected to be active members of the club.

## THE READING CLUB.

Winter evenings twice a month. Open to all advanced students in the department. Reading and discussion of biological writings.

## ASTRONOMY.

## FOR UNDERGRADUATES.

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

*Course II. Practical Astronomy.* 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; observational practice including photography and spectrum analysis, *Senior i, ii, iii.* Open to those who have completed course i, and courses i to v, of mathematics.

## FOR GRADUATES.

*Course III. Extended course in practical astronomy.*

*Course IV. Orbit work.*

*Course V. Astrophysics.*

*Course VI. Astrophotography with photographic measurements.*

## BOTANY.

## FOR UNDERGRADUATES.

*Course I. General Plant Morphology.* Lectures, laboratory work and collateral reading. The course includes a view of the comparative anatomy and embryology of plants and serves to establish the basis of the various special courses in upper years. *Freshmen iii, sophomore i, ii and iii, Sc.* Open as an elective to those who have pursued the long or short courses in general zoölogy.

*Course II. General Botany.* Lectures, demonstrations and collateral reading. The course presents an outline of physiology, ecology and taxonomy. *Sophomore ii and iii, Cl. and Lit.* Open as an elective to those who have pursued course i or ii in general zoölogy.

*Course III. General Plant Physiology.* Lectures, reference and laboratory work. The student will be required to complete a piece of independent work and present the results of the same in the form of a thesis at the end of the course. Open to those who have finished course i or ii in botany, or course i in zoölogy. *Junior or senior i, ii and iii.*

*Course IV. Elements of Archegoniate and Metaspermic Taxonomy.* Lectures, reference reading, herbarium work. *Junior or senior, i, ii and iii.*

*Course V. General Algology.* Laboratory and reference work. The course includes a study of both marine and fresh-water forms, and bears toward comparative morphology rather than towards taxonomy. *Junior or senior i, ii and iii.*

*Course VI. General Mycology.* Laboratory and reference work. The course includes a comparative morphological and taxonomic survey of the fungi, with assignments in Schroeter, Ludwig, De Bary, Zopf and Brefeld. *Junior or senior, i, ii and iii.*

## FOR UNDERGRADUATES AND GRADUATES.

*Course VII. Special Problems in Plant Physiology.* Lectures, laboratory and reference work. Particular attention will be paid to the history of investigation of the subject under consideration and to the development of new methods of research. The results of original work accomplished must be presented in a form suitable for publication at the end of the course. Open to those who have completed course iii.

*Course VIII. Special Taxonomy.* Herbarium and reference work. Open to those who have pursued course i in botany or course ii, followed by course iv. *Senior i, ii and iii.*

*Course IX. Special Plant Morphology and Embryology.* Lectures, laboratory work and collateral reading. Open to those who have completed five terms of work in the department of Botany. *Senior i, ii, iii.*

#### FOR GRADUATES.

*Course X. Comparative Gametophytic anatomy and embryology.* Laboratory and reference work. *Term i,* Open to those who have pursued six terms of botanical work.

*Course XI. Comparative Sporophytic anatomy and embryology.* Laboratory and reference work. Open only to those who have completed course x. *Terms i and ii.*

*Course XII. Phytodynamics and Ecology.* Lectures and reference work. Open to those who have pursued five terms of botanical work. *Term i.*

*Course XIII. Phycocytology, Structural and Dynamic.* Laboratory and reference work. Open to those who have pursued seven terms of botanical work. *Throughout the year.*

*Course XIV. Experimental Embryology and Organogeny.* Laboratory and reference work. Open to a limited number who may present the requisite evidence of fitness for original research. *Throughout the year.*

*Course XV. Irritability:* the directive and formative influence of the principal factors operative in plants. A subject approved by the instructor must be selected at the beginning of the course, and the original results accomplished presented in a form suitable for publication. Open to persons showing fitness for research.

*Course XVI. Special research* in some selected line. Open to all graduate students whose preparation may be deemed sufficient. *Throughout the year.*

#### JOURNAL CLUB AND SEMINAR.

This elastic organization meets bi-weekly throughout the year. While the attendance is entirely voluntary, those pursuing elective work in the department of botany are urged to attend.

#### THE BIOLOGICAL CLUB.

This club meets once a month throughout the year to listen to reports on the work going on in the fields of biology. Attendance is voluntary, though all advanced students in the department of botany and animal biology are urged to attend.

#### READING CLUB.

During winter evenings bi-weekly gatherings of advanced students are held at the house of the professor of botany for the purpose of reading and discussing classical botanical literature.

#### CHEMISTRY.

##### FOR UNDERGRADUATES.

*Course I. The Non-metallic elements.* 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.

*Course II. The Metallic elements.* Lectures and laboratory work. The course embraces the general group reactions according to the periodic law, with a special study of the individual members of the groups. Open to those who have completed course i.

*Course III. Qualitative analysis.* Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation. Open to those who have completed course ii.

*Course IV. Qualitative analysis.* Lectures and laboratory work. Reactions and the separation of the acids. Open to those who have completed course iii.

- Course V. 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 iv.
- Course VI. Quantitative analysis.* Continuation of course v. A completion of gravimetric analysis and an introduction to volumetric analysis.
- Course VII. Volumetric analysis.* Lectures and laboratory work. A continuation of course vi. Open to those who have completed course vi.
- Course VIII. Theoretical Chemistry.* Lectures and reading. A discussion of the general chemical laws. Open to those who have completed course vi.
- Course IX. The history of Chemistry.* Lectures and reading. The course includes a discussion of chemistry and the chemical theories from the beginning down to the present time. Open to those who have completed course iii.
- Course X. Organic Chemistry.* Lectures and laboratory work. An introduction to organic chemistry, a discussion of the aliphatic series and a preparation of the more important compounds of the series. Open to those who have completed course vi.
- Course XI. Organic Chemistry.* Lectures and laboratory work. A discussion of the aromatic series and the preparation of the more important compounds. Open to those who have completed course x.
- Course XII. Water analysis.* Lectures and laboratory work. The course includes the chemistry and an exhaustive analysis of the natural waters. Open to those who have completed course iv.
- Course XIII. Gas analysis.* Lectures and laboratory work. The course includes an introduction to the analysis of gases, as air, illuminating gases, gases in water, with Hempel's, Winkler's and Lunge's apparatus. Open to those who have completed course iv.
- Course XIV. The chemistry of the Carbohydrates.* Lectures and laboratory work. This course includes the determination of Hydroxyl groups in sugar, the reaction with Phenylhydrazine and Hydroxylamine with a quantitative determination with Fehling's solution and with the polariscope. Open to those who have completed course xii.
- Course XV. 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 XVI. Domestic Chemistry.* Lectures and laboratory work. The course includes a chemical and domestic study of meat, milk and butter, the fats and oils, fermentation and alcohol, flour, bread, soda, vinegar, sugar, honey, tea, coffee, chocolate, the spices, the etherial oils, fruit ethers and the perfumeries. Open to those who have completed course iii.
- Course XVII. Photographic Chemistry.* Lectures. The course includes the chemistry of the wet and dry plates, developers, fixers, paper and toning. Open to those who have finished course vi.
- Course XVIII. Electro-chemical analysis.* 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 XIX. Micro-chemical analysis.* Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substances by means of the microscope.
- Course XX. Colloquium.* The course includes a thorough systematic quiz on general (a) inorganic chemistry; (b) organic chemistry.



## FOR GRADUATES.

The following courses will be offered to those who have completed the prescribed undergraduate work.

- (a) *Special inorganic preparations.*
- (b) *Research work in electro-chemistry.*
- (c) *Research work in general organic chemistry.*
- (d) *The plant alkaloids.*
- (e) *Stereo-chemistry and the optical active of organic and inorganic compounds.*
- (f) *Special research work in general analytical chemistry.*

## DRAWING.

- Course I. Freehand.* From models and casts in crayon; outline, light and shade. *Freshman i, Sc.*
- Course II. Advanced drawing.* In crayon and charcoal, from casts embracing the study of the antique, *Junior i, ii, iii.*
- Course III. Sepia and water color.* From casts and natural objects. *Junior iii.* Open to those who have completed course ii.
- Course IV. Sketching.* Line work from nature. *Junior i.* Open to those who have completed course ii.
- Course V. Instrumental.* Problems, projections, sections, developments and interpenetrations. *Junior ii.*
- Course VI. Design.* The anatomy of pattern, the planing and application of ornament. *Junior i, ii, iii.* Open to those who have completed course ii.

## ENGLISH.

The two departments of English language and literature and of rhetoric and elocution are federated. The work is divided into five sections. i, English language; ii, English literature, including American literature; iii, rhetoric and composition; iv, criticism and comparative literature; v, elocution.

## FOR UNDERGRADUATES.

## ENGLISH LANGUAGE AND LITERATURE.

NOTE: The junior and senior elective courses are open only to those who have completed course i or ii.

- Course I. (a) Old English (Anglo-Saxon) grammar and prose masterpieces.* *Freshman i, Sc. and Lt.* Open as an elective to the juniors and seniors who did not take it as freshmen.
- (b) *Old and Middle English poetry.* *Freshman ii, Sc. and Lt.* Open to those who have completed course i (a).
- (c) *History of Old and Middle English literature,* with printed syllabi and topical work. *Freshman iii, Sc. and Lt.* Open to those who have completed course i (a and b).
- (d) *History of the English language.* Lectures with illustrative specimens. *Sophomore i, Lt.* Open to those who have completed course i (a to c).
- (e) *Chaucer,* with textual and critical studies in the Canterbury Tales. *Sophomore ii, Lt. and Sc.* Open to those who have completed course i (a to d).
- Course II. (a) Old English (Anglo-Saxon) elements and outline history of the English language.* *Sophomore ii, Cl., Sc. and Lt.* This course (a and b) constitutes the short course in English required of all students not in the long course i (a to e).
- (b) *General introduction to the history and criticism of modern English literature.* *Sophomore iii, Cl., Sc. and Lt.* Open to those who have completed course i (a to e) or course ii (a).

- Course III.* (a). *Elizabethan lyrics and selections from Spenser's Faerie Queene.* This term's work is the beginning of a sequence of studies, extending through the year, in Elizabethan literature and experimentations successively in lyric, dramatic and epic poetry. *Junior or senior i.* Open to those who have completed course ii.
- (b) *Shakspeare.* King Lear, Macbeth, Richard III, All's Well that Ends Well, Antony and Cleopatra, and A Mid-Summer-Night's Dream will be read and discussed. *Junior or senior ii.* Open to those who have completed course ii.
- (c) *Milton. The Epic and studies in Paradise Lost.* *Junior or senior iii.* Open to those who have completed course ii.
- Course IV.* *Elizabethan prose, Bacon's Essays and the English Bible.* A short history of English versions, the literary classification of the books, and illustrative passages will be taken up. *Junior and senior, i.*
- Course V.* (a) *Literature of the sixteenth century.* This course is the beginning of a sequence of three terms, during which special attention is given to the poetry of the century. Special topics, for essays and collateral reading, in the prose of this century will be assigned throughout the entire course. The course opens with the study of Keats, Shelley, Wordsworth, Coleridge and Byron. *Senior i.* Open to those who have completed course ii.
- (b) *Prose writers of the sixteenth century.* This course deals with Lamb, DeQuincy, Hunt, Landor, Newman, Carlyle, Macaulay, Matthew Arnold, Ruskin and Pater. *Senior ii.* Open to those who have completed course ii.
- (c) *Poets of the second half of the sixteenth century.* This course is complete in itself, and at the same time completes the work of the first term. This course deals with Tennyson, Arnold, Browning, Swinburne and Rossetti. Special work will be given among the minor poets of this period. *Senior iii.* Open to those who have completed course ii.
- Course VI.* *English Phonology.* Outline of phonetics; history of English sounds; history of English spelling, with an excursus on spelling reform. Lectures, and study of standard works, such as Sweet's History of English Sounds, Sweet's New English Grammar, Skeat's Principles of English Etymology, etc., with practical phonological exercises. *Senior i.* Open to those who have completed course i or ii.
- Course VII.* *English Morphology.* History of word formation and inflection. Critical review of modern English grammars. *Senior iii.*
- Course VIII.* *Interpretation of Beowulf,* with studies in English antiquities, traces of mythology heroic saga private antiquities, etc. *Senior ii.*
- Course IX.* *William Langland's Vision of Piers the Plowman.* Study of the poem and reports on the life of the times as illustrated by the literature. *Senior iii.*
- Course X.* *Advanced work of Chaucer.* The object of this course is to make the student familiar with Chaucer by extensive reading, and to lay the foundation for independent work by close study of select poems. *Senior iii.*
- Course XI.* *Seminar in English Philology.* Investigation of syntactical problems; exercises in etymology and semantics; critical study of Old English historical prose. *Throughout the year.*
- Course XII.* *Seminar in the critical reading and interpretation of selected novelists of the sixteenth century.* Open to seniors and graduate students.
- Course XIII.* *American authors of the sixteenth century.*
- RHETORIC.
- Course XIV.* *English composition and rhetoric. Freshman i, ii, iii and sophomore i, ii.*
- Course XV.* *Addresses, toasts, orations. Sophomore iii.*
- Course XVI.* (a) *Applied English etymology. Agricultural freshman and foreign-speaking students, i.*

(b) *Applied English Syntax. Agricultural freshmen and foreign-speaking students, ii.*

*Course XVII. Lectures upon the history of art* with essays on art subjects. Open to students who have completed course i. *Junior i.*

*Course XVIII. Debates.* This course is elective to freshmen and sophomores, and students who complete the six terms will be allowed one junior credit. No student will be allowed to take this work who is falling behind in any of his required work. There will be a public debate for the sophomore class in February, and for the freshman class in May; students selected from the two classes will give a public debate the following September. *One period per week through the freshman and sophomore years.*

*Course XIX. Students who excel in debate* may form an honor class, meeting twice each month. Once in two months there will be a debate at which competent critics will be present. Special excellence in this work shall constitute an honor. Not more than sixteen will be admitted to this course which is *open to juniors and seniors.*

#### CRITICISM AND COMPARATIVE LITERATURE.

*Course XX. Literary criticism.* Study of models of English in poetry, oratory, fiction, etc., with critical essays, speeches and debates. Open to those who have completed course i. *Junior i and ii and senior i, ii and iii.*

*Course XXI. Forensic and political orations.* Analysis and comparison of ancient and modern orations with briefs, by the professor of English. A course designed to supplement the president's lectures on oratory. *Junior and senior ii and graduates.*

#### ELOCUTION

*Course XXII. Reading.* Short course. *Freshman ii, Sophomore ii.*

*Course XXIII. Reading.* Long course. Sketches from standard authors studied with special attention to articulation, enunciation, flexibility of voice and purity of tone. *Freshman i, ii, iii; Sophomore i; Junior i, ii.*

*Course XXIV. Voice building.* Long course. In this course the dynamics of speech and the elements of gesture will be considered. An effort will be made to gain complete control of the voice with reference to pitch, force, stress, movement, melody, quality, etc. Open to sophomores who have completed course xxii. *Sophomore ii and iii; Junior iii.*

*Course XXV. Interpretation.* Long course. This course will involve a classification of literature with reference to expression—the correct voicing of the most varied thought and emotion, as anger, scorn, beauty, awe, gloom, etc., will be considered. Applied gesture, Open to juniors who have completed course xxiii. *Junior i and ii.*

*Course XXVI. Impersonation.* Long course. A study of Shakspeare's plays with reference to the voice and manner best suited to each character of the drama. Open to juniors who have completed course xxiii. *Junior iii.*

*Course XXVII. Oratory and dramatic recitation.* Long course. Individual work under criticism of instructor. Open to all seniors who have completed course xxiv and those who have completed courses xxi and xxii with a record of ninety per cent. or over. *Senior i and ii.*

*Course XXVIII. Advanced reading.* Long course. *Freshman i, ii, iii; Sophomore i, ii, iii.*

*Course XXIX. Oratory.* Long course. Open to seniors who have completed course xxvi. *Senior i and ii.*

*Course XXX. Oratory.* Individual instruction on original productions. Open only to seniors who are to appear on the commencement program. *Senior iii.*

#### FOR GRADUATES.

*Course XXXI. Comparative grammar of Old English,* and reading of Old English texts.

- Course XXXII.* An outline grammar of the Middle English dialects, and reading of select Middle English texts.
- Course XXXIII.* Gothic, in its relation to the cognate languages, especially Old English. An introduction to the comparative study of Teutonic philology.
- Course XXXIV.* Old Saxon grammar. The reading of the Héliand. (Behaghel-Galleé, Altsächsische Grammatik, and Heyne's edition of the Héliand will be used.)
- Course XXXV.* English Phonology. Outlines of phonetics, and history of the English sounds. Lectures and study of standard works, such as Sweet's History of English Sounds, Sweet's New English Grammar, Skeat's Principles of English Etymology, with practical phonological exercises.
- Course XXXVI.* English Morphology. History of word formation and inflection. Critical review of modern English grammars.
- Course XXXVII.* Interpretation of *Beowulf*, with studies in English antiquities, traces of mythology, heroic saga, private antiquities.
- Course XXXVIII.* Old English religious poetry.
- Course XXXIX.* Study of Old English historical prose. King Alfred's translation Bede's Ecclesiastical History, the Old English Chronicles, select charters.
- Course XL.* Historical and critical survey of the literature of the xvii century.
- Course XLI.* (a) Critical situation in the literature of the xviii century.  
(b) The rise of the Romantic movement.
- Course XLII.* Typical Victorian poets, e. g., Matthew Arnold, Tennyson, Browning, William Morris.
- Course XLIII.* A review of the schools and methods of criticism.
- Course XLIV.* The evolution of the English romance and novel.
- Course XLV.* Comparative literature studied in its bearing upon English literature.
- Course XLVI.* Research or special studies in some line selected by individual students will be guided by the department.

In 1896-'97 classes will be formed, in any term, in not more than four of the specifically graduate courses. It will be noticed that some of the undergraduate advanced courses are open, under certain conditions, to those who have not previously pursued them.

#### SOCIETIES.

The "Knights of English Learning" is a departmental society very intimately connected with the department of English; the "Philological Society" is also of great value to graduate students of this department.

#### 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.

#### SCHOLARSHIPS AND PRIZES.

For announcement of these see page 33.

#### FINE ARTS.

Students presenting satisfactory evidence of fitness are allowed, under the conditions mentioned below, to substitute artistic drawing, painting or modeling for one study to be determined by the general faculty on special application, and to pursue it through two terms of the junior year and two terms of the senior year.

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. Terms vary with the different classes of the antique, still-life, portraiture, etc. Special rates are made to University students.

## FRENCH.

### FOR UNDERGRADUATES.

*Course I. Advanced grammar and composition* Various authors will be read: Racine, Corneille, Pascal, Feuillet, Daudet, Gréville, Sand, etc. *Freshmen, i, ii and iii and Sophomore, i, ii and iii.* Open to freshmen who have completed the French required for entrance.

*Course II. French begun.* Chardenal's French Course; Blouet's French Composition; Mme. Foa's Petit Robinson de Paris; Muller's Les Grandes Découvertes Modernes; Fontaine's Histoires Modernes. *Sophomore i, ii and iii, Lt.*

*Course III. French begun.* Chardenal's French Course; Blouet's Composition; Luquien's French Prose of Popular Science; Octave Feuillet; Lacombe's Petite Histoire de France; articles from recent scientific journals. *Freshmen ii and iii and sophomore i, Sc.*

*Course IV. French begun.* 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. *Sophomore i and ii, Ct.*

*Course V. (a) The xix century in France,* the Romantic school, Mme. de Stael, Chateaubriand, Victor Hugo, Cousin, Michelet, Ste Beuve. Lectures and compositions. *Junior i.*  
*(b) The Realist Movement,* Taine, Renan, Gautier, Daudet. Lectures on the literary current of the century. *Junior ii.*  
*(c) Howell's farce—The Elevator—translated into French.* 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. *Junior iii.*

*Course VI. (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.  
 For engineering freshmen who have had previous preparation.

*Course VII. (a) Chardenal's French Course.*

*(b) La Nature.*

*(c) Luquien's French Prose of Popular Science.*

For engineering freshmen who have had no previous preparation in French.

*Course VIII. Scientific French translations.* Translation of scientific French and reading of engineering literature. *Junior i and ii engineers.*

*Course IX. Lectures on the history of the French language,* literary criticism and the history of French literature. Brunetière, Taine, Bourget, Lemaître, Hugo, Lamartine. *Senior i, ii, iii.* Two hours a week.

*Course X. Italian.* Ahn's Italian course, Goldoni, Tasso, Petrarch, &c. (Twice a week.) *Senior i, ii, iii.*

*Course XI. Spanish.* Edgren's Spanish grammar, Knapp's modern Spanish readings, Cervantes, Calderon. (Twice a week.) *Senior i, ii, iii.*

NOTE. Courses ix and x or ix and xi may be elected during the senior year. The work of both the Italian and Spanish courses is conducted altogether in French. Those who would like to acquire both languages are recommended to take one through the junior year, the other in the senior year.

## FOR GRADUATES.

*Course XII. Romance languages. (a) Old French.* Origines de langue Française, par Petit de Jelleville, Morceaux Choisis des Auteurs Français du Moyen âge, 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 Cantilène d'Eulalie; the chronicles of Ville-hardouin, La Chansons 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 XIII. A systematic study of some special topic in French literature.*

*Course XIV. Italian.* Interpretation of Dante's Inferno. This work has been done the past year in the French language.

*Course XV.* Old Spanish—II Poema del Cid.

## GEOLOGY.

## FOR UNDERGRADUATES.

*Course I. Elements of Geology.* Physiographic, structural and dynamic. This course comprehends a study of land forms with the agencies producing them and an examination of the agencies and processes by which geological formations have been developed. Text book and lectures. *Senior i.*

*Course II. Stratigraphical and historical Geology.* The special effort of this course is to outline the geological history of the North American continent. Lectures and text-book. Twice a week. *Senior ii.*

*Course III. Introduction to Paleontology.* A study of the succession of ancient forms of life in their geological relations. The classification of fossils with the examination of some invertebrates. Lectures and laboratory. Twice a week. *Senior ii.* Open to those who have completed course i.

*Course IV. Introduction to Petrology.* General considerations on the origin and the occurrence of rocks. Preliminary studies in the crystalline rocks with reference to their mineral and chemical constitution. Lectures and laboratory. Twice a week. *Senior ii.* Open to those who have completed course i geology and course i or ii mineralogy.

*Course V. Paleontological Studies.* The course traces the succession of life forms through the early Paleozoic formations as developed in Minnesota and neighboring states. Occasional expeditions can be arranged for field work. *Senior iii.* Open to those who have completed courses i, ii, iii.

*Course VI. Petrological Studies.* Investigations in the crystalline rocks. The course begins with a study of igneous rocks and extends into an examination of the leading crystalline rocks of Minnesota. Occasional expeditions can be arranged for field work. *Senior iii.* A continuation of course iv.

*Course VII. Applied Geology.* An outline of the economic relations of geology. The course comprises a discussion of ore deposits and of non-metallic materials of economic value. Text-book, lectures and reading. *Senior iii.* Open to those who have completed course i.

*Course VIII. Economic Geology.* History of mineral discovery and development in North America. A discussion of the origin and distribution of ore deposits with reference to their chemical and physical relations. *Senior i.* Required of students in technical chemistry and mining engineering.

*Course IX. Special Problems.* The investigation by individual students of particular problems involving field work, laboratory investigation and reading. *Senior iii.* Required of students in mining engineering.

Course X. *An Outline of General Geology.* This course treats of the leading physiographic facts and principles of the science with some practical applications. Lectures. Senior i. Once a week.

NOTE—Course iv is not open to those taking course iii; in any particular year one course only can be selected of courses v, vi and vii.

FOR GRADUATE STUDENTS.

Course XI. *The Granitic rocks of Minnesota.* A study in rock and mineral alteration.

Course XII. *The preCambrian eruptives of Northeastern Minnesota.* The textural relations of diabases and gabbros or other problem.

Course XIII. *The Lower Paleozoic formations of southeastern Minnesota*—in their stratigraphic and taxonomic relations.

Course XIV. *Local features of Glacial phenomena.* The special field to be selected on consultation.

NOTE—Course viii, economic geology, and course ix, special problems, are also open to graduate students.

GERMAN.

FOR UNDERGRADUATES.

Course I. *Critical studies in German classics.*

(a) *Schiller*—Outline of his life and works, with a critical reading of one drama (*Jungfrau von Orleans*, or *Die Braut von Messina*); writing from dictation and memorizing of selections from his shorter poems; oral and written exercises based on the text read; review of German grammar (inflection).

(b) *Goethe*—Brief sketch of life and works; critical reading of "Italienische Reise" and "Gedichte;" oral and written exercises, based on text; review of grammar (practical syntax), continued from (a).

(c) *Heine*—Sketch of life and works; "Harzreise" and "Buch der Lieder." German grammar (derivation and composition); original letters, notes and short essays by the class, *Freshman Sc. and Lt., i, ii and iii.* Open to those who have completed the German required for entrance.

(d) *Scientific Prose* selections (Dippold). *Freshman iii.* Engineering and scientific students.

(e) Reading of technical periodicals. *Junior i, ii.*

Course II. *History and biography.* Rapid reading of selections from Schiller's "Thirty Year's War;" Mueller's "Geschichte des deutschen Volkes;" Sybel's "Erhebung Europas;" Becker's "Friedrick der Grosse; historical ballads, reading at sight. This course is intended to give students facility in reading German for the use of the language in other studies. *Sophomore Lt., i, iii.* Open to students who have completed course i, iii or iv.

Course III. *Elementary.*—(a) German grammar and reader (Meissner, Whitney). Translation from German into English; reading of easy stories and poems; practice in writing German script.

(b) German grammar and reader, continued; exercises, oral and written, in translating English into German; dictation of prose and poetry; composition.

(c) *Scientific prose selections* (Gore); exercises based on words of the text. Objects of this course are: 1st, to enable the students to read the language as soon as possible. 2d, to give a scientific vocabulary for use in other departments. *Freshman Sc. ii and iii, Sophomore Sc. i, Freshman Engineers, i, ii, iii.* Open to those who have not completed entrance German.

Course IV. *Elementary* (Parallel with course iii).

(a) German grammar and reader, continued; oral exercises; memorizing of short poems; writing from dictation.

- (b) German grammar and reader, continued. Structure of the German sentence; translation from English into German; sight reading of easy stories and poems.
- (c) *Narrative prose and poetry.* German prose composition; letters and essays; reading at sight. The aim of this course is to give facility not only in reading but also in speaking the language; instruction given wholly in German. *Sophomore Cl. and Lt., i, ii and iii.* Open to those who have not completed entrance German.

*Course V. Intermediate.*

- (a) *Schiller*—Life and works: "Wilhelm Tell."
- (b) *Goethe*—His life and works; "Egmont." Shorter poems dictated and committed to memory; advanced grammar; syntax; derivation and composition.
- (c) *Lessing*—Life and works; "Nathan der Weise." Exercises in dictation and composition; essays; rapid sight reading of narrative prose; practice in writing and speaking German. *Junior i, ii and iii,* for those who have completed course iii or iv.

*Course VI. Advanced subjects in literature and criticism.*

- (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 Faust problem in Part II; lectures; essays by the class upon related topics. References: Grimm's "Goethe;" Boyesen's "Goethe and Schiller;" Lewis's "Life of Goethe;" Von Loeper's "Faust;" Düntzer's "Erläuterungen;" Kuno Fischer's "Faust;" Vischer's "Faust."
- (b) *Lessing's "Laocoon"* (25 chapters) and selections from his "Dramaturgie." French classicism; 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. *Junior A and Senior i, ii, iii.*

*Course VII. History of German literature, from Goethe to the present time.* Reading of modern authors. Open to all students who have completed course i, ii, v or vi.

*Senior VIII. Seminar*—German history and literature in the age of the Reformation. Open to graduates.

*Course IX. For graduates.*

- (a) Paul's "Mittel-Hoch-Deutsche Grammatik." Selections from the "Nibelungen Lied;" Gudrum; Wolfram; Walter von der Vogelweide. Translations into modern German; political and literary history of the period.
- (b) Braume's "Alt-Hoch-Deutsche Grammatik und Lesebuch." Müllenhoff and Sherer's "Denkmäler." History of the period, based upon Arnold's "Deutsche Geschichte."

## GREEK.

### FOR UNDERGRADUATES.

- Course I. Homer's Iliad*, 3 books. Smith's history of Greece, introduction and books I and II; collateral reading in Grote's history of Greece, Part I; Greek composition; reading at sight. *Freshman i, and three weeks of ii.*
- Course II. Xenophon's Symposium.* Smith's history, book IV. Collateral reading in Grote's history, chapters 47 to 68; Greek prose composition; reading at sight. *Freshman ii, nine weeks.*
- Course III. Lysias.* Smith's history, books V and VI; collateral reading in Grote's history, chapters 78 to 90; Greek prose composition; reading at sight. *Freshman iii.*
- Course IV. Xenophon's Memorabilia.* Smith's history, book IV; collateral reading in Grote's history, chapters 47 to 68; Greek prose composition; reading at sight. *Freshman i and three weeks of ii.*



*Course V. Demosthenes.* Smith's history, book VI; collateral reading in Grote's history, chapters 78 to 90. Greek prose composition; reading at sight. *Freshman ii, and nine weeks of iii.*

Those candidates who have read Homer take courses, iv, v; all others take courses i, ii, iii.

Throughout the freshman year in all courses the syntax of the language is systematically reviewed, and special attention is directed to the derivation and composition of words.

*Course VI. Plato.* Collateral reading; theses; composition; reading at sight. *Sophomore i.*

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

*Course VIII. Archæology of Greek art.* Collateral reading; theses; lectures. *Junior i and ii.*

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

*Course X. Tragedy and epic poetry.*

(a) The Trilogy of Æschylus.

(b) Œdipus Tryannus; Œdipus Coloneus; Antigone.

(c) The Chæphore of Æschylus; the Electra of Sophocles; the Electra of Euripides.

(d) The Odyssey.

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

*Course XI. Neo-Hellenic.* Collateral reading; theses. *Senior ii.*

*Course XII. Later Greek writings; selections from Polybius, Plutarch, Arrian, the Septuagint, and the New Testament.* *Senior iii.*

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

*Course XIV. The political institutions, the antiquities and the public life of the Greeks.* This course is given in short lectures distributed through the above courses, supplemented by collateral reading.

#### FOR GRADUATES.

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

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

(c) *Epigraphy.*

#### HISTORY.

##### FOR UNDERGRADUATES.

*Course I. History of Europe in the Middle Ages.* Lectures and assigned reading. The study of events is made subordinate to the study of institutions, especially such as have influenced modern life. Required of all students. *Freshman Cl. and Lt. iii, and sophomore Sc. i.*

*Course II. Early English constitutional history,* from the Roman conquest to Henry VII. Topical research and lectures. The main study is directed to the evolution of the English constitution. Open to those who have completed course i. *Sophomore Sc. and Lt. ii, and Sophomore Cl. iii.*

*Course III. English constitutional history since the accession of Henry VII.* Topical research, essays, and lectures. Special attention is given to the constitutional struggle between king and parliament, the relations of church and state, the causes, nature, and results of the revolution. Open to all who have completed course i and ii. *Junior or senior i.*

*Course IV. The beginning of modern European history.* This course is a continuation of i, and is intended to form a connecting link between the period of the early middle ages and that covered by the course in modern political history (iv). Its purpose is to trace the various forms of new life springing out of the principal movements and events of the middle ages. It is the period of the decline of medieval and of the rise of modern institutions. Special attention will be given to Italian humanism, the renaissance, the protestant reformation, the counter-reformation, and the consequent political and religious settlements leading up to the thirty years' war, and concluding with the peace of Westphalia. Open to all who have completed courses i and ii. *Junior or senior ii.*

*Course V. (a) The political and constitutional history of the United States through the adoption of the constitution.* 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 causes 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; the failure of the Confederation, the critical national period, and the adoption of the constitution. The work consists largely of cooperative topical reports, in the preparation of which students must consult freely colonial records and other original sources of information. Open to all who have completed courses i and ii. *Junior or senior ii.*

*(b) Political and constitutional history of the United States since 1789.* The organization of the new government by the Federalists, and the centralizing tendencies they set in motion; Jeffersonian and Jacksonian democracy; territorial expansion; the frontier and its influence, boundary disputes, public land policy; the slavery struggle; tariff and financial history; the states rights doctrine and its applications; reconstruction after the Civil war. A continuation of v (a). *Junior or senior iii.*

*Course VI. (a) Modern Europe—the French Revolutions, and France to-day.* 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 of Napoleon. A brief treatment of the Revolution of 1830, with the intervening events, and a fuller one of the Revolution of 1848, is followed by a study of the Second Empire, and a rapid sketch of events since its fall is closed by a more minute study of the present constitution and its workings and of economic conditions. Students will have Mrs. Gardiner's *French Revolutions* and Wilson's *The State*, and are advised to have either *Fyffe* or *Muller* in addition. Open to all who have completed courses i and ii. *Junior or senior i.*

*(b) Modern Europe—continued.* The remaining western states, except England, are taken up by topics, grouping the studies so far as possible about the successive French revolutions, with special attention to the reconstructions since 1848, to existing constitutions, and to present political and economic questions. Except Switzerland and the Scandinavian countries, the smaller states are passed over rapidly in lectures. A large part of the work must be done from periodicals, annual registers, year books, and the like. *Junior or senior ii.*

*(c) Modern Europe—continued.* The eastern question, Russia, the state of the Balkan peninsula, the Turk, England and her colonies, and the European colonies in general. *Junior or senior ii.*

*Course VII. Philosophy of history.* Lectures and theses. Open to all who have completed four terms of history. *Junior or senior iii.*

#### FOR GRADUATES.

Most of the following courses will be open also to juniors or seniors for honor work, subject to the rules of the general faculty and the approval of the department.

*Course VIII. Seminar in Medieval history.* One hour a week through the year. Subject: The relations of church and state. A study of the rise and development of church organization in its relations to (1), the Roman empire before and after Constantine; (2),

the Frankish kingdom and Charles the Great; (3), the holy Roman empire to the protestant revolution; (4), the modern kingdoms of Europe, especially Germany, France and Italy.

- Course IX. Seminar in English constitutional history.* 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 Newburg and Benedict of Peterborough. A working knowledge of Latin is required.
- Course X. Seminar in English constitutional history.* 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 foundations of the modern English constitution. Based on a careful reading of Bracton and the Chronicles of Nicholas Trivet and William Rishanger. A working knowledge of Latin is required. [Not given in 1896-7].
- Course XI. The early constitutional history of France.* Beginning with the treaty of Verdun, this course will briefly review the leading events of French history, with special study of the chief features of constitutional development. Ability to read French will be indispensable, and those who take the course will be expected to have at hand Luchaire's *Manuel des Institutions Francaises* and the early volumes of Dareste's *Histoire de France* or the equivalent, and some standard atlas illustrating French history.
- Course XII. Seminar—topical research in American colonial institutions.* One meeting a week through the year. Open to those who have completed course iii. The scope of the work is indicated by the following topics selected from the list of those that have been pursued in the seminar: Maryland manors; the southern parish; the patroon system in New York; the New England town; white slavery in the colonies; Indian slavery in New England; poor laws in the colonies; paper money in the colonies; evolution of bicameral legislatures in America; influence of the Huguenots upon American development; colonial tariffs. Each member of the seminar will prepare one paper each term. For this work and other graduate work in American history the library of the State Historical Society at the State Capitol will be found a valuable addition to the resources of the University library.
- Course XIII. Seminar—critical study of authorities for early New England history—based upon a reading of Winthrop's New England.*
- Course XIV. Seminar—the making of the constitution.* Two hours a week through the year. Members of the seminar will own the *Federalist* and *Madison's Journal*.
- Course XV. Lectures and topical research.* Constitutional and political history of the United States during the civil war and the period of reconstruction. One hour a week. (This course will not be offered in 1896-7.)  
Graduate Students will be assisted in other lines of study so far as the time of the department will permit.

## LATIN.

### FOR UNDERGRADUATES.

- Course I. Livy, Books I and XXI and XXII,* with sight reading from other writers of history; construction of the Latin sentence; composition of words, with special attention laws of to phonetic change; Latin composition based on the text; rise and development of Roman institutions. *Freshman i and ii.*
- Course II. Plautus and Terence.* Study of early Latin, language and literature; development of the drama; Latin composition. *Freshman iii, Cl. and Lt.*
- Course III. Horace.* Study of his times, style and works; outline of the history of Roman literature. *Freshman iii, Sc.*

- Course IV. Horace.* Study of Latin language and literature commenced in course ii, continued. *Sophomore i, Cl. and Lt.*
- Course V. Tacitus and Pliny.* Study of the Latin language and literature in the early empire. *Sophomore ii Cl. and iii Lt.*
- Course VI. Oratory.* Tacitus—Dialogus de Oratoribus, with selections from Cicero *Junior i.*
- Course VII. Tacitus annals and histories.* Study of Roman life in the early empire.
- Course VIII. Outlines of Roman Law.* Lectures with translations, at sight, of texts illustrating the subject. *Junior iii.*
- Course IX. Lucretius, Cicero, Ovid, Roman Mythology.* *Senior i.*
- Course X. Roman Satire,* embracing a study of the elements and development of satire with a comparison of the Roman writers in this field of literature. *Senior ii.*
- Course XI. Latin Elegiac poetry,* embracing a comparative study of Catullus, Tibullus, Propertius and Ovid. *Senior iii.*
- Course XII.* Seminar once a week throughout the junior year.

## FOR GRADUATES.

- Course XIII. Roman History.*
- Course XIV. Roman Law.*

## MATHEMATICS.

## FOR UNDERGRADUATES.

- Course I. Higher Algebra:* simple equations, proportion, progression, variation, quadratic equations, simultaneous equations of the second degree, inequalities, binomial theorem, indeterminate co-efficients and higher equations. *Freshman i.*
- Course II. Logarithms and Plane and Spherical Trigonometry,* with numerous applications. *Freshman ii.*
- Course III. Analytical Geometry:* 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. *Sophomore Sc. iii, Junior i.*
- Course IV. Differential Calculus:* 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 and envelopes. *Junior ii.*
- Course V. Integral Calculus:* 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. *Junior iii.*
- Course VI. Determinants and Co-ordinate Geometry of Three Dimensions:* the plane, the straight line in space, quadric surfaces, applications. *Senior ii and iii.*

Each of the above courses requires all of the preceding courses.

- Course VII. Method of Least Squares:* a study of the combination and adjudgment of observations and the discussion of their precision as applied especially to engineering, physics and astronomy. *Senior ii.* Open to all who have completed the first five courses.
- Course VIII. Descriptive Geometry:* problems relating to points, lines, planes, solids, surfaces of revolution and warped surfaces. Recitations, lectures and problems. *Junior iii.* Open to those who have completed courses i and ii.

*Course XI. Applied Mechanics:* 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.

FOR GRADUATES.

*Course X. Advanced work in Co-ordinate Geometry.*

*Course XI. Advanced work in Differential Calculus.*

*Course XII. Advanced work in Integra Calculus.*

*Course XIII. Quaternions.*

*Course XIV. Differential Equations.*

*Course XV. Theory of Functions.*

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

MILITARY SCIENCE AND TACTICS.

(a) For 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 and sophomore classes, i, ii, iii.

In addition to the drill prescribed during the second term, the sophomore class will be required to receive instruction in the elementary principles governing in the art of war, one hour per week. This course is open as an elective to juniors and seniors.

Military drill may be taken voluntarily by others outside of the freshman class, 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 a 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 and junior classes, 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 the 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 especial aptitude for the military service and furnish a copy thereof to 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.)

(b) The senior elective of the winter term is intended to introduce, to those interested, the elements of modern tactics and the art of war.

MINERALOGY.

FOR UNDERGRADUATES.

*Course I. Elements of Mineralogy.* Physical characters of common minerals, with determinative work; lectures and laboratory. Arranged for those who cannot take course iii. *Junior i.*

*Course II. General Mineralogy.* Elements of crystallography and the physical characters of minerals with a study of the rock-forming species; blowpipe analysis; lectures and laboratory. *Junior i.*

*Course III. General Mineralogy—continued.* Ores and economic minerals; determination of species; lectures and laboratory, with quantitative blowpipe analysis. *Junior ii.*

*Course IV. Quantitative Mineralogy.* Assaying gold and silver ores; lectures and laboratory. *Junior iii.*

*Course V. Physical and Chemical Mineralogy.* (a) Optical characters comprising investigations with goniometer, stauroscope, etc.

(b) Micro-chemical methods and applications. *Junior iii.* Not open to those who elect course iv.

*Course VI. Mathematical Crystallography.* Two hours a week. *Junior iii.*

*Course VII. An outline of Mineralogy.* Identification of minerals. Once a week throughout the year.

#### FOR GRADUATES.

*Course VIII. Original problems.* Particular groups of minerals studied. Advanced work connected with courses iii, v and vi. The line of work to be determined on consultation.

#### MUSIC.

Students who are sufficiently advanced in music are allowed under the conditions mentioned below, to substitute instrumental or vocal music for one term of the sophomore year, to be determined in each case by the general faculty, and to pursue it as an elective through two terms of the junior and two terms of the senior year.

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 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 is to be taken under instructors in the Northwestern Conservatory of Music and the instruction is to be paid for by those receiving it. The number of instructors in the Conservatory permits quite a range of individual preference. The Conservatory makes special rates to the students of the University.

#### PEDAGOGY.

*Course I. Philosophy of Education.* This will have regard to: (1) The purpose and end in education in relation to the individual and to society. (2) Mental development physiologically considered. (3) The order of mental development in its relation to subject matter of study. *Junior i.*

*Course II. Methodology.* In this will be considered: (1) The general arrangements of subject matter in course of study. (2) The proper order in the presentation of the several subjects. (3) The conduct of recitation. *Junior ii.*

*Course III. School Administration.* To include: (1) School systems, national, state and local. (2) School government and organization. (3) School hygiene. *Junior iii.*

*Course IV. Ancient education.* In this will be noted the essential characteristics of education, Greek, Roman and Asiatic, and the influence of the same upon modern life. *Senior i.* Two days each week.

*Course V. Medieval and modern theories.* *Senior ii, iii.* Two days of each week.

*Lectures.* A course of special lectures upon methods of teaching some leading subjects, as classics, history, English, and natural science will be given by heads and representatives of departments.

*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 superintendents, the students in pedagogy will pursue a systematic course of visitation of the several grades of instruction in the cities of St. Paul and Minneapolis, to be reported and considered in class.

For the relation of these courses to the Teacher's Course, see page 92.

## PHILOSOPHY.

### FOR UNDERGRADUATES.

*Course I. General Psychology.* Three hours a week in the psychology of the senses through lectures, demonstrations, experiments and reading in Ziehen: Introduction to Physiological Psychology, Krohn: Practical lessons in Psychology, and James: Psychology. One hour a week in the anatomy and physiology of the nervous system in the above manner, and with practical laboratory dissection and work. *Junior i.*

*Course II. General Psychology.* Continuation of course i. Association, memory, reasoning, feeling and will. *Junior ii.*

*Course III. Special Psychology.* Continuation of course ii into the phenomena of psychological research, i. e., thought transference, hypnotism, clairvoyance, spiritualism and theosophy, into insanity and child-psychology. *Junior iii.*

*Course IV. Logic.* The principles of deductive and inductive inference; theory of knowledge, judgment and belief. *Junior iii.*

*Course V. Experimental Psychology.* Laboratory and experimental work in the original investigation of individual problems. *Senior i, ii, iii.*

*Course VI. Physiological Psychology.* Special advanced study of nerve tracts in the development method through seven series of sections of the human medullas. *Senior i.*

*Course VII. History of Philosophy.* Lectures and special study of individual philosophers.  
Part I. Ancient philosophy. *Senior i.*  
Part II. Philosophy of the Middle Ages and the Seventeenth Century. *Senior ii.*  
Part III. Philosophy of the Eighteenth and Nineteenth Centuries. *Senior iii.*

*Course VIII. Ethics.* The principles and methods of ethics. Lectures and discussions. *Senior i.*

*Course IX. Aesthetics.* Lectures and discussions, and visits to art collections. *Senior ii.*

### FOR GRADUATES.

*Course X. Pre-Socratic Philosophy.* A critical study of the fragments of early Greek philosophy, with attempts at systematic reconstruction.

*Course XI. The Philosophy of Kant.* Study of three Critiques; the relation of Kant to the development of modern philosophy.

*Course XII. Advanced Logic.* Theory of knowledge and analysis of belief.

*Course XIII. Experimental Psychology.* Study of individual problems in a great variety, especially child psychology and experimental aesthetics.

*Course XIV. Physiological Psychology.* Technical practice in the preparation of nervous matter for macroscopical or microscopical study through the methods with silver, sublimate and hematoxylin, and in the cutting of series. Study of such material with help of the works of Obersteiner, Edinger, His, Kölliker, Golgi and Ramon y Cayal.

## PHYSICAL CULTURE.

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 unhealthy in their general effect.

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

## PHYSICS.

Mathematics of freshman year required as preparation for all courses.

*Course I. Elementary Mechanics*, with laboratory practice. *Freshman Sc. iii.*

*Course II. General Physics*, with experimental lectures. *Freshman Cl. Lt. iii and Sophomore i.*

*Course III. Sound and Light*, with laboratory practice. *Sophomore i.*

*Course IV. Heat*, with laboratory practice. *Sophomore ii.*

*Course V. Static Electricity*, with experimental lectures. *Sophomore iii.*

*Course VI. Magnetism*, with laboratory practice. *Junior i.*

*Course VII. Voltaic Electricity*, with laboratory practice. *Junior ii.*

*Course VIII. Selected problems* in electricity and magnetism. *Junior iii.*

*Course IX. Advanced Work* in practical physics, mechanics, elasticity, force of gravity.

Open to those who have completed calculus.

*Course X. Heat: thermometer and calorimetry.*

*Course XI. Light. refraction, interference and polarization.*

## FOR GRADUATES.

(a) Courses VIII to XI for undergraduates are open to graduate students desiring this work.

(b) Advanced work in some special field, experimental investigation being the feature of the work.

## MATHEMATICAL PHYSICS AND THEORETICAL MECHANICS FOR THOSE WHO HAVE COMPLETED CALCULUS.

(a) *Theory of dynamos and motors.* Open to those who have completed course i in applied mechanics. 22 hours.

(b) *Differential equations* and their application to alternate currents, to follow course i in dynamos and motors.

(c) *The potential function* and spherical harmonics.

(d) *Analytical statics* and electro statics.

(e) *Dynamics of rigid bodies* and generalized equations of motion.

(f) *Periodic functions*, circular hyperbolic and elliptic with their physical applications.

For those who have had advanced work in mathematics:

(g) *Directional calculus*, including vector analysis and determinants.

(h) *Analytical theory of heat*, conduction.

(i) *Theories of elasticity and Sound.*

(j) *Wave theories of light, heat and electricity.*

(k) *Kinetic theory of gases.*

(l) *Hydrodynamics* and fluid motion.

(m) *Theory of functions*, with applications.



## POLITICAL SCIENCE.

### FOR UNDERGRADUATES.

Some changes in the order and possibly in the character of the courses will be made for 1896-97, of which due notice will be given.

#### ECONOMICS.

- Course I. Elements of Private Economics.* The aim is to thoroughly inculcate established doctrine and show the nature and bearing of questions still unsettled. *Junior i.*
- Course II. Economic History.* Comprises an account of leading economic schools and movements, with some discussion of the successive phases of population, wage-fund, rent, value, etc. *Senior i.* Open to students who have taken course i.
- Course III. American Public Economy.* The object is to open the subject of American administration and finance. So far as time allows, such topics as taxation, money, national banking, protection, public education, transportation, land policy are treated. *Senior iii.*

#### POLITICS.

- Course I. The State and the Government.* A descriptive treatment of these institutions with discussions of their development, theories, etc. *Junior ii.*
- Course II. The Law and the Constitution.* The contents and construction of the constitutions of modern free states, with an introductory outline of the elements of law. *Junior iii.*
- Course III. Public International Law.* An elementary course open to students who have completed course i, politics. *Senior ii.*

#### SOCIAL SCIENCE.

- Course I.* History, principles and elements of sociology, with discussions of pauperism, crime, care of defectives, etc. [3]. *Senior iii.*
- Political Science Seminar.* Meets weekly through the year. Open to graduate students and also to senior undergraduates, under the general regulations concerning seminars.
- Moot Senate.* Meets weekly through the second term for practice in parliamentary procedure. Open to seniors and juniors.

### FOR GRADUATES.

The particular subjects of investigation are selected by individuals or groups, after consultation with the professor in charge. When insufficiently advanced in any elementary studies, graduates are advised to join undergraduate classes.

## PUBLIC HEALTH (SANITARY SCIENCE).

### FOR UNDERGRADUATES.

- Course I.* Lectures on personal hygiene, one hour a week. Laboratory work (optional)—elementary examination of air, water and soil, one hour a week. *Freshman i.*
- Course II.* Lectures on the hygiene of the family and the house. Laboratory work (optional)—chemical examination of air and water. Elementary work in bacteriology. Lecture one hour a week. Laboratory work two hours a week and more if desired. *Sophomore ii.*
- Course III.* Public health of communities and states—relations to some social and political problems. International hygiene; laboratory work—proofs of the relations of the bacteria of air, water and soil to health and disease. Lecture one hour a week. Laboratory work two hours a week and more if desired. *Junior and Senior iii.*

## FOR GRADUATES.

*Course IV.* Sanitary chemistry—text-book and laboratory work.

*Course V.* Sanitary bacteriology—text-book and laboratory work, (continued).

*Course VI.* Chemistry and bacteriology of air and water supply.

*Course VII.* Bacteriology of preventable diseases.

## SCANDINAVIAN LANGUAGES.

*Course I. For beginners.* Smith's Grammar; Bennett's Phrase Book; Rolfsen's Læsebog; blackboard and oral exercises; compositions. *Junior and Senior i, ii, iii.*

*Course II. Advanced. First year. (a) Lectures [2].* History of Scandinavian languages; Scandinavian archæology; Norse mythology; history of the Viking Age; history of old Scandinavian literatures, *i, ii, iii.*

*Second year. (a) Lectures [2].* History of Danish, Norwegian and Swedish literatures, in connection with the history of the respective countries. *i, ii, iii.*

*(b) Throughout the course [2].* Critical reading of masterpieces of Scandinavian literature, essays and practical exercises. Open to all students properly qualified.

*Course III. Icelandic. (a)* Sweet's Icelandic Primer.

*(b)* Wimmer's Formlaere.

*(c)* Nygaard's Udvalg af den Norroene Literatur, *Junior and senior i, ii, iii.*

## FOR GRADUATES.

*Course IV.* Gunnlaugssaga Ormstungu, Snorra Edda, Sæmundar Edda. Special topics in Scandinavian literatures and history.

THE WEYERHAEUSER CHAIR OF SEMITIC LANGUAGES  
AND HISTORY.

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

*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 1895-96 and *b* will be given in 1896-97.

*Course VI. Oriental History,* from the earliest times to the end of the Crusades. *Junior or Senior i and ii.*

## 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 shall 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—shall be allowed one half term's credit.

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## 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, certificate may be made perpetual by the indorsement of the state superintendent of public instruction and the president of the University.

### 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, and to all graduates of State high schools of the first and second classes, who have had two years' experience in teaching.

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## UNCLASSED STUDENTS.

I. Applicants for admission as unclassified students must present credentials admitting them 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 general faculty.

II. Applicants must present to the committee on unclassified students a written application giving:

- (a) The lines of work they wish to follow.
- (b) Their reasons for not taking a regular course.

III. The committee on unclassified students will meet on the first Tuesday and Saturday of each term in room 4, main building, to consider appli-

cations, and all applications must be presented to the committee and not to individual members. 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. Unclassed students desiring to change their lines of study must again present their application to the committee for approval; and must renew their application at the beginning of each year.

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## THE UNIVERSITY SUMMER SCHOOL.

This school will open Monday, July 27th, and continue in session four weeks, closing Friday, August 21st. 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.

The subjects offered in the school of '06 will be Latin, French, Anglo-Saxon, mathematics, literary criticism, animal biology, physics, botany, chemistry, history, psychology, pedagogy. 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 of 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 to the registrar of the University.

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THE COLLEGE OF

ENGINEERING

METALLURGY AND

THE MECHANIC ARTS

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# The College of Engineering, Metallurgy and the Mechanic Arts.

## THE FACULTY.

- CYRUS NORTHRUP, LL. D., *President.*  
CHRISTOPHER W. HALL, M. A., *Dean and Professor of Geology and Mineralogy.*  
JOHN G. MOORE, B. A., *Professor of German.*  
CHARLES W. BENTON, B. A., *Professor of French,*  
FREDERICK S. JONES, B. A., *Professor of Physics.*  
WILLIAM R. HOAG, C. E., *Professor of Civil Engineering, in charge of Road and Sanitary Engineering and Geodesy.*  
GEORGE D. SHEPARDSON, A. M., M. E., *Professor of Electrical Engineering.*  
WILLIAM R. APPLEBY, M. A., *Professor of Mining and Metallurgy.*  
GEORGE B. FRANKFORDER, M. A., Ph. D., *Professor of Chemistry.*  
HENRY T. EDDY, C. E., Ph. D., LL. D., *Professor of Engineering and Mechanics.*  
ARTHUR EDWIN HAYNES, M. S., M. Ph., *Professor of Mathematics.*  
FREDERICK W. DENTON, C. E., *Associate Professor of Mining.*  
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*  
HARRY E. SMITH, M. E., *Assistant Professor of Mechanical Engineering in charge of Experimental Engineering and Shop Work.*  
FRANCIS P. LEAVENWORTH, M. A., *Assistant Professor of Astronomy and Director of the Observatory.*  
WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*  
FRANK H. CONSTANT, C. E., *Assistant Professor of Civil Engineering, in charge of Structural Engineering.*  
H. WADE HIBBARD, B. A., M. E., *Assistant Professor of Mechanical Engineering, in charge of Locomotive Engineering and Machine Design.*  
WILLIAM S. PATTEE, LL. D., *Lecturer on Contracts and Torts.*  
AMELIA I. BURGESS, *Instructor in Freehand Drawing.*  
PETER CHRISTIANSON, B. S., B. Min. E., *Instructor in Assaying.*  
JAMES M. TATE, *Instructor in Carpentry, Pattern and Foundry Practice.*  
JAMES H. GILL, M. E., *Instructor in Iron Work.*  
CHARLES P. BERKEY, M. S., *Instructor in Mineralogy.*  
FRANK W. SPRINGER, B. E. E., *Instructor in Electrical Engineering.*  
NELLIE S. TRUFANT, *Scholar in Freehand Drawing.*  
ARTHUR H. ELFTMAN, M. S., *Assistant in Geology.*  
ARTHUR L. ABBOTT, *Scholar in Drawing.*  
C. H. KENDALL, C. E., *Scholar in Civil Engineering.*

- HARRY W. DIXON, *Engineer.*  
JOHN F. CATES, *Engineer.*  
WILLARD W. DAKIN, *Instrument Maker.*

## SPECIAL LECTURERS, 1896-97.

- JOHN T. FANNING, C. E., *Consulting Civil Engineer, Minneapolis.* Hydraulic power.
- GEORGE T. WILSON, C. E., *Engineer in charge of sewer construction, St. Paul.*
- F. W. CAPPELEN, C. E., *City Engineer, Minneapolis.* Water supply for large cities.
- C. F. LOWETH, *Bridge Engineer, St. Paul.* The modern railway bridge.
- L. S. GILLETTE, *President Gillette-Herzog Manufacturing Company.* The modern iron-manufacturing plant for engineering structures.
- A. B. CHOATE, *Commissioner to the National Road Parliaments under the auspices of the Agricultural Department of the United States.* The relation of the engineer to the road improvement question.
- E. E. WOODMAN, *Engineer with the C. St. P. M. and O. Ry. Company.* Economic questions relative to railway operation and maintenance.
- MORGAN BROOKS, *President Electrical Engineering Company, Minneapolis.* The economic limitations of electric lighting.
- EDWARD P. BURCH, *Electrical Engineer, Twin City Rapid Transit Company, Minneapolis.* Electric railway engineering.
- A. M. ROBERTSON, *General Manager, Minneapolis General Electric Company.* Central station management and operation.
- CHAS. L. PILLSBURY, *City Electrical Inspector, Minneapolis.* Safety in electrical installations.
- WM. H. BURTIS, *Burtis and Howard, Electrical Engineers and Contractors, Minneapolis.* Electrical contracting.

## ORGANIZATION OF THE COLLEGE.

In this college there are six regular courses of study, viz: civil engineering, mechanical engineering, electrical engineering, mining, metallurgy and chemistry, leading to the corresponding baccalaureate degrees.

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 freshman 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.

## ADMISSION.

The requirements for admission are alike for all the the courses in this college, and are as follows:

*English Grammar.*  
*English Composition.*  
*Essay.*  
*Elementary Algebra.*  
*Higher Algebra.*  
*Plane Geometry.*  
*Solid Geometry.*  
*History of the United States.*  
*History of Greece and Rome, or*  
*History of England, or*  
*History of the Middle Ages, or*  
*Civil Government.*  
*Physics.*

For more extended statement of the work covered by these subjects, see statement of the requirements for admission to the classical course, college of science, literature and the arts.

**Chemistry**—The non-metallic elements as presented in such an elementary text-book as Cooley's, Remsen's or Williams'.

Any two of the following:

*Physiology, Botany, Astronomy, Geology, Zoology.*

**Drawing** One year. Freehand sketching of simple objects and geometric forms; instrumental drawing, ornament and the elements of perspective.

The National Drawing Books, to book seven, represent the work required. If other books are used, equivalent selections may be made.

\*†**English**—(a) Latin element in English. (b) History of English literature.

And { \***German**—(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**—(a) Chardenal's Course, first two books of Telemaque. (b) Whitney's French Grammar; Histoires Modernes, by C. Fontaine; Le Française Pratique, by Paul Bercy; translation, English to French, from Blouet's Primer of French Composition.

While in the place of the English and German or French, as above stated, Latin may be offered, it is urged that candidates present the German and thus come better equipped for the modern language work of freshman year. Students who present two years of German may take French B, freshman year.

### ADVANCED STANDING.

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 college may entitle them.

## COURSES OF STUDY.

### FRESHMAN YEAR.

#### FALL TERM.

*The same for all courses:* Algebra, 5; German, 5, or French, 5; General Chemistry, 4; Freehand Drawing, 5; Military Drill, 2.

#### WINTER TERM.

*The same for all courses:* Trigonometry, 5; German or French, 5; Qualitative Analysis, 4; Constructive Geometry, 4; Carpentry, 3; Military Drill, 2.

#### SPRING TERM.

*For the Civil Engineering Course:* Descriptive Geometry, 4; German or French, 4; Surveying, 5; Platting, 1; Elementary Mechanics, 4; Military Drill, 2.

*For the Electrical and Mechanical Engineering Courses:* Descriptive Geometry, 4; German or French, 4; Qualitative Analysis, 4; Elementary Mechanics, 4; Carpentry, 3; Military Drill, 2.

*For the courses in Mining, Chemistry and Metallurgy:* Descriptive Geometry, 4; German or French, 4; Qualitative Analysis, 5; Elementary Mechanics, 4; Mine Surveying, 4; Military Drill, 2.

Students who present two years of German for admission may take French during freshman year, otherwise German shall be the study pursued.

\*The work in each of these subjects is supposed to cover two years in the high school.

†Two years' work in English literature will be accepted in lieu of this requirement. For statement of ground covered in the course in English literature see statement of requirements for admission to the scientific course, college of science, literature and the arts.



## SOPHOMORE YEAR.

## FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.]	ELECTRICAL ENGINEERING.
[Analytical Geometry, 5.	Analytical Geometry, 5.	Analytical Geometry, 5.
Topography, 4.	Carpentry and Foundry, 5.	Carpentry and Foundry, 5.
Platting, 2.		
Descriptive Geometry, 4.	Descriptive Geometry, 4.	Descriptive Geometry, 4.
Physics, 4.	Physics, 4.	Physics, 4.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.

## SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Differential Calculus, 5.	Differential Calculus, 5.	Differential Calculus, 5.
Highways, 2.		
Topographic Drawing, 2.	Working Drawings, 4.	Working Drawings, 4.
Physics, 4.	Physics, 4.	Physics, 4.
Engineering Instruments, 3.	Pattern Work, 4.	Pattern Work, 4.
Stereotomy, 2.	Machine Work, 4.	Machine Work, 4.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.

## THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Integral Calculus, 5.	Integral Calculus, 5.	Integral Calculus, 5.
Higher Surveying, 4.		
Field Work, 4.	Forge Work, 5.	Forge Work, 5.
Practical Astronomy, 2.	Machine Drawing, 5.	Machine Drawing, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.

SOPHOMORE YEAR.

FIRST TERM.

MINING.	METALLURGY.	CHEMISTRY.
Analytical Geometry, 5.	Analytical Geometry, 5.	Analytical Geometry, 5.
Descriptive Geometry, 2.	Descriptive Geometry, 2.	Descriptive Geometry, 4.
Physics, 4.	Physics, 4.	Physics, 4.
Quantitative Chemistry, 4.	Quantitative Chemistry, 4.	Quantitative Chemistry, 4.
Mineralogy, 4.	Mineralogy, 4.	Mineralogy, 4.
Mining, 1.	Mining, 1.	
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.

SECOND TERM.

MINING.	METALLURGY.	CHEMISTRY.
Differential Calculus, 5.	Differential Calculus, 5.	Botany, 4.
Working Drawings, 3.	Working Drawings, 3.	
Physics, 4.	Physics, 4.	Physics, 4.
Mineralogy, 4.	Mineralogy, 4.	Mineralogy, 4.
Mining, 1.	Mining, 1.	
Quantitative Chemistry, 4.	Quantitative Chemistry, 4.	Quantitative Chemistry, 4.
Rhetorical Work, 1.	Rhetorical Work, 1.	Rhetorical Work, 1.
Military Drill, 2.	Military Drill, 2.	Military Drill, 2.

THIRD TERM.

MINING.	METALLURGY.	CHEMISTRY.
Integral Calculus, 5.	Integral Calculus, 5.	Organic Chemistry, 4.
Field Work—4 weeks.	Field Work—4 weeks.	
Quantitative Analysis, 4.	Quantitative Analysis, 4.	Quantitative Analysis, 4.
Machine Drawing, 3.	Machine Drawing, 3.	Botany, 4.
Physics, 4.	Physics, 4.	Physics, 4.
Assaying, 3.	Assaying, 3.	Assaying, 3.
Assay Laboratory, 4.	Assay Laboratory, 4.	Assay Laboratory, 4.
Mining, 1.	Mining 1.	
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.
Curves and Earthwork, 3.	Kinematics and Graphics, 5.	Kinematics and Graphics, 5.
Field Work, 4.	Machine Construction, 5.	Machine Construction, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Law, 1.	Law, 1.	Law, 1.
Mineralogy, 4.	Technical Reading, 1.	Technical Reading, 1.

## SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Graphics, 3.	Machine Construction, 5.	Machine Construction, 5.
Materials of Engineering, 3.	Materials of Engineering, 3.	Materials of Engineering, 3.
Railway Structures, 2.	Physics, 5.	Physics, 5.
Mineralogy, 4.	Industrial Electricity, 3.	Industrial Electricity, 3.
Bridge Stresses, 3.		

## THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Structural Details, 3.	Electrical Laboratory, 3.	Electrical Laboratory, 5.
Railroad Work, 4.	Machine Design, 4.	Machine Design, 4.
or		
Municipal Engineering, 4.		
General Astronomy, 4.		
Bridge Stresses, 4.	Tool Construction, 4.	Electrical Design, 3.
	Electrical Generators, Theory, 2.	Electrical Generators, Theory, 2.
	Electrical Generators, Practice, 2.	Electrical Generators, Practice, 2.
		Technical Essay.

JUNIOR YEAR.

FIRST TERM.

MINING.	METALLURGY.	CHEMISTRY.
Mechanics, 5.	Mechanics, 5.	Organic Chemistry, 4.
Geology, 4.	Geology, 4.	Geology, 4.
Chemistry, Special Problems, 4.	Chemistry, Special Problems, 4.	Physics, 4.
Mine Surveying, 2.	Mine Surveying, 2.	Water Analysis, 4.
Ore Dressing, 2.	Ore Dressing, 2.	
Mining, 3.	Mining, 3.	
Metallurgy, 3.	Metallurgy, 3.	Metallurgy, 3.
Law, 1.	Law, 1.	Law, 1.
Technical Essay.	Technical Essay.	Technical Essay.

SECOND TERM.

MINING.	METALLURGY.	CHEMISTRY.
Mechanics, 5.	Mechanics, 5.	
Materials of Engineering, 2.	Materials of Engineering, 2.	Physics, 3.
Geology, 4.	Geology, 4.	Geology, 4.
Mining, 3.	Mining, 3.	Theoretical Chemistry, 4.
Petrology, 2.	Chemistry, 4.	Analysis of Iron and Steel, 4.
Ore Dressing, 2.	Ore Dressing, 2.	Gas Analysis, 2.
		Wine and Beer Analysis, 2.
Metallurgy, 3.	Metallurgy, 3.	Metallurgy, 3.
Technical Essay.	Technical Essay.	Technical Essay.

THIRD TERM.

MINING.	METALLURGY.	CHEMISTRY.
Mechanics, 5.	Mechanics, 5.	Micro-Chemistry, 4.
Mine Surveying, 2.	Mine Surveying, 2.	History of Chemistry, 4.
Machine Design, 4.	Machine Design, 4.	
Mining, 3.	Mining, 3.	Industrial Chemistry, 4.
Metallurgy, 3.	Chemistry, 4.	Colloquium, 2.
Math. Crystallography, 2.	Metallurgy, 3.	Metallurgy, 4.
Applied Geology, 4.	Applied Geology, 4.	Applied Geology, 4.
Field Work—4 weeks.	Field Work—4 weeks.	Math. Crystallography, 3.
Technical Essay.	Technical Essay.	Technical Essay.

## SENIOR YEAR.

## FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Masonry, 4.	Thermodynamics, 5.	Thermodynamics, 5.
Hydraulics, 4.	Valve Gear, 3.	Electrical Laboratory, 3.
Oblique Arches, 4.	Working Designs, 5.	Alternating Currents, Theory, 2.
Details of Iron Construction, 4.	Mechanical Laboratory, 3.	Alternating Currents, Practice, 2.
		Electrical Transmission, 4.
Elective, 4.	Elective, 4.	Elective, 4.
Law, 1.	Law, 1.	Law, 1.
Technical Reading, 1.	Technical Essay.	

## SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
{ Bridge Design, 5.	Prime Movers, 3.	Prime Movers, 3.
Railway Economics, 3.	Thermodynamics, 2.	Mechanical Laboratory, 5.
Iron Buildings, 2.	Mechanical Laboratory, 5.	Electrical Laboratory, 3.
Sanitary Engineering, 3.	Electrical Laboratory, 4.	Electric Lights, 2.
Least Squares, 2.	Problems in Design, 2.	Telegraph and Telephone, 2.
	Electric Lights, 2.	or
Technical Reading, 1.		Electric Railways, 2.
		Differential Equations, 2.
		or
Elective, 4.	Elective, 4.	Electrical Design, 2.
Thesis.	Thesis.	Elective, 4.

## THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
	Designs and Specifications.	Designs and Specifications.
Swing Bridges, 4.	Mechanical Laboratory, 2.	Steam Generators, 2.
	Thermodynamics, 2.	Differential Equations, 2.
Geodesy, 4.	Steam Generators, 2.	or
Field Work, 4.		Central Stations, 2.
Suspension and Arch Bridges, 3.		
Thesis, 5.	Elective, 4.	Elective, 4.
	Thesis, 5.	Thesis, 5.

SENIOR YEAR.

FIRST TERM.

MINING.	METALLURGY.	CHEMISTRY.
Thermodynamics, 5.	Thermodynamics, 5.	Chemistry of the Carbohydrates, 4.
Electric Power, 5.	Electric Power, 5.	Electric Power, 5.
Mining, 4.	Mining, 3.	Metallurgy, 3.
Metallurgy, 3.	Metallurgy, 3.	Colloquium, 2.
Ore Testing, 3.	Ore Testing, 3.	Economic Geology, 4.
Laboratory, 4.	Laboratory, 4.	
Elective, 4.	Elective, 4.	Elective, 4.
Law, 1.	Law, 1.	Law, 1.

SECOND TERM.

MINING.	METALLURGY.	CHEMISTRY.
Mining, 3.	Mining, 3.	Electro-Chemistry, 4.
Metallurgy, 4.	Metallurgy, 4.	Metallurgy, 4.
Prime Movers, 3.	Prime Movers, 3.	Mineral Analysis, 4.
Ore Testing, 2.	Ore Testing, 2.	Inorganic Preparations, 4.
Economic Geology, 4.	Electro Chemistry, 4.	Special Problems, 4.
Laboratory, 4.	Laboratory, 4.	
Elective, 4.	Elective, 4.	Elective, 4.
Thesis.	Thesis.	Thesis.

THIRD TERM.

MINING.	METALLURGY.	CHEMISTRY.
Designs and Specifications, 3.	Designs and Specifications, 3.	Food Adulteration, 4.
Mining, 3.	Mining, 3.	Photographic Chemistry, 2.
		Applied Chemistry, 4.
Geology, 4.	Electro-metallurgy, 4.	Electro-metallurgy, 4.
Metallurgy, 4.	Metallurgy, 3.	Metallurgy, 4.
Mechanical Laboratory, 3.	Mechanical Laboratory, 4.	
Elective, 4.	Elective, 4.	Elective, 4.
Thesis.	Thesis.	Thesis.

## CHOICE OF ELECTIVES.

Candidates for a degree in any one of the courses can, by a judicious use of electives, so arrange their work as to be able to graduate from any other course by additional residence at the University as the requirements of the course selected may demand.

Students in the college of science, literature and the arts, who contemplate taking a degree in this college 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 propose to enter.

The elective of any term may be chosen from the work of either junior or senior year and from any department of this college or of the college of science, literature and the arts, provided the same can be pursued with profit to the student.

## Courses of Instruction.

### A. GENERAL COURSES.

#### 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 under conditions named in the courses of study, the same amount of 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, as the following synopsis of the courses will show.

##### 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.

*Course III.* Technical readings and translations.

#### MATHEMATICS.

The course in mathematics covers six terms in freshman and sophomore years. One term each in the following subjects: higher algebra, trigonometry, descriptive geometry, analytical geometry, differential calculus and integral calculus. In the spring term of sophomore year a course is given in the application of calculus to practical problems in physics and mechanics. These exercises constitute a part of the work in integral calculus, and are required of all regular students in the college.

In imparting a knowledge of the mathematical subjects just mentioned, special emphasis is placed upon their practical applications. This gives the student a firm grasp of the more important parts of these subjects and an intelligent appreciation of their real value, as well as some little practice in their use before reaching those technical studies where mathematics furnishes the only sure basis for professional knowledge.



## RHETORICAL WORK.

- (a) An outline of rhetoric; study of the sentence; elements of style; choice and use of words; exercises in composition. *Sophomore i.*
- (b) 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. *Sophomore ii.*
- (c) Sight composition: exercises in describing engineering instruments, machines, materials and structures. *Sophomore iii.*

The work throughout the year to be illustrated by models drawn from scientific, technical and other literature.

## DRAWING AND INDUSTRIAL ART.

## (a) ENGINEERING DRAWING.

- Course I. Freehand*—Lettering, geometric forms and engineering details in outline, including the elements of perspective. *Freshman i. 110 hours.*
- Course II. Constructive geometry*—Of lines, points, circles, conics, roulettes, spirals and miscellaneous curves and simple projections. *Freshman ii, 88 hours.*
- Course III. Descriptive geometry*—Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments. Recitations and lectures. *Freshman iii, 44 hours.*
- Course IV. Descriptive geometry*—Orthographic, isometric, horizontal, oblique, and perspective projections; shades and shadows. Open to students who have completed course iii. *Sophomore i, 88 hours.*
- Course V. Working drawings*—Conventional methods, engineering details, freehand working drawings, standard sizes and shapes. *Sophomore ii, 88 hours.*
- Course VI. Machine drawing*—Assembly drawings, mechanical movements, tracing and blue prints. *Sophomore iii, 110 hours.*
- Course VII. Topographic drawing*—Pen and brush conventions; topographic maps and platting of notes. *Sophomore C. E. i., 22 hours.*

## (b) ELEMENTARY ART.

- Course VIII. Freehand*—From models and casts in crayon: outline light and shade. *i. 110 hours.*
- Course IX. Crayon*—Drawing from the cast. Open to students who have completed course viii. *i or ii, 88 hours.*
- Course X. Charcoal*—From the antique. Open to students who have completed course ix. *iii, i, ii, iii, 352 hours.*
- Course XI. Sepia—neutral tint and water color.* From casts and natural objects. Open to students in course x. *iii, iii 176 hours.*
- Course XII. Sketching*—Line work, from nature. Open to students in course x. *i, 88 hours.*
- Course XIII. Pen and Ink*—Exercises in line work and drawing for illustrative work. Open to students who have completed course xii. *ii, iii, 176 hours.*
- Course XIV. Perspective*—Lectures on the principles and methods of perspective, with applications. Open to students in course x. *i, 11 hours.*
- Course XV. Instrumental*—Problems, projections, sections, developments and interpenetrations. *ii, 88 hours.*

## (c) APPLIED DESIGN.

- Course XVI. Ornamental design*—The anatomy of pattern, the planning and application of ornament, principles and practice. Open to students in course x. *i, ii, iii, 264 hours.*
- Course XVII. Chromatics*—The production of color, theory of color, mixture, complementaries, contrasts and combinations. Lectures and applications. Open to students in course xvi. *ii, 88 hours.*
- Course XVIII. Analysis of ornament*—Study of the characteristics of style. Outlines of historic ornament. Lectures, recitations and collateral reading. *i, ii, iii, 132 hours.*
- Course XIX. Practical designing*—Original designs and accompanying working drawings for flat ornament; wood, stone and metal work. *i, ii, iii.*

## GEOLOGY AND MINERALOGY.

## MINERALOGY.

- Course II. General Mineralogy.* Elements of crystallography and the physical characters of minerals, with a study of the rock-forming species; blowpipe analysis; lectures and laboratory. *Junior i.*
- Course III. General Mineralogy, continued.* Ores and economic minerals; a study of the Zeolites; determination of species; lectures and laboratory, with some quantitative blowpipe analysis. *Junior ii.*
- Course IV. Quantitative Mineralogy.* Assaying gold and silver ores; lectures and laboratory. *Junior iii.* Pursued in the school of mining and metallurgy.
- Course VI. Mathematical Crystallography.* Two hours a week. *Junior iii.*

## GEOLOGY.

- Course I. Elements of Geology.* Physiographic, structural and dynamic. This course comprehends a study of land forms, with the agencies producing them, and an examination of the agencies and processes by which geological formations have been developed. Text book and lectures. *Senior i.*
- Course II. Stratigraphical and historical Geology*—The special effort of this course is to outline the geological history of the North American continent. Lectures and text book. Twice a week. *Senior iii.*
- Course IV. Introduction to Petrology.* General considerations on the origin and occurrence of rocks. Preliminary studies in the crystalline rocks, with reference to their mineral and chemical constitution. Lectures and laboratory. Twice a week. *Senior ii.* Open to those who have had course i, geology, and course i, mineralogy.
- Course VI. Petrological studies.* Investigations in the crystalline rocks. The course begins with a study of igneous rocks, and extends into an examination of the leading crystalline rocks of Minnesota. Occasional expeditions can be arranged for field work. *Senior iii.* A continuation of course iii.
- Course VII. Applied Geology.* An outline of the economic relations of geology. The course comprises a discussion of ore deposits, and of non-metallic materials of economic value. Text book, lectures and reading. *Senior iii.* Open to those who have completed course i.
- Course IX. Special problems.* The investigation by individual students of particular problems involving field work, laboratory investigation and reading. *Senior iii.* Required of students in mining engineering.
- Course X. An outline of general Geology.* This course treats of the leading facts and principles of the science, with some practical applications. Lectures. *Senior i.* Once a week.

## MECHANICS.

## (a) APPLIED MECHANICS.

*Course I. Statics and dynamics.* A study of the laws of equilibrium, motion, work and energy as applied to particles and rigid bodies. Recitations and lectures. *Junior i*, 55 hours. Open to students who have completed the first five courses in mathematics.

*Course II. Mechanics of materials.* 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. *Junior ii*, 55 hours. Open to students who have completed course i.

*Course III. Hydromechanics.* A study of the laws of equilibrium and flow of fluids. *Junior iii*, 55 hours. Open to students who have completed course i.

## (b) THEORETICAL MECHANICS AND MATHEMATICAL PHYSICS.

## FOR UNDERGRADUATES.

*Course I. Theory of dynamos and motors.* Twice a week during *Junior iii*, 22 hours. Open to those who have completed course i in applied mechanics.

*Course II. Differential equations* and their application to alternating currents. Twice a week. *Senior i, ii, iii*, 68 hours. Open to those who have completed course i on dynamos and motors.

## FOR GRADUATES AND UNDERGRADUATES

who have completed calculus.

*Course III. The potential function and spherical harmonics.*

*Course IV. Analytical statics and electrostatics.*

*Course V. Dynamics of rigid bodies.*

*Course VI. Circular, hyperbolic and elliptic functions* with their physical applications.

## FOR GRADUATES

who have had advanced work in mathematics.

*Course VII. Directional calculus, vector analysis and determinants.*

*Course VIII. Analytical theory of the conduction of heat.*

*Course IX. Theories of elasticity and sound.*

*Course X. Wave theories of light, heat and electricity.*

*Course XI. Kinetic theory of gases.*

*Course XII. Hydrodynamics and fluid motions.*

*Course XIII. Theory of functions* with applications.

## PHYSICS.

*Course I. Mechanics.* Dynamics of solids with laboratory practice. *Freshman iii*. Before entering upon this course, the mathematics of the freshman year must be completed.

*Course II. Mechanics.* Hydrostatics; sound, with laboratory practice. *Sophomore i*.

*Course III. Heat and light;* with laboratory practice. *Sophomore ii*.

*Course IV. Static electricity;* text-book, with experimental lectures. *Sophomore iii*.

*Course V. Magnetism,* with laboratory practice. *Junior i*.

*Course VI. Voltaic electricity* and the theory of electrical measurements, with laboratory practice. *Junior ii*.

## FOR GRADUATES.

(a) *Special problems* in electricity and heat.

(b) *Investigations* in mechanics and optics.

## B. PROFESSIONAL COURSES.

1. *Civil Engineering.*
2. *Mechanical Engineering.*
3. *Electrical Engineering.*
4. 5. *Mining and Metallurgy.*
6. *Chemistry.*

## CIVIL ENGINEERING.

## MUNICIPAL AND SANITARY ENGINEERING.

*Course I. Hydrographic survey.* 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. *Sophomore iii*, 20 hours.

*Course II. Hydraulics.* 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 formulas; flow of water in open channels; and reservoir embankments. *Senior i*, 48 hours.

*Course III. Sanitary Engineering.* Sewerage systems, separate and combined; sewage disposal; house drainage and ventilation. *Senior iii*, 36 hours.

*Course IV. Technical reading.* Reading, directed on lines relating to course ii. *Senior i*.

*Course V. Municipal engineering.* Problems relating to city streets, pavements, subways, etc. *Junior iii*, 44 hours.

## RAILWAY AND HIGHWAY ENGINEERING.

*Course VI. (a). Curves and earthwork.* 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. *Junior i*, 36 hours.

(b) *Execution in the field of practical problems*, illustrating the analytical work of (a), including computation of earthwork of railroad grades and pits, platting profiles and construction of maps. 96 hours.

*Course VII. Railway structures.* 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. Design of a Howe truss bridge. Field and office. Details obtained from actual structures as far as possible. *Junior ii*, 48 hours.

*Course VIII. Railway location and estimates.* 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 structures 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. *Junior iii*, 96 hours.

*Course IX. Railway economics.* Discussions on the economic location of railways. Text, Wellington. *Senior ii*, 36 hours.

*Course X. Highway construction and maintenance.* 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. *Sophomore ii*, 36 hours.

### STRUCTURAL ENGINEERING.

*Course XI. Stereotomy.* Working drawings by which to cut the stones for masonry wing walls, domes and arches, including groined and cloistered arches, and the intersection of two or more galleries. Lectures and drawing. *Sophomore ii*, 48 hours.

*Course XII. Graphic Statics.* The graphical determination of stresses in framed structures, continuous girders, masonry and steel arches. Lectures and drawing. *Junior ii*, 36 hours.

*Course XIII. Bridge stresses.* Analysis of the stresses in framed structures, including roofs, highway and railway bridges, continuous girders, braced towers, portal and sway bracing, and stand pipes. Study of the deflection of framed structures under different systems of loading. Lectures and recitations. *Junior ii*, 36 hours; *Junior iii*, 48 hours. Open to students who have completed course i in applied mechanics.

*Course XIV. Structural details.* Study of the methods of proportioning individual members of framed structures, and the designing of joints and splices in steel and wooden structures. Text book work, lectures and drawing. *Junior iii*, 36. Open to students who have completed course xii, and the first part of course xiii in bridge stresses.

*Course XV. Details of steel construction.* Study of plate girder construction, with complete design of a plate girder railway bridge. Making of detail shop drawings for a roof or bridge. Lectures and drawing. *Senior i*, 96 hours. Open to students who have completed courses xii, xiii and xiv.

*Course XVI. Bridge design.* A complete design of a highway or railway bridge, including computations, detail drawings, specifications and estimates. Lectures, computations and drawings. *Senior ii*, 120 hours. Open to students who have completed courses xii, xiii and xiv.

*Course XVII. Steel buildings.* Study of the design of steel mill building construction. Study of the construction of steel skeleton office buildings, including foundations, wind bracing, lighting, economical arrangement of interior for office or other purposes, and details of construction. Lectures, recitations and drawings. *Senior ii*, 48 hours. Open to students who have completed courses xii, xiii and xiv.

*Course XVIII. Swing bridges.* 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. *Senior iii*, 96 hours. Open to students who have completed courses xii, to xvi (inclusive).

*Course XIX. Suspension and arch bridges.* Theory of the suspension bridge and of solid braced elastic arches, with application to practical problems. Lectures, recitations and drawing. *Senior iii*, 72 hours. Open to students who have completed courses xii to xvi (inclusive).

*Course XX. Masonry construction.* Study of the properties of stones, bricks, cement and concrete, and of their use in engineering structures. Study of foundation construction for tall buildings and bridge piers: analysis and computation of a high masonry dam, chimneys, and retaining walls; laboratory tests of the strength and physical properties of brick, stone and cements. Lectures, recitations and laboratory. *Senior i*, 48 hours equivalent class room work. Laboratory hours to be arranged to meet the needs of the class. Open to students who have completed the courses in applied mechanics.

*Course XXI. Oblique arches.* Theory of the oblique arch; method of cutting stones; a complete design of an oblique arch. Lectures, recitations and drawing. *Senior i, 96 hours.* Open to students who have completed courses xi, xii and xiii.

### TOPOGRAPHICAL ENGINEERING.

*Course XXII. (a). Surveying.* First half devoted to recitations, lectures, constructive exercises and problems; last half to executing actual surveys in the field for illustration of methods and the use of instruments. Observation on Polaris at culmination for meridian is made. Each student plats and computes the area of all work executed by his party. Text, Carhart. *Freshman iii, 60 hours.*

(b) *Draughting.* Construction of diagonal scales, straight and circular verniers. Platting exercises illustrating class-room work; 24 hours.

*Course XXIII. (a) Topography.* 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. *Sophomore i, 96 hours.*

(b) *Draughting.* Notes taken in course ii (a) are reduced, areas computed and topographical maps made of lands surveyed; 24 hours.

*Course XXIV. Analytical study of engineering instruments,* continued, including stadia-gradientor. Reduction charts are made and stadia work of course ii reduced and platted, cross-wires are replaced in transits. *Sophomore ii, 66 hours.*

*Course XXV. Higher surveying.* 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." *Sophomore iii, 48 hours.*

*Course XXVI. Field work and platting.* 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. *Sophomore iii, 88 hours.*

*Course XXVII. (a) Geodesy.* Lectures and text-book; Geodetic reconnaissance; base-line measurement, employing bars and steel tape; measure of angles, horizontal and vertical; field methods for time, latitude, longitude and azimuth; theory of computing geographical positions. Lectures and text. *Senior i, 48 hours.*

(b) *Field and office work.* Making and reducing observations illustrating the work above. 96 hours.

*Course XXVIII. Geodesy.* Precise and trigonometric leveling; adjustment of observations and projection of maps.

### LECTURES ON ENGINEERING.

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. Practicing engineers who are leaders in their profession contribute one or more lectures each, according to the nature of the subject.

## MECHANICAL ENGINEERING.

## SHOP-WORK.

- Course I. Carpentry and joining.* Wood working, use of tools, lathe and bench work. *Freshmen ii*, 66 hours.
- Course II. Carpentry and wood-turning.* Lathe work, plain and ornamental. *Freshmen iii*, 66 hours. Open to those who have completed course i.
- Course III. Foundry practice.* Moulding; casting; mixing metals; brass work, and core making. *Sophomore iii*, 110 hours. Open to all students.
- Course IV. Pattern making.* Patterns for moulding, core boxes, flasks, etc. *Sophomore ii* 88 hours. Open to all who have completed course i.
- Course V. Blacksmithing.* Use of tools; forging; welding; tool dressing; tempering. *Sophomore iii*, 110 hours. Open to all students.
- Course VI. Machine work.* Chipping; filing to gauge; machine work; gear cutting; finishing. *Sophomore ii*, 88 hours. Open to those who have completed course v.
- Course VII. Machine work.* Construction of some machine or instrument. *Junior i* and *ii*, 220 hours. Open to students completing course vi.
- Course VIII.* Tool construction and other special work. *Junior iii*, 88 hours. Open to those completing course vii.

## MACHINE DESIGN.

- Course IX. Kinematics and Graphics.* The transmission of motion and the graphical solution of problems without consideration of the strength of parts. Lectures and recitations. *Junior i*, 84 hours. Open to those who have completed course ii in mathematics.
- Course X. Principles of machine design.* Principles and methods of design of machine members, with problems. Recitations and lectures. *Junior iii*, 44 hours. Open to those who have completed course ii of applied mechanics.
- Course XI. Machine design.* Design and detail drawings of machine parts. *Senior i*, 110 hours. Open to those who have completed course ii.
- Course XII. Designs.* Text; lectures and problems in the design of proportions and details of steam engines and other motors. *Senior ii*, 22 hours. Open to those who have completed course ii.
- Course XIII. Constructive design.* Design of a complete structure, as an engine boiler or special machine, with specifications. *Senior iii*, 110 hours.

## STEAM ENGINEERING AND PRIME MOVERS.

- Course XIV. Thermodynamics.* The mechanical theory of heat as applied to the steam engine and other motors. *Senior i*, 55 hours. Open to those who have completed courses i and iii in applied mechanics.
- Course XV. Thermodynamics.* The principles of course i, applied to the steam engine, including cylinder condensation, exhaust waste, etc. *Senior ii*, 22 hours. Open to those who have completed course xiv.
- Course XVI. Prime movers.* Theory of turbines, pumps, water motors, wind mills, etc. *Senior ii*, 33 hours. Open to those who have completed courses i and iii, in applied mechanics.
- Course XVII. Thermodynamics.* Theory of gas engines; air compressors, injectors, ice machines, etc. *Senior iii*, 22 hours. This follows course xv.
- Course XVIII. Steam generators.* Applications of theory and practice in the design of steam generators, chimneys, boiler settings and accessories, smoke burners, special furnaces, etc. *Senior iii*, 22 hours. Open to those who have completed courses xiv to xvii.

*Course XIX. Valve Gear.* Application of graphical methods to the design of valve gear and link motions. *Senior i*, 55 hours. Open to students who have completed course xiv.

#### ENGINEERING LABORATORY.

*Course XX. Materials of Engineering.* (a) Lectures and recitations on the production and properties. *Junior i*, 11 hours.

(b) *Strength of materials.* Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. *Junior ii*, 44 hours. Open to students in course ii of applied mechanics.

*Course XXI. Mechanical laboratory.* (a) Calibration of dynamometers, steam gauges, weirs, meters and other apparatus. Testing lubricating value of oils; calorimetry; tests of water motors; pumps; injectors; boilers and indicator practice. *Senior i*, 66 hours; *senior ii*, 110 hours. Open to students who are taking or have completed course i.

*Course XXII. Mechanical laboratory.* (b) Tests of gas and steam engines and special research work. *Senior iii*, 44 hours. Open to students who have completed course xxi.

*Course XXIII. Mechanical laboratory.* (c) Special modifications of course xxi and xxii for students in mining and metallurgy. *Senior iii*, 66 hours.

#### LOCOMOTIVE ENGINEERING.

*Course XXIV. Lectures.* (a) Past and future development of the locomotive.

(b) Materials of construction. Motive power specifications and standards.

(c) Locomotive and train resistance. The track from motive power point of view.

(d) The locomotive boiler; types, proportions, shop work, water, fuels, testing. Accessories.

(e) The locomotive engine; details, piston speed, steam distribution, heat insulation, lubrication.

(f) The locomotive as a carriage; frames, spring rigging, running gear, brakes, cab.

(g) The tender; tank and attachments, wood and iron frames, built-up and solid trucks.

(h) Locomotive management; train loads, coal premiums, crew systems, expert instructions. Wear limits and repairs.

(i) Compound locomotives; systems and types, conditions for economy, repairs.

(k) European locomotive engineering.

(l) The domain and outlook for electric traction.

(m) Drawing room practice. The shops; their arrangement, tools, power, labor paying, reduced costs.

(n) The railway test room and test department.

(o) The railway mechanical engineer and superintendent of motive power.

The above courses *c, d, e, f, g, n*, are open to those who have completed course x, or who can otherwise show sufficient preparation. For the others it is very desirable that the preparation should be the same.

*Course XXV. An abridgement of course xxiv.* 22 hours per term, one evening per week.

It is particularly desirable that this course be continued throughout the year by the student electing it. This does not require the preparation of course xxiv.

*Course XXVI. Drawing room.* Open to those who have completed course x.

Designing of locomotive parts by the best modern practical and theoretical methods. Link and valve motions. The indicator diagram in designing.

Calculation and designing of drivers, cylinder, steam pressure, boiler and grate for a given power and service; for simple and compound locomotives.

*Course XXVII. Railway testing of appliances and supplies.* Locomotive testing in road service.

*Course XXVIII. Literary and seminar work.* Railway technical journals, readings and discussions. Professional card indexes. Technical essays. Graduation thesis.



Course XXIX. *Car design.* Lectures and drawing room. Open to those who have completed course x.

FOR GRADUATES.

*Machine design.*

*Experimental investigations.*

*Locomotive engineering and car design.*

### ELECTRICAL ENGINEERING.

Course I. *Industrial Electricity.* Outline of industrial uses of electricity; applications of Ohm's law; methods and calculation of wiring. 32 lectures with problems for *junior ii*, electrical engineering and mechanical engineering. Preparation required: physics, courses iv and v.

Course II (a). *Electrical Generators, theory.* Theory of electro-magnet and continuous current dynamo; methods of regulation. 22 lectures and recitations for *junior iii*, electrical engineering and mechanical engineering; *senior iii*. Preparation required: electrical engineering, course i; physics, courses v and vi; differential and integral calculus.

Course II (b). *Electrical Generators, practice.* Use and abuse of primary and secondary batteries; construction and operation of dynamos; methods of testing. 22 lectures for *junior iii*, electrical engineering and mechanical engineering. Preparation required: as for course ii (a).

Course III. *Electric power.* Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. 33 lectures and 44 hours laboratory. *Senior i*, mining, metallurgy and chemistry.

Course IV. *Electrical 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; draughting, 60 hours. Preparation required: physics, courses v and vi, electrical engineering, courses i and ii; machine design, course i, and practical mechanics, courses i-vi.

Course VI (a). *Alternating currents, practice.* Phenomena, measurement and use of alternating currents; elementary theory of transformer and alternator; methods of regulation; various types of commercial apparatus. 22 lectures with problems for *senior i*, electrical engineering. Preparation required: physics, courses v and vi; electrical engineering, courses i, ii and iii; differential and integral calculus.

Course VI (b). *Alternating currents, theory.* Analytical and geometrical treatment of flow of variable or alternating currents in different kinds of circuits, based on Jackson's "Alternating Currents." 22 lectures and recitations for *senior i*, electrical engineering. Preparation required: as for course vi (a).

Course VII (c). *Electrical laboratory.* Measurements of self and mutual induction; capacity and impedance; calibration of A. C. measuring instruments; curves from alternators and transformers; regulation and efficiency tests of alterators, transformers and A. C. motors; magnetic tests of iron; *senior i*, electrical engineering. Laboratory, 66 hours. Preparation required: electrical engineering, courses i, ii, iv and vi.

Course VIII. *Electrical transmission.* Utilization of natural forces; various methods of transmission; theory of electric motor; electrical transmission between two machines; distribution with constant current, constant potential and alternating systems; study of

particular plants; application to railway, mining and miscellaneous purposes. 44 lectures and recitations for *senior ii*, electrical engineering. Preparation required: electrical engineering, courses i, ii and v.

*Course IX. 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. 22 lectures for *senior ii*, electrical engineering and mechanical engineering. Preparation required: electrical engineering, courses i and ii.

*Course X. 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 ix.

*Course XI. Electrical design (b).* Design of a transformer, dynamo or other problem as assigned. 44 hours in draughting room, elective for *senior ii*, electrical engineering. Preparation required: electrical engineering, courses ii and vi.

*Course XII. 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. 22 lectures with problems, elective for *senior ii*, electrical engineering. Preparation required: electrical engineering, courses i, iv, vi and vii.

*Course XIII. Electric railway.* 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. 22 lectures for *senior iii*, electrical engineering. Preparation required: electrical engineering, courses ii, iv and viii; mechanical engineering, courses in thermodynamics and prime movers.

*Course XIV. Electrical design (c).* Designs, specifications and estimates for an electric light or power plant, or other approved problem. *Senior iii*, electrical engineering, draughting, 100 hours. Preparation required: electrical engineering, courses v and ix.

*Course XV. 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. 20 lectures, elective for *senior iii*, electrical engineering. Preparation required, electrical engineering, courses ii, viii and ix; mechanical engineering, courses in thermodynamics and prime movers.

*Course XVI. Journal reading.* Discussion of current electrical periodicals. Two hours per week throughout the year. Open to seniors and juniors.

*Course XVII. Plant operation.* Practice in operation and care of boiler, engine, dynamo and circuits of the University lighting plant. Open to a limited number of seniors. Each student spends one evening a week during one or more terms.

#### FOR GRADUATES.

1. *Alternating currents*, as treated by Fleming.
2. *Alternating current investigations.*
3. *Arc and incandescent investigations.*
4. *Problems in design and operation of generators and motors.*
5. *Design and testing of plants.*
6. *Experimental problems in electric railway work.*

## SCHOOL OF MINING AND METALLURGY.

## MINING ENGINEERING.

- Course I. Explosives, blasting, drilling machines, air compressors.* *Sophomore i, ii, iii* 1 hour.
- 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. Surface excavation, quarrying, hydraulic mining.* Open to those who have completed course i. *Junior i*, 3 hours.
- Course IV. Shaft sinking, drifting, tunnelling.* Open to those who have completed course i. *Junior ii*, 3 hours.
- Course V. Mode of occurrence of ore bodies, prospecting, methods of mining.* Open to those who have completed courses i, iv. *Junior iii*, 3 hours.
- Course VI. Field work.* Practice in mine surveying and field geology, study in mines. Open to those who have completed courses ii, v, x. Last four weeks of *junior iii*.
- Course VII. Mine ventilation, mine timbering, underground transportation, mining machinery, mine accounts, accidents in mines.* Open to those who have completed courses i, iv and v. *Senior i, ii, iii*, 3 hours.
- Course VIII. Ore dressing.* Mechanical preparation of ore for market, for metallurgical treatment etc. *Junior i, ii*, 3 hours.
- Course IX. Designs and specifications.* Design of mine cars, skips, head frames etc. Open to those who have completed course vii. *Senior i and ii. Senior iii.* 3 periods.

## MINE SURVEYING.

- Course X. Plane surveying.* Computation, platting. With special reference to mine surveying. *Freshman iii.* 4 periods.
- Course XI. Mine mapping.* Plans, sections etc. Open to those who have completed course viii. *Junior i.* 2 periods.
- Course XII. Mine surveying.* Computations, methods. Open to those who have completed courses viii, ix. *Junior iii*, 2 hours.

## METALLURGY.

- Course XIII. Assaying.* Determination of value of the ores. Lectures, recitations and laboratory work. *Sophomore iii.* Open to those who have completed courses i, ii, iii, chemistry, and courses i, ii, mineralogy.
- Course XIV. Field assaying.* Assaying of special ores. Conferences and laboratory work. *Junior ii.*
- Course XV. Ore testing.* Determination of method of ore treatment. Lectures and practical work. *Senior iii.* Open to those who have completed course xiii.
- Course XVI. Mill work.* Practical experience in handling ore-dressing machinery. *Junior iii.* Open to those completing course xiv.
- Course XVII. General Metallurgy.* Including the subjects of combustion, fuels, refractory materials and furnaces. *Junior i.* Open to those who have completed course xiii.
- Course XVIII. Metallurgy of iron.* Lectures and recitations. *Junior ii.* Open to those who have completed course xvii.
- Course XIX. Metallurgy of wrought iron and steel.* Lectures and recitations. *Junior iii.* Open to those who have completed course xvii.

- Course XX. Metallurgy of the precious metals.* Gold, silver and platinum. Lectures and recitations. *Senior i.* Open to those who have completed course xvii.
- Course XXI. Metallurgy of the base metals.* Associated with precious metals, including lead, copper, etc. Lectures and recitations. *Senior ii.* Open to those who have completed course xix.
- Course XXII. Metallurgy of other base metals.* Comprising aluminum, zinc, tin, mercury. Lectures and recitations. *Senior iii.* Open to those who have completed course xx.
- Course XXIII. Electro-metallurgy.* Lectures and recitations. *Senior iii.* Open to those who have completed course xx.
- Course XXIV. Field work Metallurgy.* Conferences and reports. Last four weeks of *junior iii.* Open to those who have completed course xviii.

## CHEMISTRY.

- Course I. The metallic elements.* Lectures and laboratory work. The course includes a study of the more common metals, their compounds and characteristic reactions. *Freshman i,* 96 hours.
- Course II. Qualitative analysis.* Lectures and laboratory work. The course includes the qualitative separation and the characteristic tests for the more common metals. *Freshman ii,* 96 hours. Open to those who have completed course i.
- Course III. Qualitative analysis.* Lectures and laboratory work. The course includes a study of the acids, their detection and separation. *Freshman iii,* 96 hours. Open to those who have completed course ii.
- Course IV. Quantitative analysis.* Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis. *Sophomore i,* 96 hours. Open to those who have completed course iii.
- Course V. Quantitative analysis.* Lectures and laboratory work. A continuation of course iv. *Sophomore ii,* 96 hours.
- Course VI. Volumetric analysis.* Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. *Sophomore iii,* 96 hours. Open to those who have completed course v.
- Course VII. Theoretical chemistry.* Lectures and reading. The course includes a discussion of Lothar Meyer's *Modernen Theorien der Chemie*, Ostwald's *Grundriss der Allgemeinen Chemie* and Remsen's *Theoretical Chemistry*. *Junior i,* 48 hours. Open to those who have completed course iii.
- Course VIII. History of chemistry.* Lectures and reading. The course includes a full historical discussion of alchemy and chemistry. *Junior ii,* 48 hours. Open to those who have completed course iii.
- Course IX. Organic chemistry.* 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." *Junior iii,* 96 hours. Open to those who have completed course v.
- Course X. Organic chemistry.* 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," *Junior i,* 96 hours. Open to those who have completed course ix.
- Course XI. Water analysis.* Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of waters. *Junior i,* 48 hours. Open to those who have completed course vi.

- Course XII. Gas analysis.* Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency in combustible gases. *Junior ii*, 48 hours. Open to those who have completed course xi.
- Course XIII. The chemistry of sugar.* Lectures and laboratory work. The course includes a discussion of the carbo-hydrate group, optical activity and the methods of analysis. *Senior i*, 48 hours. Open to those who have completed course x.
- Course XIV. Industrial chemistry.* Laboratory work and reading. The course includes the analysis of various commercial products. *Junior iii*, 48 hours. Open to those who have completed course vi.
- Course XV. Wine and beer analysis.* Lectures and laboratory work. The course includes the determination of alcohol in wine, beer and various commercial products, with a special study of fermentation. *Senior ii*, 48 hours. Open to those who have completed x.
- Course XVI. 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 XVII. Inorganic preparations.* Laboratory. The course includes the preparation of inorganic salts supplemented by Bender's "Anorganische Präparatkunde." *Senior ii*, 48 hours.
- Course XVIII. Mineral analysis.* Laboratory. The course includes a complete analysis of the more important minerals. *Senior ii*, 48 hours.
- Course XIX. Special problems.* Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems. *Senior i*, 48 hours or more. Open to those who have completed course vi.
- Course XX. Photographic chemistry.* 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. *Senior iii*, 24 hours. Open to those who have completed course vi.
- Course XXI. Domestic chemistry.* 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. *Senior iii*, 96 hours. Open to those who have completed course v.
- Course XXII. Electro-chemical analysis.* 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 XXIII. Micro-chemical analysis.* Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substances by means of the microscope.
- Course XXIV. Colloquium.* The course includes a thorough, systematic quiz on general (a) inorganic chemistry; (b) organic chemistry.
- Course XXV. Applied chemistry.* Reading and laboratory. The course includes a number of special lines in applied chemistry and chemical technology.

## COURSES FOR GRADUATE STUDENTS.

1. *Special inorganic preparations.*
2. *Research work in electro-chemistry.*
3. *The plant alkaloids.*
4. *Stereo-chemistry, and the optical activity of organic and inorganic compounds.*
5. *Special research work in general analytical chemistry.*

## THE EQUIPMENT OF THE COLLEGE.

As an organization of the University of Minnesota, the college of engineering, metallurgy and 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, heliotropes, a telemeter, deflection magnetometer, precise levels, two marine chronometers, one sidereal and the other on mean solar time.

The department also enjoys the use, for certain problems, of the transit circle belonging to the department of astronomy.

*Railroad-work.* The usual equipment of transits, levels, planimeters, gradientors, 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, protractors 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; templates for cutting the stone used in the construction of skew arches; calculating machines, etc.

The testing laboratory contains a Riehlé cement testing machine with accompanying sieves, briquette moulds, tanks and other suitable apparatus for conducting experiments in the strength and durability of structural material.

*Topography.* For this work the department has plane-tables, telemeter rods, stadia 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 proceeding, and reports of a large number of state and university engineering societies.

*Reading room.* Here are to found all the leading American periodicals, and some few foreign, relating to civil engineering. The files of the most important are bound and are of easy 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 shops.* The basement of the engineering building is occupied by the mechanical laboratory, machine and vise shop and wood working shop; the wing by the engine and boiler room, forge shop and foundry. The shops are equipped with tools which represent the best American practice. Instruction is given by a carefully planned series of exercises, from the simplest to the most difficult operations, but avoiding the repetition of the ordinary shop. The work is adapted to parts of some machine or structure in common use, and after finishing the exercises referred to above, the class build some complete machine as a review and application of the principles learned.

The machine and vise 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, and the necessary small tools used in blacksmithing.

The foundry contains an eighteen-inch Colliau 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, is equipped with apparatus for determining ex-

perimentally the strength and other characteristics of the various materials used in engineering work under tensile, compressive, transverse and torsional stress; absorption and transmission dynamometers for determining the power generated or transmitted by engines or other motors; two machines for testing the lubricating qualities of oils and the relative values of metals used for journals and bearings; a mercury column for use in calibrating gauges and other pressure indicators; a 35-horse-power steel boiler with the necessary gauges, calorimeters, tanks, pyrometers, etc., for making complete duty trials; three automatic steam engines equipped with condensers, indicators, brakes, scales, thermometers, etc., which are used in determining the efficiency of the use of steam under various conditions assumed or found in actual practice, valve setting and indicator work; an Otto gas engine of five-horse power; and other 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.

*Locomotive engineering.* For complete work under this subject choice must be made from the divisions of course xxiv. The last four courses with this constitute the graduate year.

Students have constant reference to a personal collection of over one thousand three hundred blue prints and drawings, carefully catalogued for easy access, from the leading railroads and locomotive builders of the country and the number is continually increasing. As these date from 1867 to the present, they well illustrate the past progress in railway and shop equipment, as also the present "state of the art." There are also complete files of the Proceedings of the American Railway Master Mechanics Association and the Master Car Builders Association, of the Railroad Gazette and others.

In the railway testing the resources of the department are drawn upon for appliances and instruments. By the methods of instruction the student is placed thoroughly in touch with the best railway work; keeping always in sight the limitations to strictly theoretical design which railway experience has found financially and practically to exist.

*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.

*Journal club.* This is conducted through the year for the reading and discussion of the current engineering literature and the student is instructed in the making of a "card index" of the subjects and references. The continued growth and use of this method of preserving information in a readily accessible form has been found exceedingly valuable in school and later professional work.



*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 all its apparatus and facilities for work. This includes three rooms with eight solid masonry pillars for the support of sensitive instruments; dynamo room with engine, dynamos, motors, etc.; battery room; four laboratory rooms for general work; photometer room; photographic room; drawing room; library and reading room; professor's private study and laboratory. All the rooms are wired for electric light, time, experimental current and bells.

Besides having the free use of the extensive equipment of the department of physics, this department has a number of machines, including a Slattery alternator and exciter, Thomson-Houston, Brush and Wood arc dynamos, Edison and Mather incandescent dynamos, C. and C., D. and D. and experimental motors, and a railway motor series-parallel controller. Three of the machines have sets of rings and brushes for obtaining simple or tri-phase alternating currents. Four of the dynamos 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, direct reading and recording wattmeters, galvanometers, portable testing set, sub-divided standard and ordinary condensers, carbon megohms, telephone instruments, arc and incandescent light photometer, a large variety of switches and other electrical supplies. The laboratory dynamo room is supplied with power from a Westinghouse engine from the university lighting plant and from the 500 volt power circuit of the Minneapolis General Electric Company.

A competent instrument maker employed for this department, renders valuable service in designing and constructing new apparatus, and in repair work.

*The library* of the departments of physics and electrical engineering contains an excellent collection of works relating to these subjects. New books and trade publications are being added continually. Files of twelve 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 me-

chanical 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 for 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 construction of electrical apparatus. Practice and theory are taken together so 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. Electro-magnets and mechanisms, dynamos and motors, lines, switches, switchboards and plants are designed. Complete working drawings and specifications for some

special problem are worked out and each student is expected to help construct in the shops some piece of electrical apparatus. At present the advanced students are working out full designs and specifications for lighting the buildings and grounds of the university and for a central plant for electric light and power.

#### TECHNICAL CHEMISTRY.

The courses in chemistry include, besides general chemistry, qualitative and quantitative analysis, several lines of industrial and applied chemistry. These special lines of work are such as will cover the greater part of technical and analytical chemistry. Opportunity is offered to the student in the way of the newest and best apparatus, as well as the shortest and best methods of analysis. In addition to the purely analytical work, excursions are made to the various industrial and manufacturing establishments in order that the student may become acquainted with the practical and commercial side. Lectures and discussions are given on the machinery used in manufacturing chemistry, and the associated problems of fuels, combustion, water evaporation and distillation. Special attention is given to water analysis, from the sanitary and manufacturing standpoint; gas analysis, including the examination of illuminating gas, furnace gases and air; industrial chemistry, covering the analysis of various commercial products.

*Laboratories.* The department of chemical engineering occupies the west half of the chemical and physical building. The laboratories consist of general, qualitative, quantitative and organic rooms, with several technical rooms for water, gas, microscopic, spectroscopic, polariscopic, special organic and metallurgical work.

*Apparatus.* The department is supplied with apparatus for carrying on the special and technical work. Besides the general apparatus are balances, spectroscopes, microscopes, polariscopes, lecture apparatus, Hempel's, Winkler's, Lunge's, and Bunt's gas apparatus, furnaces, calorimeters, vapor density apparatus, oil testers, photometers and gasometers.

*The library* is supplied with many standard technical works, and with all the more important technical journals.

#### 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 on the lines of drawing and art.

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 or the necessities of individual cases seem to demand.

#### SCHOOL OF MINING AND METALLURGY.

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, 132 hours; (b) *Mining engineering*—to furnish material for treatment, 253 hours in mining and 198 in metallurgy; (c) *Ore testing*—to determine best method of treatment, 96 hours; (d) *Ore dressing*—furnishing products for metallurgical treatment, 87 hours; (e) *Metallurgy*—smelting and refining of ores and ore dressing products, reduction to metals, 198 hours in mining and 252 hours in 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 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 course includes preparing and testing reagents, making cupels, etc., and assaying samples of ore, furnace and mill products.

*Mining engineering.* The work in mining engineering is divided among the sophomore, junior and senior years, and the subjects given, together with the sequence necessary, are stated in the outline of the course, page 116

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.* 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.

*Designs and specifications.* The student makes working drawings of mine cars, skips and other parts of a miner'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 the fundamental principles are taught, and the work consists of the elements of plane surveying with special reference to the computations necessary.

The work in the freshman year is accompanied by platting in the office and some field practice in ranging, chaining and levelling.

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 University is utilized for practical illustrations.

## 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 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 course includes 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 bullions 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 button 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.

#### 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, crusher, 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, eight 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 new 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 12½x12 geared rolls complete; a four compartment spitzkasten; a three compart-

ment 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 over-head 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 and is required of students in chemistry, mining and metallurgy.

*Library.* The library consists of about five hundred volumes. This number represents only those works that treat directly of mining and metallurgical subjects.

The 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 to 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 hundred 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 subjects 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. Over a 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.

#### LIBRARIES AND READING ROOMS.

The reference and the seminar libraries of several departments of instruction within reach of the technical student 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 four hundred volumes; the library of chemistry 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 department of geology and mineralogy has a select library of nearly one thousand volumes; the school of mining and metallurgy a collection of five hundred mining and metallurgical works. The above number, upwards of four thousand five hundred 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 Athenaeum, 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 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 lists 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 the Society of Engineers.

#### FELLOWSHIP AND SCHOLARSHIPS.

One fellowship has been established in this college. The proceeds will be annually given to such graduate student as may be selected to pursue more extended original study in some line of engineering work than the



undergraduate courses will permit. For information concerning the amount available under this fellowship and the regulations respecting the appointment of a fellow, correspondence may be addressed to the dean of the college.

### THE SOCIETY OF ENGINEERS

is a flourishing organization, holding stated 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 statedly presents the progress of the engineering departments through the brief presentation of the original work done by instructors and students.

### FEEES.

A yearly incidental fee of five dollars 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.

### THE GILLETTE-HERZOG PRIZES.

The Gillette-Herzog Manufacturing Company of Minneapolis offers for competition by the students of the college of engineering, metallurgy 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) as 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 awarded under the fourth annual offer, 1895, were as follows:

First prize to Leslie H. Chapman, for the design of a swing bridge of 249 feet span.

Second prize to Harry L. Tanner, for the design of a rotary induction motor.

#### TECHNICAL ESSAYS AND THESES.

*Technical Essays.* Four technical essays are required of each student, one each term, beginning with the first term of junior year. The first and second may be translations of professional articles from the French and German engineering and technical periodicals. In the preparation of these translations the subject must be approved by the professor in charge, and the language must be accurate and idiomatic English. The third and fourth essays shall embody the results of the personal investigations of the writer, for instance: critical discussions of the views of the authors of technical papers or new technical books; the scientific description of some new machinery or manufacturing plant; a professional report upon some railroad survey, industrial works, mine or metallurgical plant.

*Theses.* Each member of the senior class in this college, in addition to the final examination, must prepare a thesis 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 work.

The thesis shall be written in a fair 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 bristol board; 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 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 on this work.

The subject of the thesis and the character of the work done upon it will be suggested in 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.

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THE COLLEGE OF

AGRICULTURE

THE SCHOOL OF

AGRICULTURE

The Dairy School

Summer School for Women

AND THE

EXPERIMENT STATION

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# The College of Agriculture.

## THE FACULTY.

CYRUS NORTHPROP, LL. D., *President.*

SAMUEL B. GREEN, B. S., *Professor of Horticulture.*

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, B. 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.

The college of agriculture offers a most thorough collegiate course. The curriculum is designed especially to meet the wants of graduates of the school of agriculture. This college course, together with the three years at the agricultural school at the University farm, gives such opportunities to young men as are offered by few, if any other agricultural colleges in this country. The preparatory training in literary and general lines of study at the school of agriculture cannot be as extended as that provided by approved state high schools, but these students come to the college course with a knowledge of the sciences related to agriculture and of practical farm affairs which is most valuable.

The student takes the general studies of this course with the classes in the college of science, literature and the arts, and the technical subjects are pursued under direction of the members of the special faculty of the college of agriculture, at the University experiment farm, three miles from the University. The agricultural college students find perfect congeniality among the students of the remainder of the University, and this course has gained high respect from the whole body of University students.

## 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 course are admitted on presentation of their certificates.

## SCOPE OF INSTRUCTION.

The course in the college of agriculture covers a period of four years, and it is designed to give a broad and liberal education. It includes a large amount of science and leads to the degree of bachelor of agricultural science. This course is largely elective, allowing the student during the first two years to elect the long course in any two and the short courses in the other two of the following: botany, zoölogy, chemistry and physics. During the last two years the student elects twelve out of twenty subjects, specially relating to agriculture in its various branches, and twelve out of eighty subjects offered in the college of science, literature and the arts, or the college of engineering, metallurgy and the mechanic arts.

The course in the school of agriculture is designed for technical training in farming, together with general culture, the student in the college course pursues many of the scientific and literary subjects, and is given a thorough training in technical agricultural subjects. There is nothing in this course except studies which would make a man a better farmer, it is designed to make him also an expert in agricultural science, and, if he so elects, he may become a specialist in some department of professional agriculture. The college course is designed to fit men as teachers for schools of agriculture, as experimenters, as editors and public lecturers on agricultural topics.

## FACILITIES FOR INSTRUCTION.

Students in the college of agriculture receive the benefit of the library and apparatus of the entire University as well as those at the University experiment farm belonging to the department of agriculture. The general University library contains more than forty thousand volumes. Many volumes are devoted to the subjects relating to agriculture, agricultural chemistry, horticulture, forestry, stock raising, dairying and veterinary science. The city public libraries also are available to students.

The general museum, the museum of technology and the museum of agriculture are of great value to the students and are rapidly growing. The agricultural museum contains collections of agricultural plants and animals, arranged to show their economic features. Few institutions have so valuable an entomological museum as the combined collection of insects belonging to the department and to Dr. Lugger's private collection, which latter is available for the use of advanced students. A valuable collection of the most modern farm, dairy and horticultural machinery is kept. Green houses provide facilities for instruction in raising plants under glass. The laboratory of the division of agricultural chemistry is well equipped for advanced college and experimental work. The University farm is stocked with typical specimens of the more prominent breeds of domestic animals. The veterinary division is equipped with demonstrative materials and charts, and a hospital furnishes clinics for practice in treating diseases of animals. The dairy building is equipped with all the latest machinery in use in this rapidly developing industry.

## THE UNIVERSITY EXPERIMENT FARM.

The University experiment farm, consisting of two hundred and fifty acres of most 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, the fields, the horticultural and forestry plantations and the gardens are arranged for experiments and instruction in the various technical agricultural subjects. Each professor in the faculty has charge also of a division in the experiment station. Students in the college course learn much of the work of the station and are often employed as assistants in conducting experiments. Encouragement will be offered to students who wish to do original work in special lines.

Graduates of this or other agricultural colleges wishing to do graduate work can arrange for special instruction by correspondence or interview with those members of the faculty under whom they wish to work. This course is rapidly being developed into a practical and thoroughly scientific course, and young men trained in it are already in demand.

## FRESHMAN YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Drawing,	Drawing, 3.	Chemistry, 4.
English, 5.	Mathematics, 5.	Botany, 4.
Solid Geometry, 5.	German B, 5.	Zoölogy, 4.
or Higher Algebra, 5.	English, 5.	Physics, 4.
German B, 5.	Rhetorical work, 1.	German B, 4.
Drill, 2.	Drill, 2.	Drill, 2.
Rhetorical work, 1.		Rhetorical work, 1.

## SOPHOMORE YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Botany, 4.	Botany, 4.	Chemistry, 4.
Zoölogy, 4.	Zoölogy, 4.	Physics, 4.
Chemistry, 4.	Chemistry, 4.	Botany, 4.
German B or French B,	Physics, 4.	Zoölogy, 4.
or History, 4.	German B or French B,	German B or French B
Physics, 4.	or English Literature, 4.	or History, 4.
Drill, 2.	Drill, 2.	Drill, 2.
Rhetorical work, 1.		Rhetorical work, 1.

In electing from chemistry, physics, botany and zoölogy the student is required to take the long course in two and the short course in the other two. In the long course in chemistry, the second and third terms of the sophomore year may be pursued in the laboratory of agricultural chemistry.

## JUNIOR YEAR.

## FIRST TERM.

†Veterinary Science, 4.  
 †Agricultural Chemistry, 4.  
 †Feeding, 4.  
 †Forestry, 4.  
 †Entomology,  
 Botany,  
 Psychology,  
 History,  
 Political Science,  
 Mineralogy,  
 Scandinavian,  
 Mathematics,  
 English,  
 Physics,  
 Rhetoric,  
 German,  
 Animal Biology,  
 Latin.

## SECOND TERM.

†Veterinary Science, 4.  
 †Agricultural Chemistry, 4.  
 †Dairying, 4.  
 Mineralogy,  
 Botany,  
 History,  
 English,  
 Scandinavian,  
 French,  
 Mathematics,  
 Psychology,  
 Political Science,  
 German,  
 Physics,  
 Animal Biology,  
 Rhetoric.

## THIRD TERM.

†Horticulture, 4.  
 †Animal Industry, 4.  
 †Entomology, 4.  
 †Agricultural Chemistry, 4.  
 †Veterinary Science, 4.  
 †Agricultural Engineering,  
 Latin,  
 German,  
 Drawing,  
 English,  
 Botany,  
 Mineralogy,  
 Political Science,  
 Animal Biology,  
 Physics,  
 Astronomy.

## SENIOR YEAR.

## FIRST TERM.

†Geology, 4.  
 †Field Agriculture, 4.  
 †Horticulture, 4.  
 †Agricultural Chemistry, 4.  
 †Veterinary Science, 4.  
 Botany,  
 English,  
 Physics,  
 Political Science,  
 History,  
 History of Philosophy,  
 English Literature,  
 Animal Biology.

## SECOND TERM.

†Farm Economics, 4.  
 †Carpentry, 4.  
 †Agricultural Chemistry, 4.  
 †Veterinary Science, 4.  
 Animal Biology,  
 Botany,  
 Geology,  
 Political Science,  
 Latin,  
 Ethics,  
 Mathematics,  
 English,  
 Military Science,  
 French,  
 Pedagogy,  
 German,  
 Scandinavian,  
 Physics,  
 History.

## THIRD TERM.

†Field Agriculture, 4.  
 †Dairying, 4.  
 †Forestry, 4.  
 †Veterinary Science, 4.  
 Political Science,  
 Astronomy,  
 Ethics,  
 Botany,  
 Pedagogy,  
 Applied Geology,  
 Animal Biology,  
 Latin,  
 Social Philosophy,  
 English,  
 Mathematics,  
 History,  
 German,  
 Scandinavian,  
 French,

†Students are required to elect twelve of the twenty subjects marked thus (†) in their junior and senior years; they are also required to elect an equal number from the remaining list, making twenty-four subjects in all.

## COURSES OF INSTRUCTION.

## AGRICULTURE.

As classified in this college, the division of agriculture includes farm management and the production of field crops. As most of the students have pursued the subjects taught under this head in the school of agriculture, the work given is supplementary to that given in the school. As most of the young men who complete the college course expect to become teachers or experimenters, the work is given with a view to fitting them for such duties. Where needed, lectures are given; courses of reading are prescribed; practice work in

various farm operations is arranged; and when possible the student is placed in charge of experiment work. With the proposed extension of field experiments there will be opportunities for undergraduates and graduate students to help in planning and carrying out experiments in field work and in general farm management. Students who elect subject offered by this division will be expected to become familiar with growing and preserving all kinds of grains, grasses, other forage crops and field crops grown in each part of the State, and with the methods of improving or breeding them. Field management, rotation of crops, manures, tillage and weeds are subjects for study and on which practice work and experimentation may be required. Likewise a thorough course in road making, land draining and fence building, will be offered. Work in agricultural economics will be developed. Some practice in acting as farm foreman is given both to afford experience and to test the aptness of the student in the ability to manage men. The thoroughly organized plat field work, the field crop nurseries devoted to the breeding of our staple crops, and the other lines of experiments under way in the farm department, will be made useful in every way possible to college students.

#### AGRICULTURAL CHEMISTRY.

In agricultural chemistry instruction is given by means of lectures and recitations, supplemented by laboratory practice. The first and second term's work are lecture courses devoted to a general study of the subject matter of agricultural chemistry; other terms are mainly laboratory work.

In the first term a study is made of the essential elements and their compounds which form the food of plants, and also of the organic compounds of plants and animals which are of special value as food. The chemical composition of all farm products, particularly human and animal food stuffs, receive their proper attention. A study is also made of the chemistry of animal nutrition.

In the second term the work is devoted mainly to the chemistry of the soil. The various sources of plant food are considered, together with those forms of food which are the most valuable to growing crops. The special requirements, in the way of plant food, of each of the important farm crops are considered, not only as to the amount of food which is required, but also the power of each crop for procuring this food. The physical properties of the soil as related to their chemical properties form one of the topics of study; the composition and characteristics of farm manures and commercial products is another topic. The subject of nitrification, and the laws which govern the increase and the decrease of the soil nitrogen, together with the organic compounds of the soil, and the indirect part which they take in the soil fertility, are carefully studied. The subject of soil exhaustion and soil improvement forms the basis of this term's work.

The two terms of lectures above mentioned are intended for those students in the general course of agriculture who are specializing in other branches and not intending to take up the more extended study of the subject. Laboratory practice may be taken along with the lectures.

Those who desire to devote more time to the subject will receive additional instruction in agricultural chemical analysis. Two or more terms may be devoted to this laboratory work. Special facilities are offered for this line of instruction; the chemical laboratories of the college of agriculture are given up entirely to the study of agricultural topics. In the laboratory, instruction is given in the analysis of soils, ash, water, fertilizers, food products and all agricultural materials. In the analysis of food stuffs, particular attention is given to detecting the various forms of adulteration to which the material may be subjected. The aim of the laboratory course is to enable the student to become acquainted with the methods which are employed in investigations relating to the application of chemistry to the science of agriculture.

#### ANIMAL INDUSTRY.

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 characters 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 co-relation is dwelt upon. Prepotency is discussed and more 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, also the coat and influences which affect it, and the outcome 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 especial attention. Cross-breeding, grading, the formation of breeds, and the influences of environment are carefully examined.

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 their 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 beef breed 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.

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.

During the month of January, in the second term of the junior year, students will receive a course of lectures covering the breeding, rearing and management of dairy stock, the points essential in animals intended for the dairy, the feeding of dairy cows, home and coöperative dairying and the manufacture of butter and cheese for commercial purposes.

In the spring term during the month of May a special study is made of the relation of bacteriology to the dairy, tracing the various changes that take place in milk and its products to the action of bacteria; the isolation and culture of bacteria found in milk and dairy products and microscopic examination of milk, and a study of the influences of the size of globules on the creaming of milk and churning of cream. During the month there will be practice work in the creaming of milk, ripening cream, churning and packing butter and the making of cheese adapted especially for domestic manufacture and home use.

#### 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 the 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 AND FORESTRY.

The college course in horticulture is a continuation of the work begun in the school of agriculture. It embraces the study of the origin of horticultural plants; practical work in propagation by seeds, budding, grafting and cuttings and in general nursery management; cross-

ing and hybridization of various fruits, vegetables and ornamental plants, with the purpose of improving them; the study of various hardy ornamental trees, shrubs, herbs and summer bedding plants; and the laying out and planting of lawns and parks.

A course in forestry is also offered. It consists in the study of the methods of propagation, habits, hardiness and value of the various native and introduced timber trees and the conditions affecting their growth, the formation of wind breaks and in the study of the present condition of the forest lands in Minnesota and the opportunities of profit in improving them.

#### MATHEMATICS.

Mathematics, as pursued in the college of agriculture, aims primarily at mental discipline and only secondarily at application to lines of practical work.

Algebra, as a means for acquiring fixed attention, penetrating analysis of abstract thought and a comprehensive grasp of logical relations, is required, as given in any standard elementary treatise.

Geometry, as a discipline for clear perception, accurate statement and logical inference, 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 covers three terms in the junior and the third term of the senior year. Instruction is given largely by lectures illustrated by clinical work at the hospital, and by skeletons, manikins and charts. Anatomy and physiology of digestion with reference to animal nutrition and health are given prominence. Contagious diseases of domestic animals are discussed with especial reference to their recognition, causes, prevention, dangers and methods of controlling. Simple and common surgical operations including obstetrics are described with appliances and methods, and are illustrated by practical work in the hospital. Certain medicines which intelligent farmers should understand, are shown, their uses and doses discussed and methods of administration illustrated for the various domestic animals. It is not the purpose of this department at present to train men for the profession of veterinary medicine, but to fit students to deal intelligently with the various animals which they may rear and handle.

## The School of Agriculture.

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### FACULTY.

- CYRUS NORTHROP, LL. D., *President.*  
 HENRY WEBB BREWSTER, Ph. D., *Principal, Mathematics.*  
 SAMUEL B. GREEN, B. S., *Horticulture, Forestry, Physical Culture.*  
 OTTO LUGGER, Ph. D., *Zoology, Entomology.*  
 CHARLES R. ALDRICH, *Carpentry, Drawing.*  
 FLORENCE A. BREWSTER, *Librarian.*  
 WILLIAM A. ROBERTSON, B. S., *Physics, Botany.*  
 J. A. VYE, *Penmanship, Accounts, Arithmetic.*  
 HARRY SNYDER, B. S., *Chemistry.*  
 T. L. HAECKER, *Dairy Husbandry.*  
 M. H. REYNOLDS, M. D., V. M., *Physiology, Veterinary Science.*  
 WILLET M. HAYS, B. S. A., *Agriculture.*  
 THOMAS SHAW, *Animal Industry.*  
 J. M. DREW, *Blacksmithing, Poultry.*  
 ANDREW BOSS, *Dressing and Curing Meats, Machinery.*  
 WILLIAM BOSS, *Carpentry, Engineering.*  
 ALVIN D. GAINES, A. M., *Language, History, Civics, Music.*  
 HARRY A. LEONHAEUSER, Lieutenant U. S. A., *Military Drill.*

When applying for admission or information, address Henry W. Brewster, Principal, St. Anthony Park, Minn.

### OPENING.

The coming year will open October 5th, 1896, and close March 26th, 1897. The fall term closes Saturday, December 24th, and the winter term begins Thursday, January 4th, giving a vacation of twelve 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.

Students will be received without examination in subjects for which they can furnish the certificates of high schools or county superintendents.

Applicants for admission after the opening of the term, will, in addition to passing the entrance examination, be required to show proficiency in the work done by the class up to the time of such application.

A command of the English language, such as may be gained from practice in spelling, composition and letter writing, is very essential; those who expect to enter this school are urged to prepare themselves thoroughly in these branches. They are also expected to have a practical knowledge of fractions—common and decimal—percentage, measurements and interest.

Students who cannot pursue the full course, either from lack of time or lack of proper preparation, may pursue a special course in preparatory or other work. The following studies will be offered to this class of students: agriculture, engineering, language, reading, history, arithmetic, penmanship and freehand drawing. Students electing from these subjects are required to take enough work to occupy their time while at school.

#### 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 warmed by steam and 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 and comb and brush.

No deduction in charges are made for absence of less than a week. 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.

*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 fifty cents per term, or may be purchased for about \$4. Drawing materials and mimeographed lectures are furnished to the student at cost.

*Military Drill Uniform*—It is recommended that all students taking the drill provide themselves with the uniform, which consists of blouse, trousers, vest and cap, modeled after the U. S. Military Academy uniform, of cadet gray, and is as neat and economical a dress as the student can obtain. The leading furnishers of Minneapolis and St. Paul furnish the suit complete, to measure, for about \$17. The vest may be omitted, for which allow \$3. A much cheaper suit than the above can be obtained, but is not recommended.

*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.

#### LABOR.

The school is conducted upon the principle that character makes all labor honorable. Therefore as much of the labor at the home and on the farm as can be distributed among the students is given to them at a fair rate of compensation. Anyone who wishes work must be on hand at the opening of the term.

#### LIBRARY.

The library is very well equipped. It contains nearly four thousand books of reference, besides thirty-five hundred pamphlets, including reports, bulletins, etc. The State furnishes the text books, which are rented to 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. The library is supplied with a card catalogue, from the United States Department of Agriculture, of all reports and bulletins issued by 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.

#### GRADUATION.

Students are entitled to the certificate of the University upon the following conditions:

First—The completion of the prescribed course with an honorable standing in department, and thoroughness and intelligence in subjects studied.

Second—A practical experience in field work, either at the University or elsewhere, as shall appear in reports received from responsible sources.

This certificate admits students to any one of the special lines of study provided in the college of agriculture.

#### STUDENTS' DEBATING SOCIETY.

A society for the purpose of improvement in elocution and debate, and for obtaining instruction, in the form of lectures, gives excellent opportunities for entertainment and culture.

#### STUDENTS' CHRISTIAN ASSOCIATION.

This society has for its object 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; but 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 their members at the depots to meet and direct incoming students on the arrival of the trains, Monday and Tuesday, October 5 and 6. One 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, and Union, Milwaukee and St. Louis, in Minneapolis.

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.

## COURSE OF STUDY.

## FIRST YEAR.

## FIRST TERM.

Agriculture [3].  
 Study of Breeds [2].  
 Botany [5].  
 4Carpentry [2½].  
 1Drawing [2].  
 Physiology [5].  
 1Blacksmithing [1].  
 Military Drill [2].  
 One Essay,  
 5One Declamation.

## SECOND TERM.

Botany [5].  
 Farm Accounts [5].  
 4Carpentry [2½].  
 1Drawing [2].  
 Physiology [4].  
 1Blacksmithing [1].  
 Military Drill [2].  
 One Essay,  
 5One Declamation.

} or 2Algebra [5].

## SECOND YEAR.

## FIRST TERM.

Breeding Animals [2½].  
 1Dairy Husbandry [2½].  
 Dairy Chemistry [2].  
 Fruit Growing [3].  
 Veterinary Science [5].  
 Zoölogy and Entomology [5].

OR

2Algebra [5].  
 3Military Drill [2].  
 1Poultry [1].  
 One Essay.

## SECOND TERM.

1Veterinary Science [3].  
 Agricultural Chemistry [5].  
 Dairy Husbandry [3].  
 Vegetable Gardening [3].  
 Field Crops [5].

OR

2Algebra [5].  
 3Military Drill [2].  
 One Essay.  
 5One Declamation.

## THIRD YEAR.

## FIRST TERM.

1Agricultural Chemistry [5]  
 Forestry [3].  
 Physics applied to Agriculture [5].  
 Plane Geometry [5].  
 Lectures on Farm Law.  
 Music [2].  
 1Handling Grain and Machinery [1].

## SECOND TERM.

Greenhouses and Hot-beds [3].  
 Physics applied to Agriculture [5].  
 Soils and Fertilizers [5].  
 Civics [4].

OR

2Geometry [4].  
 1Dressing and Curing Meats [1].

1Figures in brackets indicate the number of hours per week in which the subject is pursued; all work in subjects marked thus (1) extend through double periods in the daily program.

(2) Intended only for students who have decided to take the college course in agriculture. In order to graduate, students must have completed the course with all the mathematics or all the equivalents.

(3) Only six terms of military drill are required. Students who have pursued military drill in the preparatory year, may elect music and physical culture in the place of drill in the second year.

(4) An explanatory talk on carpentry will be given on Thursday, which all members of the carpentry classes are required to attend. During January carpentry will be taught by Mr. Aldrich, special work being required in drawing.

(5) Students who take regular work in the students' literary society will be excused from the declamation.

(6) Each student is required to pursue either singing or physical culture two periods each week throughout the year.

PROGRAM—FALL TERM.

	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.		
Boss, A.							A. Handling Grain and Machinery. 3 Pds			
Boss, W.		A. Power Machinery. 2 Pds.				C I. Carpentry. 5 Pds.		C II. Carpentry. 5 Pds.		
Brewster	A. Plane Geom. A. R.	B. Algebra. S. W. R.								
Drew			Arithmetic. S. W. R.	F. H. Drawing, 1, 2, 3. O.D.R. 3 Pds.		C II. Blacksmithing. 2 Pds.		C I. Blacksmithing. 2 Pds.		
Gaines		Language. A. R.	Language. A. R.		C	Reading, A. R.				Music, 2 Pds.
Green			A. Forestry. 2, 3, 4. 3 Pds.	B, Fruit Cult., 1, 2, 3. 3 Pds.	H					
Haecker					A	B. Dairy Stock. 2 Pds.	B I. Home Dairying. 3 Pds. 1. B II. Home Dairying. 3 Pds. 3. B III. Home Dairying. 3 Pds. 5.			
Hays	C L. Agr. 3 Pds. 1, 2, 3.	C II. Agr. 3 Pds. 1, 2, 3.			P					
Leonhauser					E					Military Drill. 2 Pds.
Lugger		B. Entomology and Zoology.			L					
Reynolds			C I. Physiol- ogy.	C II. Physi- ology. A. Physics.			B. Veterinary Science We. & Fri. 5 Pds.			
Robertson	C II Botany.	C I. Botany.								
Shaw	C I. Study of Breeds, 4, 5. 2 Pds.	C II. Study of Breeds, 4, 5. 2 Pds.				B. Breeding. 2½ Pds.	C II, Study of Breeds. 1 Pd. 3.	C I. Study of Breeds. 1 Pd. 3.		
Snyder				B. Dairy Chemistry, 4, 5. 2 Pds.		A. Agr'l Chem. 10 Pds.				
Vye	Penmanship. O. D. R.	Arithmetic. O. D. R.								

The School of Agriculture.



PROGRAM—WINTER TERM.

	8:15—9:30	9:05—9:50	9:55—10:40	10:45—11:30	11:40	1:15—2:00	2:05—2:50	2:55 to 3:40	3:45—4:30	4:35
Aldrich						C I. Drawing. 4 Pds.		C II. Drawing. 4 Pds.		
Boss, A.							A. Dressing and Curing Meats. 2 Pds.			
Boss, W.						C I. Carpentry. 5 Pds.		C II. Carpentry. 5 pds,		
Brewster	C. I. Algebra. S. W. R.	A. Geom. 4 Pds. S. W. R.	B. Algebra. S. W. R.							
Drew				F. H. Draw'g 3 Pds. 1, 2, 3. O. D. R. B. Poultry. 1 Pd.		C II. Blacksmith'g. 2 Pds.		C I. Blacksmith'g. 2 Pds.		
Gaines	Language. A. R.	A. Civics. 4 Pds. A. R.	Language A. R. A.-G. Houses and H. Beds. 3 Pds. 2, 3, 4.	Language. A. R. B. Veg. Gar. 3 Pds. 2, 3, 4.	C H A P E L	History. A. R.				Music. 2 Pds.
Green								A.-G. Houses and Hot B. 2 Pds.		
Haecker						B. Dairying. 1 Pd, 3.	B I. Home Dairying. 3 Pds. 1. B II. Home Dairying. 3 Pds. 3. B III. Home Dairying. 3 Pds. 5.			
Hays		B. Field Crops.								
Leonhauser										Military Drill. 2 Pds.
Reynolds			C I. Physiology. 4 Pds.	C II. Physiology. 4 Pds. Arith. S. W. R.		B. Veterinary Science. 4 Pds. 2, 4.				
Robertson	C II. Botany.	C I. Botany.				A. Physics.				
Shaw	A. Feeding.									
Snyder	B. Agr'l Chem.									
Vye	Arith. O. D. R.	Penmanship. O. D. R.		A. Soils and Fertilizers.		C II. Acc'ts. 5 Pds. O. D. R. 3, 4, 5.		C I. Acc'ts, 5 Pds. O. D. R. 3, 4, 5.		

#### SPECIAL ELECTIVE WORK.

Graduates, and others of equal attainments, are offered the opportunity of entering as special students for elective work in mathematics, English composition, designs and structures, 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 those lines that shall be satisfactory to the instructors in charge.

Any one contemplating this elective work should make application to the principal before coming, and should state what lines of work they desire to pursue.

#### CONNECTION WITH THE COLLEGE COURSE.

The school articulates with the college of agriculture, in which the subjects are largely elective to meet the demands for special education.

#### CHARACTER OF INSTRUCTION.

##### AGRICULTURE.

The instruction in agriculture continues through the course and is outlined as follows.

The selection, laying out and general management of farms; soils and soil formation; drainage; road making; fence building; the general principles of cultivation; farm machinery; breeding; the production of grain and grasses, clovers and other foliage 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. Many special subjects, such as stacking grain, handling machinery, and exterminating noxious weeds are dealt with. Green manuring, management of farm manures and place of commercial fertilizers in field management in various parts of the state are discussed.

The 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 preservations 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.

##### 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.

##### AGRICULTURAL CHEMISTRY.

One term's work is given to the study of the general principles of the science of chemistry, and is illustrated by the many chemical changes which

take place on the farm. Particular attention is given to those elements and compounds which are the food of plants and animals.

In the second term, the work is devoted mainly to the study of the composition of farm products, including food stuffs. Under the head of dairy chemistry, the composition of milk and the changes involved in the manufacture into butter, cheese and other products is studied. One term's work is given to chemistry of soils and fertilizers. The demands of the various farm crops upon the soil are considered, together with the best ways of satisfying these demands. The entire work in agricultural chemistry is supplemented by constant practice in the laboratory.

#### ALGEBRA.

No algebra is required. Students intending to enter the college of agriculture, after graduating from the school of agriculture, should complete elementary algebra through logarithms.

#### ANIMAL INDUSTRY.

The talks on animal industry will be most practical. The characteristics of the leading pedigree breeds that have special adaptation to north-western conditions, will be discussed. The points of good and inferior animals in beef-cattle, sheep and swine will be 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, will be pointed out in the simplest manner possible. The feeding of animals will be discussed, special prominence will be 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 will be made clear. And, as far as practicable, these talks will be 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 microscopes; 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 AND DRAWING.

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. 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 the farm. Estimates are made of the amount of material and cost of construction.

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 states 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.

DAIRY HUSBANDRY.

*Dairy Stock*—During the first term and the last part of the second term of the second year, students receive instruction in the characteristics of the various breeds of dairy stock, with practice in judging by the score card; the breeding, rearing, feeding and management of dairy cattle.

*Home Dairying*—Practical work in this branch commences the second week of the first term, and closes the second week in December, and during the second term it commences the second week in February and continues.

until the close of the school year. Students receive practical training in the most advanced methods of handling and testing milk, creaming milk, by the gravity and centrifugal processes, ripening cream, churning, working and packing butter.

#### DRESSING AND CURING MEATS.

Instruction and practice is given in dressing beef, pork, mutton and poultry, and in cutting up and curing meats.

#### 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 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.

The first two books of Wentworth are required. Students intending to enter the college of agriculture should finish geometry. Special attention is given to principles of symmetry, clearness of statement, and accuracy of logical inference.

#### HORTICULTURE AND FORESTRY.

The department of horticulture and forestry is well equipped with nurseries, orchards, forest plantation, vegetable garden, and greenhouses. The grounds about the buildings are tastefully laid out and planted. The ornamental and timber trees and shrubs are labeled with their botanic as well as common names, and the place whence they were introduced. There are about twelve hundred species and varieties of plants cultivated by this department.

#### 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.

#### 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 soils; 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, windmills, steam and gasoline engines; friction and lubricants; tensile 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.

#### POULTRY.

In the instruction 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 important breeds, incubator cellar, workroom, etc., has been provided, where experimental work and practical instruction will be carried on.

#### POWER MACHINERY.

Those 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 careful attention.

#### VETERINARY SCIENCE.

The instruction in veterinary science covers two years. In the first year instruction is given in anatomy and physiology. The lectures are illustrated by means of charts, skeletons, manikins, and, whenever practicable, by living animals.

In the second year the elements of pathology and therapeutics are taught, for which purpose sick animals are kept and treated in the veterinary hospital, giving the student a chance to examine and care for them and to diagnose common diseases, under the direction of the instructor. Special attention is given to animal hygiene, including causes and prevention of diseases.

#### 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 exhibit.

## The Dairy School.

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### FACULTY.

CYRUS NORTROP, LL. D., *President.*

T. L. HAECKER, *Professor of Dairy Husbandry, in charge of the School.*

PROF. HARRY SNYDER, *Dairy Chemistry.*

DR. OTTO LUGGER, *Bacteria in Dairy Products.*

PROF. W. M. HAYS, *Forage and Pastures.*

PROF. M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*

MR. J. A. VYE, *Dairy Accounts*

MR. WM. ROBERTSON, *Care of Boiler and Engine.*

MR. C. R. ALDRICH, *Dairy Buildings.*

MR. I. M. DREW, *Silo and Stable Conveniences.*

B. D. WHITE, *Instructor in Butter Making.*

U. S. BEAR, *Instructor in Cheese Making.*

WM. BOSS, *Instructor in Practical Engineering.*

A. L. HAECKER, *Instructor in Milk Testing.*

A. J. GLOVER, *Instructor in Sweet Curd Work.*

N. H. FULTON, *Assistant in Butter-making.*

GEO. GULMON, *Assistant in Creamery Work.*

The next session of the Dairy School will begin January 6, 1897, and continue four weeks.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese, or who propose to take up that 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 for 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 week's 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 work by the most approved methods.

Instruction is divided into five 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 and composite tests, and the pasteurization of milk and cream.
- 5th. Practical engineering, steam-fitting and plumbing.

#### LECTURES.

The course of sixty lectures is a rare treat to any one interested in any branch of agriculture, covering, as it does, the most important points in animal husbandry, growing and preserving forage crops, construction of silos, arrangement of barns, stables and yards, co-operative dairying and creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of common diseases of the dairy cow.

#### I.—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 for 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.

#### II.—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 to carry on this work.

A complete record of every step taken is required from 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. Minnesota is not occupying her rightful place in this industry; she does not even supply her home demand, whereas she should have a surplus.

#### III.—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 test machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is becoming 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 this process.

#### IV.—MOTIVE POWER.

It is intended to so train students that by the close of the term they will be able to run engines, fire and care for boilers, and do ordinary steam fitting and plumbing. Engine, pumps, piping and other necessary appliances are provided.

#### REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some experience in the creamery or cheese factory before coming to the dairy school are, as a rule, the best students, and are the ones most pleased with what they have learned. It is therefore required that persons who intend to operate a creamery should 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, whether members of the school of agriculture or not. Board and room can be secured near the school for from \$3.50 to \$4 per week. Each student is required to supply himself with two white suits, including caps, to be worn during the working hours in the creamery and cheese rooms. These suits may be procured in either city for about \$1 each.

To reach the school from either city, take short line trains from union depots, interurban from Minneapolis, and St. Anthony Park car from St. Paul.

Address applications for admission to T. L. Haecker, St. Anthony Park.

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## Summer School for Women.

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#### OBJECT.

This term is for the mothers and daughters of Minnesota. The subjects which will be taught the coming term are cooking, dairying and sewing, six days of the week; and chemistry, English, entomology, horticulture, hygiene and poultry as indicated in the program on next page.

The term begins Tuesday, April 28th, and closes Friday, June 5th, 1896.

EXPENSE.

The total expense, payable in advance, is \$3 per week for board and room, and 50 cents per week for materials used in the practice work.

BOOKS.

No text-books are required, except those drawn from the library; all students who draw books, deposit \$2 as a guaranty for their return.

Each student furnishes four sheets, one spread, one pillow, pillow slips, towels, napkins, quilts, and several white aprons, preferably with bibs.

ADMISSION.

Application for admission should be made to H. W. Brewster, Principal, St. Anthony Park, Minn.

DAILY PROGRAM.

	8-8:50 Lectures.	9-12 Practice Work.	2-2:50.	3-3:50.
Cooking.	Mo. & Th.	1st Div., Mo. & Th. 2d Div., Tu. & Fr. 3d Div., We. & Sa.		
Dairying.	Tu. & Fr.	1st Div., Th. & Fr. 2d Div., We. & Sa. 3d Div., Mo. & Th.		
Sewing.	We. & Sa.	1st Div., We. & Sa. 2d Div., Mo. & Th. 3d Div., Tu. & Fr.		
Chemistry. Horticulture,3 Entomology,1 English,3 Hygiene,2 Poultry,3			Mo., We. & Fr. Tu., Th. & Sa.	Mo., We. & Fr. Tu., Th. & Sa. Mo., We. & Fr. Tu., Th. & Sa.

1First three weeks of the term.  
2Last three weeks of the term.  
3Four weeks each.

CHEMISTRY.

In domestic chemistry, instruction is given on the chemistry and economy of foods, the purity of the water supply for household purposes, the chemical changes that take place in the making of butter and cheese. Simple tests for the detection of the adulteration of foods are also given. Many other topics, as the chemistry of sewer gases, disinfectants, soaps, dyes, etc., receive due attention. Opportunity will be given for some laboratory work.

COOKING.

Each student devotes two forenoons a week to cooking and other household subjects. A demonstration lecture is followed by practice work in doing the cooking discussed and shown in the lecture. Mainly common foods are dealt with. Baking bread, boiling, broiling and roasting meats are

taught, also the preparation of vegetables and fruits. Instruction is given in regard to the choice of foods, also serving, carving, etc.

#### DAIRYING.

Instruction in this department comprises:

1. A course of lectures on home dairying.
2. Practice work in creaming milk by the gravity and centrifugal processes, care of cream, proper temperature and condition for ripening, so as to secure exhaustive churning, proper temperature and condition of cream, when ready to churn; how to wash, salt, work and pack butter for the market, and how to judge butter.
3. The manufacture of cheese especially adapted to home dairying.
4. Practice work in testing cream, milk, whey, skim milk and butter milk.

#### ENGLISH.

The work in English aims to secure the use of proper words and correct forms of expression in conversation, letter writing, and more extended forms of composition. The student is led to think, to analyze and define this 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.

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.

#### ENTOMOLOGY AND ZOOLOGY.

The most common insects of the house, stable and garden are discussed, and remedies given to counteract their injuries, and to prevent losses. The more common wild animals found near the home and their relation to our interests are also considered, as well as the action of some small organisms, as bacteria and molds.

#### HORTICULTURE.

The lectures in horticulture are on each of the three subjects, small fruit growing, the vegetable garden, lawn and house plants. These lectures are supplemented by demonstrations and observations in the gardens and greenhouses of the experiment station.

#### HYGIENE.

Six lectures are given on the physiology of digestion, nutrition and tissue changes, together with talks on home hygiene.

#### POULTRY.

Lectures are given on the history and characteristics of the different breeds with their adaptability to special uses, on feeding and management for eggs and for meat, and the handling of incubators and brooders.

The new poultry house containing sample pens of the more important

breeds, incubator cellar, work room, etc., will be at the disposal of the students who are interested in this branch of work.

SEWING.

The work in sewing is planned to meet the needs of those who desire to take it. Plain sewing will include the description of different kinds of stitches and practice in seaming, hemming, mending, and the cutting and making of plain clothing. Dressmaking will be taught to those who are able to take the work.

HOW TO REACH THE SCHOOL.

The school is located a little north of St. Anthony Park, midway between St. Paul and Minneapolis. Students arriving in either city should buy tickets and check their trunks at the Union Depots on the Great Northern Railroad for St. Anthony Park. The trains which stop at St. Anthony Park leave the Union Depots as follows: From Minneapolis at 10:30 A. M., 11:30 A. M., 5:40 P. M. and 6:30 P. M. From St. Paul, 8:05 A. M., 3:30 P. M. and 4:30 P. M. Conveyances from the school will be at St. Anthony Park station upon the arrival of these trains, and students and baggage will be taken to the school building free of charge. St. Anthony Park can also be reached by electric street car; no baggage is taken on these cars. At Minneapolis take an interurban car at the Union Depot, go to Lexington avenue and take a transfer to the St. Anthony Park line, get off at Raymond avenue and go north. When on the interurban line, coming from Minneapolis, do not get off when St. Anthony Park is called at Cromwell and Raymond avenues, as these points are two miles from the school, but go on to Lexington avenue as directed, and there wait for a St. Anthony Park car. At St. Paul take a St. Anthony Park car and get off at Raymond avenue.

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## The Agricultural Experiment Station.

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The eighth year of the agricultural experiment station has given evidence of growth in many ways. The experiment work shows a very comprehensive scope. The accuracy and general character of the work has constantly attained a more satisfactory basis. The year 1895 was favorable to the successful prosecution of all lines of experiment work which are in any way dependent upon the weather, since good crops obtained at the experiment farms, and throughout the state as well. Sub-station work at Mr. O. C. Gregg's Coteau Farm, Lyon county, was generally successful.

In compliance with a law passed by the last legislature, two sub-experiment stations have been located—one in the Red River valley, a mile north of the city of Crookston, and one in the pine regions, a mile east of Grand Rapids. The former is known as the North West Sub-Experiment Farm and the latter as the North East Sub-Experiment Farm. These farms give

greatly increased facilities by means of which the University can study and aid in the development of the northern part of the State. The station as well as the educational courses in agriculture is showing signs of rapidly gaining the confidence and hearty good will of the agricultural classes of the State, and people of every calling show an interest in the practical things which deal with plant and animal life and with the promotion of agricultural interests. The growth of the experiment station in the work on the University experiment farm and on its sub-experiment farms afford added opportunity for giving that practical experience to teachers and advanced and graduate students that helps to build up the agricultural instruction of the University.

During the year 1895 six regular and three press bulletins were issued and reprint was issued of a part of bulletin No. 35, relating to the organization of co-operative creameries and to the cost of butter production in winter. An annual report was also issued giving the contents of the six regular bulletins and other facts relative to the work of the station. The accumulation of unpublished matter year by year grows larger. The bulletin free list is increased by the addition, upon request, of about a thousand names annually.

Press bulletin No. 3, March 5, 1895—Wheat Smut.

Press bulletin No. 4, July 9, 1895—The Russian Thistle Law.

Press bulletin No. 5, Dec. 15, 1895—Hog Cholera and Swine Plague.

Bulletin No. 41 treats of soils under five heads: (1) The essential elements of soil fertility, showing that nitrogen, phosphorus, potassium and calcium are the essential elements most liable to become deficient in soils; while iron, magnesium and sulphur are essential elements usually abundant. (2) Humus is shown to be a most important factor in soil fertility, as with a decrease of humus there was a proportional loss of nitrogen, potash and phosphates and of the ability of the soil to hold water in times of drouth. Oats were matured where all the essential elements of fertility were supplied to the soil in the form of humates. Bare summer fallowing is particularly destructive of humus while farm manures, grass and clover and green manure crops build up the content of humus in the soil. (3) The mechanical analyses of soils is discussed and analyses of soils from various parts of the state are recorded. The analyses of a number of marls are given. The size of soil particles is discussed and the fineness of particles and general character of soils suited to wheat, corn, potatoes and other crops are discussed. (4) The action of organic and mineral acids upon various soils is recorded and discussed. (5) The effects of different methods of farming, as wheat farming, mixed farming, dairy farming, etc. are compared, with the many facts shown in tabular form and by means of diagrams.

Bulletin No. 42 discusses the composition, digestibility and food value of potatoes. An experiment performed with pigs shows that ninety-seven per cent. of the total dry matter of potatoes was digested, the cooked and uncooked being about equally digestible. Potatoes for human food were

found to lose a large part of their albumen if soaked or started to boil in cold water, while if placed at once in hot water the albumen was coagulated and preserved in the potato.

Bulletin No. 43 is on the subject of insects injurious in 1895. Chinch bugs, migratory locusts or grasshoppers, potato beetles, blister beetles, cabbage insects, currant insects, lepidopterous borers, the leaf roller on box elder, apple tree leaf folder, sweet corn moth or tassel worm, rosin weed caterpillar, parsley butterfly, box elder bug, bean fly, wheat stem maggot-hessian fly, aphides or plant lice and scale insects or bark lice. This very complete treatise contains seventy-five illustrations, most of which are new and of great scientific merit. An article is given on machines for applying insecticides in both the wet and dry states. An extensive classified list of owlet moths captured at St. Anthony Park and at Duluth, Minn., is also included.

Bulletin No. 44 records an experiment with fattening steers in winter and another with fattening lambs in winter. Those steers were most profitably fed which did not receive all the grain they would take and not get off their feed. A light decrease in the quality of hay and other food showed a decrease in grains showing the value of food flavor and other elements of good quality. Wheat at 47.6 cents per bushels was fed with profit when other foods were fairly high in price. Profits were made by feeding good steers which were sold at an advance in price of 1½ cents per pound over the cost price.

Fattening lambs ate three pounds daily for each 100 pounds live weight. Good lambs gain 9.2 pounds per month each at a cost of 5.4 cents per pound. Lambs gain in winter weather, if not too cold. Lambs left free to be under shelter or in the open air gained faster than those confined under cover. Wheat screenings and oil cake proved more profitable for a long feeding period than wheat and oil cake. The value of the lambs also, as well as the steers, more than doubled during the period of feeding, showing that only fatted animals should be sold from the farm. Selling as soon as good gains cease in fattening animals was emphasized.

Bulletin No. 45 contains a record of many of the experiments in the horticultural division for 1895. In the variety tests of potatoes the following named kinds were among the best yielders at university and coteau experiment farms; World's Fair, American Wonder, Irish Daisy, Irish Cobbler and Rural New Yorker. Scabby potatoes were very successfully treated with Bordeaux mixture. The subsoiling of heavy clay land seemed to increase the yield of potatoes. Brown rot of potatoes, a new disease, is again observed. No apparent good came from spraying potatoes to prevent blighting. In the variety tests of tomatoes some were found much less subject to the rot than others. Of commercial varieties the following did best: Dwarf Champion and Beauty, and of early kinds, Early Ruby, Maules' Earliest and Earliest of All, proved best. The best yielding varieties of strawberries were Haverland, Warfield, Crescent and Beder Wood. An article is given on spray pumps.

Bulletin No. 46 gives a report of experiments with field crops, breeding crops, tillage and weeds in 1895. Several of the best varieties of corn are being improved by breeding and it is shown that farmers generally do not have good yielding varieties. Saving seed corn is discussed, as also testing seed corn. Subsoiling for corn on medium clay land in a year of ample rainfall gave a decreased yield. Eight varieties of wheat are chosen as best out of over 200 tested for five years. Sixteen pure bred varieties of wheat yielded an average of  $9\frac{1}{2}$  bushels more per acre than the two parental varieties, fife and blue stem, from which they were originated. Numerous promising cross bred wheats are now under trial. Many good varieties of oats have been secured, some of which will stand erect on the very rich lands of special stock farms. The different classes of root crops produced per acre the following amounts of water-free food: Rutabagas 2,326 pounds, mangels 2,220 pounds, sugar beets 2,187, turnips 1558 and carrots 1,322. Results are given of the trials of the depth and distance apart to plant roots. Remedies are given for stinking smut in wheat. Cross rotation experiments show that potatoes and root crops put the soil in the best condition for crops the next year while flax, wheat and peas put the land in poorer condition.

Articles treating on three weeds, foxtail or pigeon grass, wild mustard and wild oats are included. Tables furnished by the Minnesota division of the weather bureau are given, showing, for numerous weather observing stations, the mean monthly and annual temperatures and the monthly and annual rainfall for 1895. Other tables give the average monthly and annual temperatures and precipitation for a long series of years.

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THE COLLEGE OF LAW

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## The College of Law.

### FACULTY.

CYRUS NORTHROP, LL. D., President.

WILLIAM S. PATTEE, LL. D., Dean, *Department of Contracts and Equity Jurisprudence.*

CHARLES B. ELLIOTT, LL. D., Ph. D., (Judge of District Court for Hennepin County, Minn.), *Department of Corporations and International Law.*

JAMES PAIGE, A. M., LL. M., *Department of Domestic Relations, Partnership and Agency.*

EDWIN A. JAGGARD, A. M., LL. B., *Department of Torts and Criminal Law.*

A. C. HICKMAN, A. M., LL. B., *Department of Pleading and Practice.*

HENRY J. FLETCHER, ESQ., *Department of Property.*

### LECTURERS.

GEORGE B. YOUNG, LL. B., St. Paul, Minn., (Ex-Associate Justice of the Supreme Court of Minn.), *Conflict of Laws.*

CHARLES A. WILLARD, LL. B., Minneapolis, Minn., *Bailments.*

HON. JAMES O. PIERCE, Minneapolis, Minn., (Ex-Judge of the Circuit Court of Memphis, Tenn.), *Constitutional Jurisprudence and History.*

HON. C. D. O'BRIEN, St. Paul, Minn., *Criminal Procedure.*

CHARLES W. BUNN, LL. B., St. Paul, Minn., *Mortgage and Suretyship.*

HON. JOHN DAY SMITH, LL. M., Minneapolis, Minn., *American Constitutional Law.*

HON. HIRAM F. STEVENS, St. Paul, Minn., *Law of Real Property.*

T. DWIGHT MERWIN, A. B., St. Paul, Minn., *Law of Patents.*

FRANCIS B. TIFFANY, LL. B., St. Paul, Minn., *Criminal Law.*

HERBERT R. SPENCER, Duluth, Minn., *Admiralty Law.*

A. D. KEYES, Faribault, Minn., *Minnesota Practice.*

ARTHUR B. WILL, LL. B., *Circumstantial Evidence.*

### 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.

#### I.

William S. Pattee, LL. D., Dean, is at the head of the department of contracts and equity jurisprudence, and lectures also upon special subjects in the department of property.

#### II.

Charles B. Elliott, LL. D., Ph. D. (Judge of the District Court for Hennepin County), has charge of the department of corporations and international law.

## III.

James Paige, LL. M., has charge of the department of domestic relations, partnership and agency, and in addition thereto conducts the classes in text-book work in real property.

## IV.

Edwin A. Jaggard, LL. B., of the St. Paul bar, is at the head of the department of torts and criminal law, and lectures also before the senior class on the subject of taxation.

## V.

Hon. A. C. Hickman, LL. B., of the St. Paul bar, 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 Courts is specially emphasized.

## VI.

Henry J. Fletcher, Esq., of the Minneapolis bar, is at the head of the department of property, and will lecture upon various branches of real estate.

## GRADUATE COURSE.

In addition to the six departments of undergraduate work there is a one year course of graduate work leading to the degree of LL. M. For further particulars respecting the subjects considered in this department, reference is made to the three courses of study hereinafter set forth.

## 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 institution 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 the applicant 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 subject 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, in case they attend more than two courses of lectures daily.

### 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; but as these studies constitute a part of the student's course in law, he will be required to pay a fee of ten dollars per term in said department.

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 dean 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 dean.

### 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 preceeding 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.

#### TUITION.

A matriculation fee, of ten dollars, and one term's tuition, fifteen dollars, must be paid in advance by each student entering the department. Tuition, of fifteen dollars per term, is payable at the beginning of each subsequent term. Diploma fee ten dollars.

### FOUR COURSES OF STUDY.

#### I.

##### THREE YEARS' DAY COURSE.

The undergraduate course, extending over a period of three years, of nine months each, comprises the following:

##### FIRST YEAR—JUNIOR.

Contracts, including the statute of frauds; domestic relations; torts; agency; commercial paper; real property (Blackstone—second book); partnership; criminal law and criminal procedure.

##### SECOND YEAR—MIDDLE.

Real property continued (land, estates, titles); personal property, including sales; pleading and evidence; insurance; bailments; corporations—private and public; mortgages; suretyship; liens; carriers and insolvency law.

##### THIRD YEAR—SENIOR.

Wills and administration; equity jurisprudence; real property continued, taxation; practice in United States courts; American constitutional law; medical jurisprudence; international law and legal ethics and 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, respectively, 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.

#### II.

##### THREE YEARS' EVENING COURSE.

To accomodate 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.

### III.

#### 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 Laws (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 servants; insurance; sales.

The studies in this course may be varied upon consultation with the dean of the faculty, and other subjects in place may be substituted by those whose business in life, or whose preference render it desirable.

Those who complete the course and pass a satisfactory examination receive a certificate of proficiency.

### IV.

#### GRADUATE COURSE.

##### IN JURISPRUDENCE AND POLITICAL SCIENCE.

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

Students are earnestly advised to pursue this course, as it offers an opportunity to acquire a wider knowledge of certain subjects, which cannot be fully discussed in the undergraduate course, and it offers other subjects of importance not considered at all in the preceding courses.

The courses of lectures offered in this department are as follows:

General jurisprudence.

Political science.

International law.

Constitutional jurisprudence and history.

Taxation.

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. 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. Tuition in this course is \$10 per term or \$30 per year and diploma fee of \$10.

#### 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.

Besides the University and Bar Association libraries, the State library, containing everything 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 forty 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 for the day students begin at 10 a. m. and 2 o'clock p. m., and those for the evening students at 7:15 o'clock p. m., and continue from one and a-half to two hours.

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 PROMOTION.

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 prove 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.

#### MOOT COURT.

A moot court is organized the third term of junior year. 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 moot 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 his legal acquirements, and to respond in earnestness and with fidelity to the faithful efforts of his instructors in his behalf.

## THE LITERARY SOCIETY.

The students of the college have joined in organizing a literary society 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 the other departments or colleges of the 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 dean. The following subjects are suggested as being particularly suitable: international law, constitutional history and political science.

## DEGREES.

The degree of bachelor of laws will be conferred upon all students who pursue the full course in this college and pass an approved examination. The degree will also be conferred upon those who, having attended another law school for the period of one year, shall also attend for two year in this college and pass a like examination.

## ADMISSION TO THE BAR.

The legislature of Minnesota in the year 1891, 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. The 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 toward 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 counsellor 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 (\$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 of any 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 sections 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 subjects 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; Macdonnell 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; Rosco'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, Stephens. Chitty, Hurd, Bliss on Code Pleading; 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 (1485-1760); 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.

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THE DEPARTMENT OF MEDICINE

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## The Department of Medicine.

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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 used by the several colleges; the library of the department; the reading-room; the dissecting-rooms and the laboratories of anatomy; the operating-rooms and laboratories of the college of dentistry; the dental infirmary and a division of the university free dispensary.

The laboratory of medical sciences has been completed and occupied within the past year. It is admirably adapted to the purposes to which it is devoted. One wing of the building is occupied by the college of pharmacy, which has its separate entry and is isolated by a fire-wall from the rest of the structure. It contains the office and private laboratory of the dean of the college of pharmacy, the pharmaceutical laboratory, the botanical laboratory, the organic chemistry laboratory, with preparation and stock rooms. A large lecture amphitheatre, especially arranged for demonstrative work, is situated in the same wing. Closely adjoining it are the laboratories of physiology and physiological chemistry.

The centre and opposite wing are occupied by the chairs of histology and embryology, pathology and bacteriology. Each of these branches has its well-lighted laboratories, preparation-rooms and private study rooms. Up-

on the basement floor are spacious and comfortably equipped animal-rooms, one of these being devoted to physiological and the other to 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 chair. It is to be refitted during the present season with laboratories, preparation-rooms, store-rooms and the private offices of the professor of chemistry and his assistant.

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. By means of these agencies it utilizes, for the benefit of its students, the clinical material of these two large centres of population. The location of the University near the interurban line of the Twin City electric car system enhances the value and convenience of these clinical opportunities.

A medical library, containing some fifteen hundred volumes and supplied with current periodicals, is open to all the students of the department. This collection has been chosen with especial regard to the need for reference works and collateral reading. The general library of the University and the public libraries of Minneapolis and St. Paul are also open to the students.

## RULES AND REGULATIONS OF THE DEPARTMENT.

### COLLEGE YEAR.

The ninth annual course of study in this department will begin on October 1st, 1896 and will continue eight months, closing upon the first Thursday in June, 1897.

The college year will be divided into semesters; the first semester ending January 28th, 1897. The succeeding week will be devoted to mid-year examinations which will be conducted in many of the chairs. The second semester will begin February 4th, 1897, and will close May 13th, 1897, 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 3d, 1897.

### ENROLLMENT.

It is desirable that students matriculate on or before September 25th.

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 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 which they will be permitted to take and they will be required to present this record to the chairs in charge of such studies within the first week of the term.

ENTRANCE EXAMINATIONS.

The examination for entrance will be conducted by the deans of the several colleges jointly. These examinations will be held at 9 a. m., of October 1st, 2nd and 3d.

All applicants for admission to any of the colleges of this department, whether they propose to take general or special courses of instruction, will be required to pass the entrance examinations, or to present in lieu thereof, one of the following alternatives:

(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.

N. B. It is provided, that, if the above diplomas do not represent a sufficient course in Latin, the applicant will be required to pursue the course in medical and pharmaceutical Latin provided by this department.

The program of entrance examinations is as follows:

October 1st, 9 a. m. An English composition, of not less than 200 words, upon a subject to be announced at the time of the examination. Spelling, punctuation and grammatical construction will be considered.

October 1st, 2 p. m. Elementary algebra, as given in Olney's Elements.

October 2d, 9 a. m. Physics—call for a knowledge of the subject as treated in Avery's or Gage's elementary text-books.

October 3d, 9 a. m. Latin. This examination will test the knowledge of the applicant in declension, conjugation, construction, rules for agreement and the translation of easy Latin prose. Jones' First Latin Lessons will give the necessary preparation.

Students may carry a condition in Latin and in either algebra or physics during their first year, but both of these conditions must be removed before they enter upon the work of the second year.

Students who desire to submit alternatives for the entrance examinations may present them on October 1st, at 9 a. m.

N. B. ANNOUNCEMENT FOR 1899.

The faculties of the college of medicine and surgery and of homeopathic medicine and surgery desire to announce that on and after the college year beginning October 1899, all applicants for admission to these colleges will be required to pass the entrance examinations provided for the students of other departments of the University of Minnesota, or present, in lieu thereof, the equivalents accepted in those departments. (See pages 50 to 56 of the general catalogue for details of these examinations and equivalents).

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:

- October 2nd, 9 a. m. Anatomy, first year; Physiology, second year.  
 October 2nd, 2 p. m. Histology, first year; Chemistry, second year.  
 October 3rd, 9 a. m. Physiology, first year; Anatomy, second year.  
 October 3rd, 2 p. m. Chemistry, first year; Histology, second year.

#### ADVANCED STANDING.

Applicants for advanced standing must pass their 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 examinations before all chairs in which they wish to be exempt.

Conditions may be removed at the final examinations, in May, as well as on the above dates. Students who are conditioned in the first year's work of a graded study will not be permitted to take either that or any related study (see courses of study) of the second year.

Students of the senior year, who carry conditions, must remove these conditions at the end of the first semester in order to be eligible for final examinations.

#### CLASSIFICATION.

Monday, October 5th, will be devoted to the classification of students. The opening lectures of the course will be delivered at 8 p. m. October 5th.

#### 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," "conditioned," "incomplete," or "failed." In the four common branches, the term "passed, with excellence" will exempt its recipient from final examination. "Conditions" may be removed as indicated above. The term "failed," or the failure to remove a condition at the opening of the ensuing year, carries with it the necessity of repeating the work in class. "Incomplete" work must be made up before the final examinations of the following year.

A student who carries conditions into a succeeding year, may not complain of any conflict of hours resulting, but must always give preference to the unfinished studies of the lower and conflicting course.

Students must pass a majority of the studies of their year, in order to classify in the next succeeding year.

Habitual absence, without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

#### SPECIAL STUDENTS.

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.

FEEs.

With the coming year, the colleges of this department (with the exception of the college of pharmacy) will abandon the scale of fees for matriculation, lecture courses, laboratory courses, dissections and graduation. Instead, they have adopted the system of level fees, in which these items are merged, 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

\*In the college of dentistry the fee for the third year is \$100.00.

The present junior class, (the senior class after June 4th) will pay fees according to the present schedule, and will not come under the new rule.

One-half of the level 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 4th, 1897). 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 or dean of the faculty of the college to which the petitioner belongs.

A student who takes advanced standing will receive a credit of five dollars upon his level fee 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 before he can receive credits for his course or take his annual examinations.

A statement of these charges will be submitted to the registrar and such breakage or loss fees will be payable to him.

SPECIAL FEES.

Special students will pay to the registrar a fee of twenty dollars 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.

Fees for special graduate courses, of six weeks' duration, will vary from ten dollars to twenty-five dollars, per course.

A statement of the fees required by the college of pharmacy will be found in the announcement of that college.

# The College of Medicine and Surgery.

## THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*  
PERRY H. MULLAFD, M. D., *Dean; Professor of Principles and Practice of Surgery and Medical Jurisprudence.*  
THOMAS G. LEE, B. S., M. D., *Professor of Histology and Embryology.*  
GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*  
RICHARD CLING BEARD, M. D., *Professor of Physiology.*  
CHARLES JOHN BELL, A. B., *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. ABLOTT, 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. DUNSMOCK, M. D., *Professor of Operative and Clinical Surgery.*  
JAMES H. DUNN, M. D., *Professor of Genito-Urinary Diseases and Adjunct Professor of Clinical Surgery.*  
JAMES E. MOORE, M. D., *Professor of Orthopædia and Adjunct Professor of Clinical Surgery.*  
PARKS RITCHIE, M. D., *Professor of Obstetrics.*  
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 of Hygiene.*  
FRANK ALLPORT, 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.*  
CHARLES L. WELLS, A. M., M. D., *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 L. GREEN, M. D., *Instructor in Clinical Medicine and Physical Diagnosis.*  
H. L. STAPLES, M. D., *Instructor in Medical and Pharmaceutical Latin and in Clinical Medicine.*  
CHARLES ERDMAN, M. D., *Demonstrator of Anatomy.*

## CORPS OF INSTRUCTORS.

- ROBERT A. WHEATON, 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.*

JOHN T. ROGERS, M. D., *Clinical Instructor in Diseases of Children.*  
 ARTHUR J. GILLETTE, M. D., *Clinical Instructor in Orthopædia.*  
 BURNSIDE FOSTER, M. D., *Clinical Instructor in Dermatology.*  
 GEORGE D. HEAD, B. S., M. D., *Instructor in Pathology.*  
 J. E. SCHADLE, M. D., *Clinical Instructor in Diseases of the Nose and Throat.*  
 H. C. CAREL, B. S., *Instructor in Chemistry.*

#### DISPENSARY STAFF AND ASSISTANTS.

C. NOGTNAGEL, M. D., *Assistant in Clinical Medicine.*  
 C. A. ERDMAN, M. D., *Assistant in Medicine.*  
 M. W. GLENN, M. D., *Assistant in Clinical Medicine.*  
 A. E. BENJAMIN, M. D., *Assistant in Gynecology.*  
 R. E. CUTTS, B. S., M. D., *Assistant in Surgery.*  
 F. P. WRIGHT, M. D., *Assistant in Surgery.*  
 W. DE LA BARRE, M. D., *Assistant in Nose and Throat Diseases.*

### CURRICULUM.

The course in the college of medicine and surgery leads to the degree of doctor in medicine. It covers a period of four years of collegiate study, each year representing eight 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.

Students, seeking admission to this college, must fulfill the requirements common to all matriculants of the department of medicine.

#### ADVANCED STANDING.

Graduates of recognized universities or colleges of science, literature and arts, who have taken courses in chemistry, physiology or histology, equivalent to those pursued during the first year in this college, may present evidence of the fact to the chairs in question, which, if approved, will entitle them to credits for such work in freshman studies.

Those applying for entrance who have pursued courses of study in other recognized universities or colleges of medicine or of dentistry, will be credited with the actual work they have completed, provided such work be the equivalent of that required in this college, and will be admitted to advanced standing upon passing satisfactory examinations in those studies from which they desire to be exempt. No conditions of advanced standing, however, will entitle the student to take the two years of any graded study coincidentally; nor can any advanced study be undertaken unless the student has completed the subjects which are antecedent and related to it. (See table of related studies.)

The same rules will apply to students who are conditioned in graded and related studies. Classification in each year will depend upon a completion of a majority of the branches taught in the preceding year.

## GRADED SYSTEM OF STUDY.

### FIRST YEAR.

Histology and embryology, anatomy, physiology, chemistry.

### SECOND YEAR.

Histology and embryology, anatomy, physiology, chemistry, materia medica, bandaging.

### THIRD YEAR.

Surgical anatomy, pathology, bacteriology, surgical pathology, operative surgery, practice of medicine, obstetrics, gynecology, hygiene, physical diagnosis, therapeutics, ophthalmology and otology, nervous and mental diseases.

### FOURTH YEAR.

Practice of surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, therapeutics, nervous and mental diseases (optional), diseases of children, genito-urinary diseases, orthopædia, diseases of the skin, diseases of the nose and throat, medical jurisprudence, clinical studies in all branches, electives.

### RELATED STUDIES.

*Histology*, in the second year, can be taken by those who have completed the histology, anatomy and physiology of the first year's course.

*Anatomy*, in the second year, can be taken by those who have completed the anatomy and histology of the first year's course.

*Physiology*, in the second year, can be taken by those who have completed the histology and chemistry of the first year's course.

*Chemistry*, in the second year, can be taken by those who have completed the chemistry of the first year.

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## COURSES OF INSTRUCTION.

### HISTOLOGY AND EMBRYOLOGY.

This chair occupies a large part of the first floor and basement of the laboratory of medical sciences. The classes are taught in its general laboratory, extending across an entire wing of this building and well lighted by windows upon three sides and a portion of the fourth. The dimensions of the laboratory are forty-four by seventy-two feet. Adjoining it is a special laboratory for the use of advanced students, covering twenty by thirty-five feet.

The next apartment contains the library of the laboratory and neighboring rooms are devoted to the office and private laboratories of the professor and his assistants. Supplies are stored in a preparation and stock room in the basement.

The laboratories are equipped with seventy-five Leitz' microscopes, each fitted with double nose-piece and Abbè condenser. Several aquaria, incubators, water-baths, microtomes, a series of His' wax models, a photo-micrographic and reconstruction apparatus and technical glassware are included in the equipment.

Study tables, accommodating seventy students, are arranged immediately in front of the windows surrounding the room. A second tier of desks, providing for twenty students, is furnished with lockers for the storage of apparatus and materials for the use of the entire class.

A dumb-waiter serves to facilitate the transit of microscopes and material from one laboratory to another.

An abundance of carefully prepared histological and embryological material, both human and comparative, is kept constantly on hand and in process of development. Fresh material for histological sections and for the study of the embryo, at various stages of growth, is supplied from the animal-rooms of the chair of physiology.

The work in histology and embryology is as purely practical as possible. The student, at the opening of the course, is trained in the technique of the microscope. He is then instructed in the staining and mounting of prepared specimens. Later, he is taught to carry a series of sections through the various stages of preparation from the living tissue to the completed microscopical specimen. During his two years' course, he thus acquires a large and valuable collection of specimens, of his own preparation, illustrating the structure and development of the human body.

The work is illustrated by series of charts, in oil and water-colors, of embryological and histological subjects. Demonstrations are frequently given, under the microscope, of typical sections illustrating tissues and parts of organs, accompanied by camera lucida drawings or photo-micrographs with explanatory text.

This chair offers an opportunity for advanced courses of laboratory study and original research. Advanced students are admitted to the special laboratory and to the full use of the apparatus and material. Reference cabinets of embryological and histological specimens are open to their inspection. A reference library, consisting of a small but carefully chosen collection of related literature, of both standard and periodical character, is offered to them.

In addition, the other libraries of the University, together with the public libraries of Minneapolis and St. Paul, afford the student access to the best publications among current periodicals and monographs.

#### FOR UNDERGRADUATES.

*Course I. General morphology.* 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; reproduction; ovum, spermatozoon, formation of blastodermic layers. A detailed study of the structure and life-history of certain typical unicellular animal and plant forms, as amoeba, paramoecium, vorticella, the sporozoa, yeast, bacteria, spirogyra, etc. Simple multicellular forms, as hydra; a coelomate worm, as earth worm; the parasitic worms of man, leading to the consideration of the elements of structure in the vertebrata. Professor Lee. Lectures etc., 2 hours per week. Laboratory work, 6 hours per week 1st semester, 1st year.

*Course II. Elements of histology and embryology.* Lectures, demonstrations and laboratory work. A comparative study of the structure and development of the blood, epithelial, connective, muscular and nervous tissues; vascular and lymphatic systems; integumental organs and teeth. The formation of the embryo, foetal envelopes etc., with practical work on chick, frog and mammalian embryos. Professor Lee. Lectures, etc., 2 hours per week; laboratory work 6 hours per week. 2d semester, 1st year. Open to those who have completed course i.

*Course III. Advanced histology and embryology.* Lectures, demonstrations and laboratory work. Advanced methods of histological and embryological technique. The comparative study of the minute structure, origin, and development of the various organs of the alimentary, respiratory and uro-genital systems; the central and sympathetic nervous systems, the organs of special sense, etc. Professor Lee. Lectures, etc., 2 hours per week; laboratory work, 3 hours per week. 1st and 2d semesters, 2d year. Open to those who have completed the courses of the 1st year in histology and embryology and in anatomy and physiology.

#### FOR GRADUATES AND UNDERGRADUATES.

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 chair of anatomy occupies rooms in medical hall. These include two large students' 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 student, in his first year, takes a preliminary course of lectures upon osteology. This is accompanied by practical work in the bone laboratory, where he is furnished with all the bones of the human skeleton which he studies under the direction of 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 animals 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.

## ANATOMY.

### FOR UNDERGRADUATES.

*Course I. 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 10 weeks of first semester. Laboratory work on the human skeleton; class, in sections, two hours each section, for 10 weeks, first semester. Required of all first year students.

*Course II. Syndesmology.* Lectures, recitations and laboratory demonstrations, Three hours each week, for four 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; three 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, four hours each week, for five weeks. Open to those having taken course ii.

**Course IV. Splanchnology.** Lectures on the thoracic, abdominal and pelvic viscera, two 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. Professor Hendricks, Dr. Erdman.

**Course V. 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. Required of second-year students.

**Course VI. Descriptive and surgical anatomy.** Head, neck, trunk and extremities. Lectures and recitations, three 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, three hours each week, for eight weeks. Open to those who have completed course vi. Professor Hendricks.

**Course VIII. Dissecting.** The work extends over two periods of six weeks each, requiring five afternoons of each week. The method of work follows that laid down in Holden's Manual of Dissections. Dr. Erdman. These second year lecture and dissecting courses are open to those having completed the first year's work in anatomy and histology.

**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. One hour per week, first semester. Required of third year students. Professor Hendricks.

**Course X. Applied anatomy of the nervous system.** Elective.

## PHYSIOLOGY.

The chair of physiology occupies a suite of rooms in the laboratory of medical sciences, including a general laboratory of physiology and physiological chemistry, a demonstration room for experimental work and the library and office of the professor in this branch.

A large amphitheatre, adapted to the demonstration of major experiments, immediately adjoins the laboratory and is used, also, for lecture purposes by this and other chairs.

Class-work in physiological chemistry is conducted in the laboratory of chemistry, occupying the adjoining building.

In the basement of the laboratory of medical sciences, the chair maintains a spacious and comfortably equipped animal-room, which is furnished with a large aquarium, frog-tanks, rabbit and guinea-pig enclosures, breeding cages, rat and mouse cages, and dog and cat kennels. 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 apartment at a distance from this room.

The physiological laboratory is equipped with a fair supply of apparatus, instruments, etc., for experimental purposes, and with materials, glassware, digesters, water-baths, ventilating hood, etc., for the work in physiological chemistry. Its outfit includes sets of vivisection instruments, an artificial respiratory machine, batteries; DuBois-Reymond coils, galvanometers, rheostats, moist muscle chambers, recording drums, Ludwig's kymograph, spring myograph, Burdon Sanderson's stethometer, Dudgeon's sphymographs, Runnés' Chronograph, Roy's tonometer, Gaskell's clamp, etc., etc.



The course in physiology is graded in the first and second years. In the first year, the student takes 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; 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; of respiration and of 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 per 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. Under this subject, 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 biogico-chemical changes of the tissues.

A laboratory reference library is in process of collection, to which the advanced student will have access for collateral reading.

#### FOR UNDERGRADUATES.

*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. Three hours per week, 1st 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. Three hours per week, 2nd semester, first year. Open to those who have completed course i. Professor Beard.

*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 dietetics; of reproduction; of the physiological changes incident to successive periods of life; and of the functions of the nervous system. Two hours per week, both semesters, second year. Open to those who have completed the courses in physiology of the first year and the freshmen courses in histology and chemistry. Professor Beard.

*Course IV. Physiological chemistry.* Laboratory work. A practical study of the several classes of proteids; of carbo-hydrates, fats, bone, muscle and blood; of gastric juice, saliva, pancreatic juice, and bile in their respective digestions; of milk; of glycogen; and of extractives. Three hours per week, first semester, second year. Open to those who have completed the work in freshman physiology and in first year histology and chemistry. Professor Beard.

*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 functions. Three hours per week, second semester, second year. Open to those who have completed course iv. Professor Beard.

## GRADUATE COURSES.

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.

## CHEMISTRY.

This chair occupies a laboratory building especially devoted to its uses. During the coming year this building will be refitted with two general laboratories, preparation rooms, stock rooms and private laboratories for the professor of chemistry and his assistant. At present its class-work is conducted in the single main laboratory of the building, which accommodates seventy-two students. This laboratory has the usual equipment of reagent desks, ventilating hoods, sinks, reagents, glassware and material. In it are conducted the courses in practical chemistry, inorganic and organic, in toxicology, in chemical urinalysis and in physiological chemistry which are required in the first and second years. The chemical lecture room, with an adjoining preparation room, are situated in medical hall.

*Course I. General inorganic chemistry.* Lectures and recitations. Three hours per week, first semester, first year. Professor Bell.

*Course II. Preparation and study of inorganic compounds.* Laboratory work. Six hours per week, from December 1st to the end of the first semester.

Professor Bell and Mr. Carel.

*Course III. General inorganic chemistry, continued.* Qualitative analysis. Lectures and recitations. Two hours per week, second semester, first year. Professor Bell.

*Course IV. Qualitative analysis.* Laboratory work. Six hours per week, second semester, first year. Professor Bell and Mr. Carel.

*Course V. Analysis of urine.* Lectures and recitations. One hour per week, first semester, second year. Professor Bell.

*Course VI. Qualitative and quantitative analysis of the urine.* Laboratory work. Six hours per week, from October 5th to December 1st, second year.

Professor Bell and Mr. Carel.

*Course VII. Toxicology, organic and inorganic; the elements of organic chemistry; water analysis.* Lectures and recitations. Two hours per week, second semester, second year. Courses v, vi and vii open to those who have completed first year chemistry.

## 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 and 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 action. Lectures, recitations and laboratory work. Three hours per week in both semesters, 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. Two hours per week, in both semesters, 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 per week, during both semesters, fourth year. Professor Bracken.

## PATHOLOGY AND BACTERIOLOGY.

The chair of pathology and bacteriology occupies spacious quarters in the new laboratory of medical sciences. A general laboratory, 44x70 feet, well lighted by windows on three sides and a part of the fourth, and affording desk room, with ample window space, for ninety-five students. Beneath the student's desks lockers are provided for the storage of apparatus and materials. The room is furnished with ventilating hood, sinks, gas fixtures, etc., for use in staining and other chemical work. A preparation room, for the development of pathological sections, flanks it upon the one side; the private laboratory of the professor of pathology and bacteriology upon the other. Adjoining the latter is an incubator room, containing sterilizers, incubators, filters and culture media, for the preparation of bacteriological work.

Adjoining this is the pathological research room, occupied by the chair of surgical and clinical pathology. Specimens, illustrative of surgical pathology, are prepared in this room.

In the basement of the building a preparation and store-room, an experimental pathological laboratory and a bacteriological animal room belong to this branch. A large museum will be fitted up in the near future upon the third floor for the storage and exhibition of pathological specimens, while a preparation room for the care and preservation of these specimens adjoins it.

This chair has at its command seventy-five Leitz microscopes, with attachments, and is provided with a line of pathological apparatus which includes freezing, paraffin and celloidin microtomes and other instruments for the preservation and development of specimens.

The course in pathology and bacteriology consists of lectures, recitations and demonstrations, together with practical observations with the microscope and upon the cadaver by means of autopsies. In all its branches the subject is taught as practically as possible. The student is trained in the comparison of abnormal with normal tissues and of pathological processes. Collections of preserved specimens are kept for this purpose and fresh sections are made, as opportunities offer, for the use of the class.

The hospitals of Minneapolis and St. Paul afford the chair a large supply of pathological material and frequent opportunities for post-mortem examinations.

In the subject of bacteriology the student is given a thorough knowledge of the relations of this science to disease and to prophylaxis. He is trained in bacteriological technique, so as to enable him to make bacterial diagnoses and to analyze air, water, milk, foods and body fluids, as the subjects of bacterial contamination. He prepares a series of cultures of pathogenic bacteria and is taught to familiarize himself by these means with bacterial forms. At the end of his course in these two branches he has a valuable collection of permanent specimens, of both pathological and bacteriological character, for future microscopic study.

## FOR UNDERGRADUATES.

*Course I. General pathology.* Lectures and demonstrations. The general processes involved in disease. The consideration of tumors will be, however, omitted, since this subject will be fully dealt with in the course on surgical pathology. Two hours per week, in the first semester, third year. Professor Wesbrook.

*Course II. The pathology of special organs.* This course consists of:

(a) Lectures and demonstrations in which will be employed both fresh tissues and preserved gross specimens from the pathological museum. Two hours per week, in second semester, third year.

(b) Practical laboratory work in which the student will be required to mount and examine, under the microscope, selected specimens illustrative of morbid processes. In this way not only will a knowledge be acquired of the microscopic appearance of diseased tissues, but a good working set of permanent preparations will be obtained. Where diseases are dependent on or characterized by the presence of bacteria, the pathological lesions and their histological characteristics will alone be considered; the demonstration of the bacteria themselves being given in the course on elementary bacteriology. Six hours per week, in second semester, third year. Open to those who have completed courses i and vi. Professor Wesbrook.

*Course III. Surgical pathology.* This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological basis 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 morbid 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. Two hours per week, second semester, third year, and first semester, fourth year.  
Professor Stewart.

*Course IV. Autopsies and post mortem technique.* In this course students will have an opportunity of personally taking part in and conducting the work under the direction of the pathologist in charge. A knowledge of the technique of post mortem work and of morbid anatomy will be thus afforded. This course will be given, as opportunity offers, throughout the third and fourth years, both in Minneapolis and St. Paul.  
Professor Stewart and Dr. Rothrock.

*Course V. Clinical microscopy.* This course will consist of demonstrations and practical laboratory work, in which will be included the microscopic examination of pathological urine, faeces, sputum, and blood; parasites, cyst and stomach contents, etc. It will be conducted in the pathological laboratory, under the direction of the professor of pathology, by Dr. Head. First semester, third year.

*Course VI. Elementary bacteriology.* Though, of necessity attention must be paid to bacteria of all kinds, for the purpose of the differentiation of the pathogenic from the harmless varieties, the aim will be to study this science in its special relation to disease. Both the pathological and hygienic aspects of bacteriology will receive due consideration. This course consists of:

- (a) Lectures and demonstrations. Two hours per week, in first semester of third year.
- (b) Laboratory work. Practical work will consist of the preparation of the various culture media, the technique of sowing and of examination of cultures, the separation and isolation of bacteria, the staining and making of permanent preparations of micro-organisms, both from cultures and in tissue. The diagnosis of disease by bacteriological methods will be especially dwelt upon. Six hours per week, in first semester, third year. Open to those who have completed course iii in histology.

Professor Westbrook.

#### FOR GRADUATES AND UNDERGRADUATES.

*Course VII. Advanced bacteriology.* (Optional and open to those who have taken course vi, or the equivalent.) This course will be given to those who desire to prepare themselves for special or research work. It will include lectures and practical laboratory work in the bacteriological examination of water, earth, air, foods, etc., with special work in the study of the anaerobic bacteria. Bacterial toxins, preparation of such diagnostic agents as tuberculin, mallein, etc., as well as the bacteriological aspect of serum-therapy, will be considered.

*Research.* Special facilities will be afforded those who are properly qualified and desirous of doing research work along pathological or bacteriological lines.

#### HYGIENE.

This course 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 causes of their contamination. It treats of food-stuffs and their adulteration. It deals, especially, with the relations of the subject to bacteriology. One hour per week, first semester, third year.  
Professor Fulton.

#### PRACTICE OF MEDICINE.

*Course I. The practice of medicine.* Didactic lectures and recitations, two hours per week, in both semesters, third and fourth years.  
Professor Hunter.

- Course II. The practice of medicine.* Didactic lectures and recitations. One hour per week, both semesters, third and fourth years. Professor E. J. Abbott.
- Course III. Clinical lectures on general medicine.* (a) City hospital, Minneapolis, two hours per week, first semester, third and fourth years. Professor J. W. Bell and Dr. Staples.
- (b) St. Barnabas Hospital, Minneapolis, two hours per week, first and second semesters, third and fourth years. Professor Hunter and Professor Bracken.
- (c) Asbury Hospital, Minneapolis, two hours per week, second semester, third and fourth years. Professor J. W. Bell and Dr. Staples.
- (d) City Hospital, St. Paul, two hours per week, first and second semesters, third and fourth years. Professor E. J. Abbott.
- (e) St. Josephs Hospital, St. Paul, two hours per week, first and second semesters, third and fourth years. Professors Senkler and Abbott and Dr. Green.
- (f) St. Lukes' Hospital, St. Paul, two hours per week, first and second semesters, third and fourth years. Professors Senkler and Abbott and Dr. Green.
- (g) University Dispensary, two hours per week, first and second semesters, third and fourth years. Dr. Staples and Dr. Glenn.
- (h) City Dispensary, St. Paul, two hours per week, second semester, third and fourth years. Dr. Green.

### 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.
- 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.
- 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. Professor Bell.  
One hour per week, in both semesters, third year.
- Course IV. 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.  
Three hours per week during both semesters in the fourth year. Professor Bell.
- Course V. 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.  
Two hours per week, both semesters, fourth year. Dr. Green.

### SURGERY.

- Course I. The principles and practice of surgery.* Lectures and recitations.  
Two hours per week, in both semesters, fourth year. Professor Millard.
- Course II. Bandaging;* a practical course of demonstrations in bandaging.  
Sixteen hours, second semester, second year. Professor Millard.
- Course III. Operative surgery.* A course of lectures and demonstrations, upon the human cadaver and upon the living animal, of the technique of major and minor operations.  
One hour per week, second semester, third year. Professor Dunsmoor.
- Course IV. The surgery of the genito-urinary tract.* Lectures and recitations.  
One hour per week, first semester, fourth year. Professor Dunn.
- Course V. Orthopaedia.* Lectures, recitations and clinical demonstrations.  
One hour per week, second semester, fourth year. Professor Moore.

*Course VI. 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 Hospital, St. Joseph's Hospital and St. Luke's Hospital, in St. Paul, weekly, in both semesters, by Professor C. A. Wheaton.

At the City Hospital, St. Paul, weekly until January 1st, by Professor Millard.

At St. Luke's Hospital and the St. Paul Free Dispensary, weekly, in second semester, by Professor Millard.

At the City Hospital, St. Joseph's Hospital, St. Luke's Hospital and the Free Dispensary, at St. Paul, with sections of the class, weekly, both semesters. Dr. R. A. Wheaton, Dr. G. L. Coon and Dr. A. J. Gillette.

At the Asbury Hospital and the City Hospital, at Minneapolis, weekly, both semesters, by Professor F. A. Dunsmoor.

At St. Mary's Hospital and Asbury Hospital, weekly, both semesters, by Professor J. H. Dunn.

At St. Barnabas Hospital and the Northwestern Hospital, weekly, in both semesters, 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. Two hours per 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. Two hours per week, second semester, third year. Professor Ritchie.

*Course II. Course of demonstrations,* by charts and upon the manikin, associated with the course of 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 or Dr. H. W. Davis.

### GYNECOLOGY.

The course in 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.* One hour per week, both semesters, third year. Professor Stone.

*Course II. Clinical course.* Observation of patients, methods of examination, diagnosis and treatment. Both semesters, fourth year.

Professor Stone, Professor A. W. Abbott, Professor McLaren.

### OPHTHALMOLOGY AND OTOTOLOGY.

*Course I. General and inflammatory diseases of the eye and its appendages.* Lectures and recitations. One hour per week, first semester, third year. Professor Fulton.

*Course II. Refraction and its errors. Diseases of the ear.* Lectures and recitations. One hour per week, second semester, third year. Professor Allport.

*Course III. Clinical lectures* will be given by Professor Fulton at St. Joseph Hospital on every Saturday during both semesters.

Clinical lectures will be given every Wednesday by Professor Fulton at the City Hospital during the months of January, February and March.

Ocasional clinics will be given at St. Lukes Hospital. Fourth year.

*Course IV. Clinical lectures* will be given in Minneapolis on Saturdays, throughout the year, at the different Hospitals of the City, by Professor Allport. Fourth year.

St Paul and Minneapolis Free Dispensaries 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 third year. A supplementary course will be given in the fourth year 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. One hour per week to January 1st, third year. Professor Jones.

*Course II. Electro-physics, electro-physiology, electro-diagnosis, electro-therapeutics, diseases of the brain and cord, Peripheral and functional neuroses, psychiatry.* Lectures, recitations and demonstrations. One hour per week, from January 1st to end of second semester, third year. Professor Riggs.

*Course III. Advanced course of lectures upon nervous and mental diseases.* (optional) One hour per week, both semesters, fourth year Professor Riggs and Professor Jones.

*Course IV. Clinical course.* Practical instruction will be given upon Wednesdays and Saturdays, throughout both semesters. 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, Northwestern Hospital, and the University Free Dispensary.

### DISEASES OF CHILDREN.

*Course I, Theory and practice.* Lectures and recitations, One hour per week, both semesters, fourth year. Professor Wells.

*Course II. Clinical instruction* will be given in this branch in the hospitals and dispensaries of Minneapolis and St. Paul. Fourth year, Professor Wells and Dr. Rogers.

### 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.* One hour per week, both semesters, fourth year. Professor Van der Horck.

*Course II. Clinical lectures,* in connection with the dispensaries and hospitals of Minneapolis and St. Paul. Weekly, in the fourth year. Professor Van der Horck and Dr. 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. One hour per week, first semester, 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. Five hours per week, both semesters, fourth year. Professor Laton.

Similarly, clinical instruction will be given weekly in the Hospitals and Dispensaries of St. Paul. Dr. Schadle.

## MEDICAL JURISPRUDENCE.

A course of lectures and recitations, in the legal relations of medicine, is given in the first semester of the fourth year. Professor Millard.

## ELECTIVE COURSES.

Elective or optional courses in the following branches are offered to the undergraduates who purpose to enter for the degree of doctor of medicine *cum laude*. Special topics for study, as major or minor requirements of such candidacy, are suggested in each branch:

*Histology and Embryology:*

- The histology and histogenesis of the tissues.
- The histology and histogenesis of the organs of the body.
- The histology and histogenesis of the nervous system, and of the sense organs.
- Comparative embryology of vertebrates,

*Anatomy:*

- The anatomy of the special sense organs.

*Physiology:*

- The digestion and metabolism of sugars.
- The thermotaxic mechanisms of the animal body.
- Cerebral localization.

*Pathology and Bacteriology:*

- The bacterial toxins,
- Serum therapy.

*Physical Diagnosis:*

- Senile changes in the circulatory apparatus.

*Surgical Pathology:*

- Experimental results.

*Surgery:*

- Experimental operative surgery.

*Gynecology:*

- Ovarian reflexes,
- Extra uterine pregnancy, without rupture.

*Ophthalmology and Otology:*

- The physiology of the labyrinth.

An optional course in botany is offered in the first semester of the first year. It will consist of lectures, recitations and laboratory exercises. The course includes a study of the structure and functions of the vegetative organs of plants, roots, stems and leaves; a discussion of plant histology; of the cell and the principal tissues; of plant physiology; of the chemical processes in the plant; the various products of metabolism: their function in the plant economy and their economic and medicinal value; of the morphology and physiology of flowers, fruits and seeds, and of the principles of scientific nomenclature.

Mr. Francis Ramaley.

## GRADUATE COURSES.

The faculty will inaugurate with the coming year a series of graduate courses of instruction. These courses will be of six weeks' duration, opening Tuesday, November 17th and closing Tuesday, December 22d, 1896. It will be the endeavor of the faculty to make these courses as practical as possible and to emphasize their laboratory and clinical features. Graduate students will be admitted to the use of the special laboratories and equipment attached to each chair.

The following courses are offered:

- The comparative histology and embryology of the tissues and viscera.*
- Comparative histology and embryology of the nervous system and sense organs.*
- The comparative embryology of vertebrates.*



<i>Methods of microscopical work.</i>	Professor Lee.
<i>The applied anatomy of the nervous system.</i>	Professor Hendricks.
<i>Recent advances in physiology.</i>	
<i>The physiological chemistry of the fluids of the body.</i>	
<i>Methods of experimental physiology.</i>	Professor Beard.
<i>Bacteriological technique.</i>	
<i>The bacterial examination of air, earth, water and foods.</i>	Professor Wesbrook.
<i>Surgical and experimental pathology.</i>	Professor Stewart.
<i>Gastro-intestinal diseases.</i>	Professor Hunter.
<i>Physical diagnosis.</i>	Professor Bell.
<i>Operative surgery.</i>	Professor Dunsmoor.
<i>Operative obstetrics.</i>	Professor Cates.
<i>Gynecology.</i>	Professor Abbott.
<i>Ophthalmology and Otology.</i>	Professor Allport.
<i>Anatomy and Physiology of the Nervous System.</i>	Professor Jones.
<i>Surgical diagnosis.</i>	Professor Dunn.
<i>Clinical surgery.</i>	Professor Moore.
<i>Dermatology and genito-urinary diseases.</i>	Professor VanderHorck.
<i>Laryngology and rhinology.</i>	Professor Laton.

## TEXT BOOKS AND COLLATERAL READING.

The following text-books are preferred by the faculty. Reference works are suggested, also, for collateral reading.

*Histology.* First year. Quain's Anatomy, 10th edition, Vol. I, Pt. II.

Piersol's Normal Histology.

Böhm u. von Davidoff's Histologie.

Hertwig's Die Zelle u. die Gewebe.

Parker's Elementary Biology.

Second year: Quain's Anatomy, Vol. III, Pts. 1, 3 and 4.

Stirling's Practical Histology.

Piersol's Histology.

*Collateral reading:* Behren's Kossel u. Schiefferdecker's Gewebelehre; Kölliker's Gewebelehre; Lee's Microtometist's Vade Mecum.

Sedgwick and Wilson's General Biology; Huxley and Martin's Practical Biology.

*Embryology:* Hertwig-Mark's Text-Book of Embryology,

Quain's Anatomy, Vol. I, Pt. 1.

Marshall's Vertebrate Embryology.

*Collateral reading:* Minot's Human Embryology. Kölliker's Entwicklungs geschichte;

Prénant's Elementes d' Embryologie.

*Anatomy:* First year: Quain's Anatomy, 10th edition, Vol. II, Pts. 1 and 2.

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.

Holden's Manual of Dissections.

Treves 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.

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:* First year: Remsen's Introduction to Inorganic Chemistry.

Second year: Tyson's Examination of Urine.

Reese's Toxicology.

Taylor on Poisons.

*Materia Medica and Therapeutics:* Bracken's Outlines of Materia Medica and Pharmacology; practical Dietetics, Thompson.

*Collateral reading:* The Pharmacopeia of the U. S.

The National Dispensatory.

Sayre's Organic Materia Medica and Pharmacognosy.

Hare's System of Practical Therapeutics,

Allen's Handbook of Local Therapeutics.

*Pathology:* Ziegler's General Pathology.

*Collateral reading:* Hamilton's Text-Book of Pathology; Delafield & Prudden's Pathological Anatomy and Histology; Woodhead's Practical Pathology; Weichselbaum's Elements of Pathological Histology; Boyce's Morbid Histology.

*Surgical Pathology.* Warren's Surgical Pathology.

*Collateral reading:* Senn 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.

*Collateral reading:* Lenhartz' Microscopie u. Chemie am Krankenbett; Linbeck's Klinischen Pathologie.

*Bacteriology:* Abbott's Principles of Bacteriology.

Kanthack and Drysdale's Practical Bacteriology.

*Collateral reading:* Sternberg's Manual of Bacteriology; Fraenkel's Bacteriology; McFarlane's Pathogenic Bacteria; Woodhead's Bacteria and their Products.

*Practice of medicine:* Osler's Practice of Medicine.

Hilton Fagge's Practice of Medicine.

*Collateral reading:* Flint's Practice of Medicine; Reynold's System of Medicine; Loomis' Practice of Medicine; Robert's Practice of Medicine.

*Physical diagnosis:* Page's Physical Diagnosis.

Flint's Auscultation and Percussion.

Musser's Medical Diagnosis.

*Collateral reading:* Bramwell's Medical Diagnosis; Bramwell's Heart and Thoracic Aorta; Fox's Physical Diagnosis.

*Surgery:* Warren's Surgical Pathology and Therapeutics.

Senn's Principles of Surgery.

Moulin's American Text Book of Surgery.

Robert's Modern Surgery.

*Collateral reading:* Ashurst's Encyclopædia of Surgery; Agnew's Practice of Surgery.

*Genito-urinary diseases:* Thompson's Diseases of Urinary Organs.

*Collateral reading:* Van Buren and Keyes' Venereal Diseases; Bumstead and Taylor's Venereal Diseases.

*Orthopaedia:* Moore's Orthopedic Surgery.

Bradford and Lovett's Orthopedic Surgery.

*Obstetrics:* Lusk's Midwifery.

American System of Obstetrics,

Grandin and Jarman's Midwifery.

*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; Hart and Barbour's Manual of Gynecology.

- Ophthalmology and Otology*: Noyes' Diseases of the Eye.  
Swanzy's Diseases of the Eye.  
Roosa's Diseases of the Ear.  
Pollitzer'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.
- 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.  
Bigelow'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 Functions of the Brain; Ferrier's Localizations of Cerebral Disease; 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.
- Diseases of children*: J. Lewis Smith's Diseases of Children.  
American Text-book of Diseases of Children.  
*Collateral reading*: Cyclopædia of Diseases of Children.
- Diseases of skin*: Hyde's Diseases of the Skin.  
*Collateral reading*: Duhring's Diseases of Skin; Crocker's Diseases of Skin; Fox's Skin Diseases.
- Diseases of the nose and throat*: Bosworth's Diseases of the Nose and Throat.  
*Collateral reading*: Ingall's Diseases of the Nose, Throat and Lungs; Sajous' Diseases of the Nose and Throat.
- Hygiene*: Coplin and Bevan's Practical Hygiene.  
Parke's Hygiene.  
*Collateral reading*: Richardson's Preventive Medicine; Buck's Hygiene and Public Health.
- Medical jurisprudence*: Reese's Medical Jurisprudence.  
Tidy's Legal Medicine.  
*Collateral reading*: Hamilton's American System of Legal Medicine; Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence.

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## RULES AND REQUIREMENTS.

### EXAMINATIONS.

In the studies of the first and second years, the classes will recite in sections during hours regularly assigned for this purpose. They will be required to take mid-year examinations in these branches, at the close of the first semester. Examinations for conditioned students are held in the first week of October and the third week in May. Advanced standing examinations are held at the same time. Senior students who carry conditions must remove them at the close of the first semester, when special examinations will be conducted, in order to make them eligible for final examinations.

The final examinations, in all studies, occur between May 14th and May 28th.

## DEGREES.

The degrees of doctor of medicine and of doctor of medicine, *cum laude*, are conferred by the Board of Regents upon students who are recommended, by vote of the faculty, for graduation. Candidates for the degree of doctor of medicine must, however, possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.
- (3) 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.
- (4) Satisfactory examinations passed in all branches in accordance with the foregoing rules.

N. B. Students who may have matriculated in the three year's course, provided in this University prior to January 1st, 1895, will obtain their degrees at the close of that period (June, 1897), provided they have otherwise fulfilled the above requirements and have been in continued residence since their entry and until that date.

Students may enter for the degree of doctor of medicine, *cum laude*, who have been exempt from their final examinations, on account either of advanced standing or term excellence, in all the studies of the first and second years; who have been unconditioned and have passed satisfactory examinations in all the studies of the third and fourth years. To attain that degree they must choose two elective studies, one of which shall be considered as a *major* and the other as a *minor*, and one of which may be of a clinical and the other of a laboratory character. Work in these electives must be done in the first semester of either the third or fourth years under direction of the faculty. Not less than ten hours' time per week during such semester shall be put upon the major and not less than three hours per week upon such minor elective. Upon both electives satisfactory examinations shall be passed by the candidate, under the chair in charge of the selected studies. If the major be a clinical study, a type-written report, or, if it be a laboratory study, a type-written thesis upon the work accomplished shall also be prepared and presented, for approval, to the executive committee of the faculty. Such report or thesis, if approved, shall be at the disposal of the faculty, for publication, over the name of its author and that of the chair directing or assisting in its preparation. If not published, it shall remain the property of the chair.

## DISPENSARY AND HOSPITAL CLINICS.

## DISPENSARIES.

The University free dispensary is located in the basement of medical hall. Several rooms are 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 has been, very recently, re-organized and incorporated. It has acquired the lease of 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 mornings and afternoons and Wednesday 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 classes 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.

THE CITY HOSPITAL, of St. Paul, occupies a new large building, of modern construction and generously equipped with clinical conveniences. Its management has spared neither effort 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 has recently been completed and possesses all the most desirable features of modern hospital architecture. It is, in fact, one

of the finest hospital structures in the west. It is furnished with an amphitheatre for the benefit of students and has a thoroughly equipped operating room, in which clinics are frequently conducted.

#### 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 insane asylums of this and adjoining states. A few appointments are awarded to undergraduates, by means of competitive examinations.

#### 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 2nd, 1897, in Medical Hall. The association may be addressed through its secretary, Dr. C. A. Erdman. All 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. Perry H. Millard, Dean, College of Medicine and Surgery, University of Minnesota, Minneapolis, Minn.

# College of Homeopathic Medicine and Surgery.

## THE FACULTY.

CYRUS NORTROP, 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. CLARK, 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., }

HENRY H. LEAVITT, A. M., 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.*

*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.*

H. L. STAPLES, M. D., *Instructor in Latin.*

FRANCIS RAMALEY, B. S., *Instructor in Botany.*

## ANNOUNCEMENT.

In the organization of this college the Board of Regents of the University of Minnesota has aimed to secure the united efforts of the homeopathic practitioners of the State in the establishment of a college broad in its scope and complete in its teaching corps.

The college of homeopathic medicine and surgery confidently appeals to the profession of the Northwest to second its efforts to educate thoroughly those students who wish to practice homeopathy.

Every practitioner fully appreciates the great advantage to be derived by the practical study of disease. The young physician who has depended upon his reading and attendance upon didactic lectures, to the exclusion of bed-side or clinical study, will find himself hampered and embarrassed at almost every step in his career. Practical points in practice are only acquired by slow degrees, and often at the expense of the patient's welfare or of professional reputation. Hence the importance of attending at least one course of lectures in a large city, where material for dissection and surgical demonstrations is fresh and abundant, and where there are large hospitals and clinics constantly crowded with every variety of disease and surgical injury. The difference in expense is but trifling, while the advantage in favor of the great metropolis is incalculable. Minneapolis and St. Paul are not only great commercial centers, easily reached by a net-work of railroads extending to all points of the compass, but are great medical centers to which the diseased and maimed come in search of relief, thus filling the many hospitals with choice clinical material from all quarters of the great Northwest.

These advantages, with those furnished by the dispensaries of two large cities, will give unsurpassed opportunities for special study, and will make practical clinical work a feature of the college.

Quizzes of the nature of daily recitations will be given by each professor upon the subject of the previous lecture.

Senior students will have opportunity to attend out-door patients, to assist in special and general surgical operations, and to attend at least three obstetrical cases during the last course of lectures.

#### EXAMINATIONS.

Examinations will be conducted at the end of each year, upon the subject taught during the year, according to the schedule printed elsewhere. Attendance upon at least four-fifths of the lectures under each chair is required in order that the student may be allowed to enter for final examination, or to receive a certificate of attendance. Ten per cent of the senior class will be recommended to receive the degree 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.

The dispensary, located at 1416 Washington avenue south, occupies an entire building, and thus increased and unusual facilities are offered the students 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 in practice. Patients present themselves in large numbers daily, more than eight thousand prescriptions being made during the past 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.

### HOSPITAL CLINICS.

Each Monday is devoted to clinics held in one of the hospitals of Minneapolis and St. Paul, by a member of the faculty.

#### CITY HOSPITAL, MINNEAPOLIS.

The faculty of the college of Homeopathic medicine and surgery is largely represented on the staff of this institution. One-third of all the patients admitted are placed in the homeopathic department.

Graduates of this college are eligible for appointment to the position of interne in this hospital. Two internes are appointed each year after a competitive examination.

#### 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.

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### COURSE OF INSTRUCTION.

The extension of the course of instruction to four years enables the faculty to present to the student 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.  
Minor surgery and bandaging.

#### THIRD YEAR.

Surgical anatomy.  
Bacteriology, general pathology.  
Materia medica and therapeutics.

#### SECOND YEAR.

Materia Medica—experimental.  
Organic chemistry—toxicology and urinalysis.  
Anatomy dissection.  
Physiology—chemical and experimental.  
Surgical emergencies and bandaging.  
Hygiene and sanitary science.  
Physical diagnosis.

#### FOURTH YEAR.

Surgical pathology.  
Materia medica and therapeutics.  
Practice of medicine.

Practice of medicine, Organon and institutes of medicine.	Clinical medicine.
Clinical medicine.	Mental and nervous diseases.
Obstetrics.	Dermatology and genito-urinary diseases.
Principles and practice of surgery.	Obstetrics.
Diseases of women.	Clinical obstetrics.
Pædology.	Principles and practice of surgery.
Ophthalmology and otology.	Heart and respiratory organs.
Heart and respiratory organs.	Ophthalmology and otology.
Orthopædic and clinical surgery.	Medical jurisprudence.
Clinics—medical and surgical.	Diseases of women—didactic and practical
	Clinics—medical and surgical.

#### MATERIA MEDICA AND THERAPEUTICS.

The first year students will receive instruction in homœopathic pharmacy, kindly furnished, as for several years past, by Mr. G. A. Babendrier. This instruction will comprise a thoroughly practical course in the preparation of homœopathic drugs, fully illustrated, each student receiving personal laboratory drill in the necessary details of prescription writing, making of powders, cerates, etc.

During the second year, for at least one hour a week, experiments in testing the effect of drugs will be made, and lectures held upon the toxicology and physiological action of a few leading drugs; a groundwork being thus laid for more detailed knowledge. The remaining years will be devoted to the study of the chief drugs of the homœopathic materia medica, classified according to their scientific relations in the natural kingdoms, and their practical relations in applied medicine. In the daily quiz time will be devoted to general and special therapeutics, as allied to the use of drugs.

Examinations will be held at the close of each year, the results of which will determine each student's standing, as in the other primary branches.

Text-books—First year, American Homœopathic Pharmacopœia; second, third and fourth years, Hughes' Pharmac-Dynamics, Farrington's or Cowperthwait's Materia Medica, Hahnemann's Organon. Reference-books—Allen's Hand Book, Hering's Condensed Materia Medica, Dunhams Lectures.

#### CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.

The course of instruction in physical diagnosis consists of a series of didactic lectures, teaching the general principles upon which this science is based, with illustrations and demonstrations upon the healthy body; this is followed by clinical work, showing the practical application of these principles in diseased conditions at the dispensary and hospitals, which furnish abundant material for this method of teaching. Outside dispensary work also furnishes the members of the graduating class with cases of acute disease, which they treat under the supervision of the professor of this department. In addition to physical examination and diagnosis, the special aim will be to teach and to demonstrate the practical application of, homœopathic principles in therapeutics.

Text-books—Lilienthal's Therapeutics; Lippe's Repertory; Farrington's Clinical Materia Medica; Vierordt's Medical Diagnosis; Abrams' Manual of Clinical Diagnosis.

#### PRINCIPLES AND PRACTICE OF SURGERY.

A comprehensive course of lectures on general surgery will be given. Surgical pathology will be treated in a concise and comprehensive manner. Surgical anatomy will be carefully and thoroughly demonstrated. Senior students will be required to perform amputations, excisions, resections and all the other principal operations that belong to this class, upon the living and upon the cadaver. They are also required to ligate the principal arteries of the body. The professor of surgery gives this work his personal attention.

Text-books—Homœopathic Text-book of Surgery, Bryant, Erickson, Packard and Holmes.

CLINICAL AND ORTHOPÆDIC SURGERY.

The diagnosis, prognosis and homeopathic treatment of surgical diseases will be taught practically. Surgical operations will be performed before the class. There will be two clinics and one lecture each week on surgical emergencies, minor surgery and orthopædia.

Text-books—Helmuth, *The Homœopathic Text Book of Surgery*; Gilchrist's *Surgical Therapeutics*; Ramaley's *Surgical Diagnosis*; Maullin, Bradford and Lavitt.

Reference-book—*International Encyclopædia of Surgery.*

DISEASES OF WOMEN.

A systematic course of lectures upon the anatomy, physiology and pathology of the generative organs, with the etiology, symptomatology and treatment of their diseases will be given.

Abundant supply of material at the dispensary and the hospitals permits of clinical and bedside instruction; and principal operations upon the pelvic organs will be performed.

Text-book—Wood.

DISEASES OF NOSE, THROAT AND EAR.

Didactic lectures of diseases of the nose, throat and ear will be delivered to third year students; it will be the aim of this course to show the logical sequence of etiology, pathology, symptomatology and treatment.

Text-book—Nose, Throat and Ear, McBride. Reference—Burnett Lysken, *Nose and Throat*, Ivins-McDonald; Reference, Bosworth; Ear. Buck-Houghton; Reference, Roosa.

Clinical instruction to familiarize the student with the use of instruments and the technique of operations and local treatment will be given to the fourth year students.

OPHTHALMOLOGY.

In the department of ophthalmology are taught the anatomy of the eye and its appendages, with didactic and clinical lectures upon the diseases commonly met with in each part of the organ.

Attention is given to the relationship existing between diseases of the eye and other organs of the body, and general systemic disturbances which produce reflex eye troubles. The great abundance of clinical material presented at the dispensary and hospitals, affords opportunity to witness all operations which are of importance in this branch of surgery.

With the inauguration of the extended term will be given special instruction in the correction of errors of refraction, and the use of the ophthalmoscope in the diagnosis of intra-ocular troubles.

Text-book—Norton.

MENTAL AND NERVOUS DISEASES.

It will be the aim of this chair to qualify the student to detect the earliest symptoms of insanity and diseases of the nervous system.

In this course, particular attention will be given to the history, course, development, symptoms, pathology and defining terms of the diseases of the brain and spinal cord.

Text-books—Insanity: Worcester, Clouston, Regis.

Text-books—Nervous diseases: Hart, Dana, Herter, Martin.

Text books—Electricity: Steavenson and Jones.

THEORY AND PRACTICE OF MEDICINE.

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 teachings of Hahnemann, Hering, Dunham, etc., will be carefully and thoroughly presented to the students, as well as will frequent illustrations of the practical application of such principles to every day professional life.

As a part of such drill the student will be made familiar with the proper method of "taking a case" and the use of the repertory in selecting the "similar" remedy.

Text-books—Goodno's Practice; Raue's Pathology; Arn'ts Practice; Lippe's Repertory; Pepper's System of Medicine; Bartholow's or Osler's Practice; Da Costa's Diagnosis.

#### OBSTETRICS.

It is sought to give the student a thoroughly practical course of instruction in this branch, assigning to clinical teaching more time than to purely didactic work.

Two hours each week are devoted to lectures on the science of obstetrics—such being illustrated by charts and drawings, by phantoms and pelvis, wet and dry preparations, and by demonstrations of fresh specimens, products of arrested gestation, normal or otherwise, as such may be procured. It would be highly appreciated by the students and by the college, if physicians generally would send to the chair of obstetrics for such demonstration, interesting specimens as they are met in general practice. It is aimed to give a scientific basis of facts of anatomy of physiology and pathological processes of forces, active and reactive; the mechanics of parturition, etc., in order that the student may think for himself and understandingly deduce and apply the right methods to cover the conditions presenting.

The art of obstetrics is, first, the capability to recognize such conditions, and second, the skillful application of measures, operative or otherwise, to meet such conditions.

The seniors will be given operative courses on the phantom and infant cadaver, being thoroughly drilled in diagnosing positions, applying forceps, turning, etc. Furthermore, at the dispensary and at the homes of applying women, students are trained in inspection, palpation (as diagnosing position of child by abdominal touch), auscultation (recognizing fetal heart sounds, etc.), bimanual digital examinations, and measuring the various pelvic diameters, etc., and generally at every opportunity to practice the eye and ear and finger, in seeing, and hearing and feeling.

Such examinations are made during the various months of gestation, as the women may apply—but always, when possible, before term—and they are repeated as often as practicable. Each senior will attend, at least, one confinement, at which the professor always endeavors to be present, that instruction and profit may be obtained to the fullest extent. The material promises to be ample.

Text-books—Leavitt, Reynolds, Lusk, Garvin and Jarmin.

#### DISEASES OF CHILDREN.

The course on this subject will consist of lectures and clinics. The details of infant feeding and hygiene are gone into thoroughly. The children's clinic is very full and affords a variety of cases. Opportunities are given to all seniors to study at the bedside the exanthems and diseases of the respiratory organs.

Text-book—Tooker.

Reference books—Ashby and Wright; Rotch; American Text-book of Diseases of Children.

#### SKIN AND GENITO-URINARY DISEASES.

These subjects will be taught by didactic lectures, and also by exhibiting characteristic cases from the dispensary.

Text-books:—Kippax, Berseau, Otis Keyes.

#### HISTORY AND METHODOLOGY OF MEDICINE.

A course of lectures will be delivered to the first year students on the history and methodology of medicine. It will be the object of this course to fully acquaint the student with the history of medicine and methods which have prevailed at various periods in the world's history, and the evolution of homeopathy. This chair will also present a course on dietetics, and careful rules will be laid down for the guidance of the student in the selection of food for the sick, and also artificial food for infants.

Text-book:—Dake's Therapeutic Methods.

Reference book:—Renand's History of Medicine.

## CLINICAL OBSTETRICS.

Senior students under the charge of the professor of this chair will be required to examine patients in the various periods of gestation. At these examinations the various signs and symptoms of pregnancy are pointed out and examined in detail. Diagnosis by palpation, inspection and vaginal touch, together with the abdominal and pelvic measurements are made by the student in charge of that particular case. The disturbances of pregnancy are met by local and internal medication, and the student in charge is expected to visit the patient at her home before term and to learn the supervision of the lying in chamber. A careful record is made of the signs and symptoms, and the various measurements, in this way any pelvic deformity or uterine deviation is known before labor occurs. At the time of labor a blank is furnished upon which a record is kept of the mother and child; the condition of the patient's heart, pulse, bladder, rectum and the progress of the labor, also the duration of the first, second and third stages, together with the phenomena incident to the above and the expedient used. The foetal heart sounds are also recorded, the rate and where heard with greatest clearness, also the presentation and position of the foetus and its position through the pelvic canal.

Forceps are applied in suitable cases by students under the direction of the professor in charge. The care of the new-born and the puerperal period are given the strictest attention.

## MEDICAL JURISPRUDENCE.

The special purpose of these lectures is to familiarize the student with the legal rights, duties and responsibilities of the medical practitioner.

Text-books:—Reese, Chapman, Abercrombie.

Reference book:—Withaus and Becker, Hamilton.

## RELATED STUDIES.

*Histology*, in the second year, can be taken by those who have completed the histology, anatomy and physiology of the first year's course.

*Anatomy*, in the second year, can be taken by those who have completed the anatomy and histology of the first year's course.

*Physiology*, in the second year, can be taken by those who have completed the histology and chemistry of the first year's course.

*Chemistry*, in the second year, can be taken by those who have completed the chemistry of the first year.

## HISTOLOGY AND EMBRYOLOGY.

This chair occupies a large part of the first floor and basement of the laboratory of medical sciences. Its main classes are taught in its general laboratory, extending across an entire wing of this building, and well lighted by windows upon three sides and a portion of the fourth. The dimensions of this laboratory are 44 x 72 feet. Adjoining it is a special laboratory for the use of advanced students, covering 20 x 35 feet.

The next apartment contains the library of the laboratory, and neighboring rooms are devoted to the office and private laboratories of the professor in charge and his assistants. Supplies are stored in a preparation and stock room in the basement. The laboratories are equipped with seventy-five Leitz' microscopes, each fitted with double nose-piece and Abbé condenser. Several aquaria, incubators, water-baths, microtomes, a series of His' wax models of the human embryo, a photo-micrographic apparatus and a reconstruction apparatus complete their equipment.

Study tables, accommodating seventy students, are arranged immediately in front of the windows surrounding the room. A second tier of desks, providing for twenty students, is furnished with lockers for the storage of apparatus and materials for the use of the entire class.

An abundance of carefully prepared histological and embryological material, both human and comparative, is kept constantly on hand and in process of development. Fresh material for histological sections and for the study of the embryo at various stages of growth, is supplied from the animal-rooms of the chair of physiology.

The work in histology and embryology is as purely practical as possible. The student, at the opening of the course, is trained in the technique of the microscope. He is then instructed in the staining and mounting of prepared specimens. Later he is taught to carry a series of sections through the various stages of preparation from the living tissue to the completed microscopical specimen. During his two years' course he thus acquires a large and valuable collection of specimens, of his own preparation, illustrating the structure and development of the human body.

The work is illustrated by series of charts, in oil and water-colors, of embryological and histological subjects. Demonstrations are frequently given under the microscope, of typical sections illustrating tissues and parts of organs, accompanied by camera lucida drawings of photo-micrographs with explanatory text.

This chair offers an opportunity for advanced courses of laboratory study and original research. Advanced students are admitted to the special laboratory and to the full use of the apparatus and material. Reference cabinets of embryological and histological specimens are open to their inspection. A reference library—a small but carefully chosen collection of related literature, of both standard and periodical character, is offered to them.

In addition, the other libraries of the University, together with the public libraries of Minneapolis and St. Paul, afford the student access to the best publications among current periodicals and monographs.

#### FOR UNDERGRADUATES.

*Course I. General morphology.* Lectures, demonstrations and laboratory work. The course includes the structure and manipulation of microscope-structure and properties of protoplasm; the cell, its structure; cell division; reproduction; ovum, spermatozoön, formation of blastodermic layers. A detailed study of the structure and life history of certain typical unicellular animal and plant forms, as amoeba, paramoecium, vorticella, the sporozoa, yeast, bacteria, spirogyra, etc. Simple multicellular forms as hydra; a coelomate worm, as earth worm; the parasitic worms of man; leading to the consideration of the elements of structure in the vertebrata. Lectures, etc. 2 hours per week, laboratory work 6 hours per week, first semester, first year.

*Course II. Elements of histology and embryology.* Lectures, demonstrations and laboratory work. A comparative study of the structure and development of the blood, epithelial, connective, muscular and nervous tissues. Vascular and lymphatic systems, integumental organs and teeth, The formation of the embryo, foetal envelopes, etc., with practical work on chick, frog and mammalian embryos. Lectures, etc., 2 hours per week; laboratory, 6 hours per week; second semester, first year. Open to those who have completed course i. Professor Lee.

*Course III. Advanced histology and embryology.* Lectures, demonstrations and laboratory work. Advanced methods of histological and embryological technique. The comparative study of the minute structure, origin, and development of the various organs of the alimentary, respiratory and uro-genital systems. The central and sympathetic nervous systems, the organs of special sense, etc. Lectures, etc., 2 hours per week. Laboratory work, 3 hours per week; first and second semester, second year. Open to those who have completed the courses of the first year in histology and embryology and in anatomy and physiology. Professor Lee.

#### FOR GRADUATES AND UNDERGRADUATES.

The following courses are open to properly qualified students and will consist of practical work in laboratory, a prescribed course of reading with reports of work, and 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, reconstructions, etc., etc.

*Course V. (a) Comparative histology and histogenesis of the tissues.* The animal cell, the epidermal, 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.

(a) *Comparative histology and histogenesis of nervous system and sense organs.* Central nervous systems, etc. after the method 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, patromyzon, 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 chair of anatomy occupies rooms in medical hall. These include two large students' dissecting rooms, the general laboratories of anatomy, a bone laboratory, a private 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 student, in his first year, takes a preliminary course of lectures upon osteology. This is accompanied by practical work in the bone laboratory, where he is furnished with all the bones of the human skeleton which he studies under the direction of 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 animals, 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, and gives recitations 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.

## ANATOMY.

### FIRST YEAR.

*Course I. 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, ten weeks. Laboratory work on the human skeleton, class in sections, two hours each, ten weeks. Required of all freshman students.

*Course II. Syndesmology.* Lectures and recitations, three hours each week, four weeks. 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; 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, five weeks. Open to those having taken course ii.

*Course IV. Splanchnology.* Lectures on the thoracic, abdominal and pelvic viscera; two hours each week, ten weeks. Required of all freshman students. Laboratory work, demonstrating and dissecting the thoracic, abdominal and pelvic organs of the human subject or of the dog or sheep.

## SECOND YEAR.

*Course V. Splanchnology.* Descriptive and topographical anatomy of the thoracic viscera; the alimentary and urino-genital organs. Lectures and recitations, three hours each week, 10 weeks.

*Course VI. Descriptive and surgical anatomy.* Head, neck, trunk and extremities. Lectures and recitations, three hours each week, 12 weeks.

*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, three hours each week, 8 weeks.

*Course VIII. Dissecting.* The work extends over two periods of six weeks each, five afternoons of each week. The method of work follows that laid down in Holden's *Manual of Dissections*. Open to those having completed first year's work.

## THIRD YEAR.

*Course IX. Surgical anatomy.* The instruction consists of dissections, demonstrating the relations of structures composing the surgical regions of the body. Demonstrations on 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. Required of all junior students.

## FOURTH YEAR.

*Course X. Applied anatomy of the nervous system.* Elective.

TEXT-BOOKS. *First Year.* Quain's *Elements of Anatomy*, The Tenth Edition, Vol. II, Part I. *Osteology*, Vol. II. Part II. *Arthrology*; *Myology*; *Angiology*; Gray's *Descriptive and Surgical Anatomy*.

*Second and Third Years.* Quain's *Elements of Anatomy*, The Tenth Edition; Morris' *Text-Book of Anatomy*; Gray's *Descriptive and Surgical Anatomy*; Holden *Practical Anatomy*; Holden's *Manual of Dissections*; Treves' *Applied Anatomy*.

COLLATERAL READING. *First Year.* Flower's *Osteology of Mammals*; Gegenbaur's *Elements of Comparative Anatomy*; Chaveau's *Comparative Anatomy*.

*Second and Third Years.* 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.

The chair of physiology occupies a suite of rooms in the laboratory of medical sciences, including a general laboratory of physiology and physiological chemistry, a demonstration room for experimental work and the library and office of the professor in this branch.

A large amphitheatre, adapted to the demonstration of major experiments, immediately adjoins the laboratory and is used, also, for lecture purposes, by this and other chairs.

Class-work in physiological chemistry is conducted in the laboratory of chemistry, occupying the adjoining building.

In the basement of the laboratory of medical sciences, the chair maintains a spacious and comfortably equipped animal-room, which is furnished with a large aquarium, frog-tanks, rabbit and guinea-pig enclosures, breeding cages, rat and mouse cages, and dog and cat kennels. 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 apartment at a distance from this room.

The physiological laboratory is equipped with a fair supply of apparatus, instruments, etc., for experimental purposes, and with materials, glassware, digesters, water-baths, ven-



tilating hood, etc., for the work in physiological chemistry. Its outfit includes sets of vivisection instruments, an artificial respiratory machine, batteries, DuBois Raymond coils, galvanometers, rheostats, moist muscle chambers, recording drums, Ludwig's Kymograph, Spring Myograph, Burdon Sanderson's Stethometer, Dudgeon's Sphymographs, Runnë's Chronograph, Roy's Tonometer, Gaskell's Clamp, etc., etc.

The course in physiology is graded in the first and second years. In the first year, the student takes lectures, gives recitations and sees demonstrations in general physiology. These embrace the discussion and, so far as possible, the observation of the physiological ingredients of the animal body; of the physiology of cell-life or 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; of the respiration and of the organs of 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 per 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. Under this subject, the student is familiarized with physiological apparatus and its uses; with forms of electrical stimulation and with methods of experimentation; while his command of physiological principles is strengthened by the observation of functional facts.

This subject is illustrated by means of series of charts in oil and water colors, which picture the physiological anatomy; the mechanical relations and the biologic-chemical changes of the tissues.

A laboratory reference library is in process of collection, to which the advanced student will have access for collateral reading.

#### FIRST YEAR.

*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 basis of the animal body. Three hours per week, 1st semester, first year.

*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 the excretory systems. Three hours per week, 2d semester, first year. Open to those who have completed course i. Professor Beard.

#### SECOND YEAR.

*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 dietetics; of reproduction; of the physiological changes incident to successive periods of life; and of the functions of the nervous system. Two hours per week, both semesters, second year. Open to those who have completed the courses in physiology of the first year and the freshman courses in histology and chemistry. Professor Beard.

*Course IV. Physiological chemistry, laboratory work.* A practical study of the several classes of proteids; of carbo-hydrates, fats, bone, muscle and blood; of gastric juice, saliva, pancreatic juice, and bile in their respective digestions; of milk; of glycogen; and of extractives. Three hours per week; 1st semester, second year. Open to those who have completed the work in freshman physiology and in first year histology and chemistry. Professor Beard.

*Course V. Experimental physiology.* Laboratory work and demonstrations. A study of physiological apparatus, electrical stimuli and methods of experimentation and the demonstration of experiments which illustrate physiological functions. Three hours per week, second semester, second year. Open to those who have completed course iv.  
Professor Beard.

## GRADUATE COURSES.

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 the chair.

## CHEMISTRY.

This chair occupies a laboratory building especially devoted to its uses. During the coming year, this building will be refitted with two general laboratories, preparation rooms, stock-rooms and private laboratories for the professor of chemistry and his assistant. At present its class-work is conducted in the single main laboratory of the building which accommodates seventy-two students. This laboratory has the usual equipment of reagent desks, ventilating hoods, sinks, reagents, glassware and material.

In it are conducted the courses in practical chemistry, inorganic and organic, in toxicology, in chemical urinalysis and in physiological chemistry which are required in the first and second years. The chemical lecture room with and adjoining preparation room are situated in medical hall.

*Course I. General inorganic chemistry.* Lectures and recitations. Three hours per week, first semester, first year.  
Professor Bell.

*Course II. Preparation and study of inorganic compounds.* Laboratory work. Six hours per week, from December 1st to the end of the first semester.  
Professor Bell and Mr. Carel.

*Course III. General inorganic chemistry, continued.* Qualitative analysis, lectures and recitations. Two hours per week, second semester, first year.  
Professor Bell.

*Course IV. Qualitative analysis.* Laboratory work. Six hours per week, second semester, first year.  
Professor Bell.

*Course V. The analysis of urine.* Lectures and recitations. One hour per week, first semester, second year.  
Professor Bell.

*Course VI. Qualitative and quantitative analysis of the urine.* Laboratory work. Six hours per week, from October 5th to December 1st, second year.  
Professor Bell and Mr. Carel.

*Course VII. Toxicology, organic and inorganic; the elements of organic chemistry; water analysis.* Lectures and recitations. Two hours per week, second semester, second year. Courses v, vi and vii open to those who have completed first year chemistry.

## PATHOLOGY AND BACTERIOLOGY.

## FOR UNDERGRADUATES.

*Course I. General Pathology.* Lectures and demonstrations. The general processes involved in disease. The consideration of tumors will be, however, omitted since this subject will be fully dealt with in the course on surgical pathology. Twice a week (two hours weekly), in first semester of third year.  
Professor Wesbrook.

*Course II. The Pathology of Special Organs.* This course consists of:  
(a) Lectures and demonstrations in which will be employed both fresh tissues and preserved gross specimens from the pathological museum. Twice a week (two hours weekly) in second semester of third year.  
Professor Wesbrook

(b) Practical laboratory work in which students will be required to mount and examine, under the microscope, selected specimens illustrative of morbid processes. In this way will be acquired not only a knowledge of the microscopic appearance of diseased tissues, but a good working set of permanent preparations will be obtained. Where diseases are dependent on or characterized by the presence of bacteria, the pathological lesions, and their histological characteristics, will alone be considered; the demonstration of the bacteria themselves being given in the course on elementary bacteriology. Twice a week (six hours weekly), second semester of third and first semester of fourth year.

Professor Stewart.

*Course III. Surgical pathology.* This course will consist of lectures and laboratory demonstrations, and will cover the general subject of the pathological and bacteriological basis 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 morbid processes and the bacteria concerned. Especial attention will be given to inflammation and its complications, to the infectious diseases of surgical importance, and to tumors. Twice a week (two hours weekly), second semester of third and first semester of fourth year.

Professor Stewart.

*Course IV. Autopsies and post mortem technique.* In this course, students will have an opportunity of personally taking part in and conducting the work under the direction of the pathologist in charge. A knowledge of the technique of post mortem work and of morbid anatomy will be thus afforded. This course will be given, as opportunity offers, throughout the third and fourth years, both in Minneapolis and St. Paul.

Professor Stewart and Dr. Rothrock.

*Course V. Clinical microscopy.* This will consist of demonstrations and practical laboratory work in which will be included the microscopic examination of pathological urine, faeces, sputum and blood, parasites, cyst and stomach contents, etc. It will be conducted in the pathological laboratory under the direction of the professor of pathology. First semester of third year.

Dr. Head.

*Course VI. Elementary bacteriology.* Though of necessity attention must be paid to bacteria of all kinds for the purpose of the differentiation of the pathogenic from the harmless varieties, the aim will be to study this science in its special relation to disease. Both the pathological and hygienic aspects of bacteriology will receive due consideration. This course consists of: (a) Lectures and demonstrations. Twice a week, (two hours weekly), in first semester of third year.

(b) Laboratory work. Practical work will consist of the preparation of the various culture media, the technique of showing and examination of cultures, the separation and isolation of bacteria, staining and making of permanent preparations of micro-organisms, both from cultures and in tissue. The diagnosis of disease by bacteriological methods will be especially dwelt upon. Twice a week (six hours weekly), in first semester of third year. Open to those who have completed course iii, in histology.

Professor Wesbrook.

#### FOR GRADUATES AND UNDERGRADUATES.

*Course VII. Advanced bacteriology.* (Optional and only open to those who have taken course vi, or the equivalent.) This course will be given to those who desire to prepare themselves for special or research work. It will include lectures and practical laboratory work in the bacteriological examination of water, earth, air, foods, etc., with special work in the study of the anaerobic bacteria. Bacterial toxins, preparation of such diagnostic agents as tuberculin, mallein, etc., as well as the bacteriological aspect of serum-therapy will be considered.

*Research.* Special facilities will be afforded those who are properly qualified and desirous of doing research work along bacteriological or pathological lines.

*Pathology. Text-books:* General Pathology, Ziegler.

Reference and collateral reading. Text-book of Pathology, Hamilton. Pathological Anatomy and Histology, Delafield and Prudden. Practical Pathology, Woodhead. The Elements of Pathological Histology, Weichselbaum. Morbid Histology, Boyce,

*Surgical pathology. Text-book:* Surgical Pathology, Warren.

Reference and collateral reading. Tumors, Senn. Surgical Pathology, Bowby. The principles of Surgery and Surgical Pathology, Tillmann. Tuberculosis of Bone Joints, Watson Cheyne.

*Clinical microscopy. Text-book:* Clinical Diagnosis, Von Jaksch.

Reference and collateral reading. Microscopie und Chemie am Krankenbett, Lenhartz. Klinischen Pathologie des Blutes, Linbeck.

*Bacteriology. Text-book:* Principles of Bacteriology, Abbott. Practical Bacteriology, Kanthack and Drysdale.

Reference and collateral reading. Manual of Bacteriology, Sternberg. Bacteriology. Fraenkel. Pathogenic Bacteria, McFarland. Bacteria and their Products, Woodhead.

### HYGIENE.

This important subject will be taught in a thoroughly practical manner.

Text book, Park's Hygiene.

Reference book, Richardson's Preventative Medicine.

Buck's Hygiene.

### BOTANY.

All students are required to take this course who have had insufficient 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 principle 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.

### THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

THOMAS E. WEEKS, D. D. S., *Dean and Professor of Operative Dentistry and Dental Anatomy.*

CHARLES M. BAILEY, D. M. D., *Professor of Orthodontia, Metallurgy and Prosthetic Technics.*

WILLIAM P. DICKINSON, D. D. S., *Professor of Therapeutics and Clinical Professor of Operative Dentistry.*

FREDERICK B. KREMER, D. D. S., *Professor of Prosthetic Dentistry and Crown and Bridge-Work.*

### INSTRUCTORS.

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.*

HENRY M. BRACKEN, M. D., *Professor of Materia Medica.*

THOMAS G. LEE, A. M., M. D., *Professor of Histology and Embryology.*

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

HENRY L. STAPLES, A. M., M. D., *Instructor in Medical and Pharmaceutical Latin.*

THOMAS B. HARTZELL, D. M. S., M. D., *Lecturer on Pathology, Physical Diagnosis and Oral Surgery.*

FRANK R. WRIGHT, D. D. S., M. D., *Lecturer on Anesthesia and Chief of Anæsthetic Clinic.*

GEORGE S. MONSON, D. M. D., *Instructor in Prosthetic Technics and Orthodontia.*

MARK O. NELSON, D. M. D., *Demonstrator of Prosthetic Dentistry.*

OSCAR A. WEISS, D. M. D., *Instructor in Operative Technics.*

### ASSISTANTS IN TECHNICS AND CLINICS.

MARY V. HARTZELL, D. M. D.

JAMES M. WALLS, D. M. D.,

W. FRED JEWETT, D. D. S.

EDWARD HAAS, D. M. D.

NATHAN L. WATSON, D. M. D.

FREDERICK E. COBB, D. M. D.

### ANNOUNCEMENT.

The college of dentistry of the University of Minnesota offers two distinct progressive courses of study to dental students, which may be taken consecutively or separately as may be desired.

The first, which is the regular course, covers three terms of eight months each, in three separate calendar years. Classes are graded as first, second and third year. Students who successfully complete this course are given

the degree of D. M. D. (doctoris in medicina dentaria), which entitles them to come before the State board of dental examiners for a license to practice dentistry in the State of Minnesota.

A four years' course is also offered in which the student acquires a more comprehensive medical knowledge, and which entitles the graduate having an average standing of seventy-five per cent, to the degree of D. M. D. *cum laude*.

The central idea upon which this institution was founded, is that dentistry is a branch of the healing art, and as such should be practiced as a specialty in medicine. In order to do this the practitioner must possess a medical education, and the curriculum has been broadened so as to include the fundamental principles that underlie the practice of medicine, and has substituted dentistry for its other specialties. It is most earnestly advised that all students who can spare the time and means take the full course of four years. In this connection special attention is called to the fact that while a thorough course in theory is required, practical work is not neglected. The technical courses are very complete and the clinical facilities are unsurpassed.

The time actually to be spent in the prosthetic laboratory and infirmary for the ensuing year, will reach an aggregate of very nearly two thousand hours, divided as follows: first year, three hundred forty hours; second year, nine hundred hours, and third year, eight hundred hours. Attendance upon laboratory work and infirmary practice is compulsory, a daily record being kept by the clerk, and one of the requirements for graduation necessitates attendance upon all laboratory work. 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. Each operation is a recitation, and the student is thus able to trace his progress from the daily record.

## COURSES OF INSTRUCTION.

### ANATOMY.

*First year*—Lectures and recitations in osteology, syndesmology and myology One course; two hours per week; 64 hours. Also attendance upon lectures on descriptive, topographical and surgical anatomy, one course of two hours per week; 64 lectures.

*Second year*—The practical work in the laboratory covers the dissection of the whole body and is under the supervision of the professor of anatomy and the personal direction of the demonstrator. The laboratory work is supplemented by lectures and recitations. Students recite upon these lectures and receive their final examinations at the close of the term on the didactic work and also upon the work in "practical" anatomy done in the laboratory.

### DENTAL ANATOMY.

*First year*.—The subject is taught by text books, and 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 the macroscopic

and microscopic characteristics of sections, including the study of the relation of enamel to dentine and of the pulp canal. Outline drawings of the principal surfaces of the teeth will be made.

In the study of structural anatomy, teeth from each side of the maxillæ will be selected and mounted upon wooden blocks. They will then be filed down until the pulp chamber and canals are exposed and a careful study of their form made. Afterwards silhouette prints of different aspects will 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, printing of silhouettes, models, drawings and recitations.

#### PHYSIOLOGY.

Students are required to study physiology in the first year. The subject is taught by recitations and lectures illustrated by practical demonstrations. These embrace the digestion 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 the connective tissues, and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, excretion and respiration.

#### HISTOLOGY AND EMBRYOLOGY.

*First year*—Lectures, recitations and laboratory work; each student will receive carefully prepared specimens illustrative of the various tissues and organs of the body, which he will preserve for permanent use, and from which drawings will be made. Didactic and practical instruction in embryology will be given in connection with the work in histology. Practical instruction also will be given in the methods of preserving and preparing material for microscopic examination.

*Third year*—A short laboratory course covering certain special practical points in the histology and development of the teeth, jaw, salivary glands and mouth cavity, with demonstration, lectures and reading of special literature.

#### DENTAL 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 degenerative 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.

Practical work in the laboratory of pathology will be given under the supervision of the chair of pathology of the department of medicine and will include the study of inflammations, pathological histology of tumors of the face and oral cavity and pathological histology of the hard tissues,

#### CHEMISTRY.

*Second year*—Lectures on inorganic chemistry. Laboratory—general chemistry and qualitative analysis.

*Third year*—Special laboratory instruction, with practical examination of the urine and other body fluids in their relation to disease, and as aids in diagnosis, also an examination of the alloys used in dentistry.

#### MATERIA MEDICA AND THERAPEUTICS.

*First year*—Lectures, practical demonstrations in the laboratory, and recitations. In the course in dental therapeutics, instruction will be imparted by means of recitations and lectures, giving special attention to the first named. No intelligent use can be made of medicinal or remedial agents without an understanding of the funda-

mental principles of anatomy, physiology, pathology, chemistry and diagnosis, and the studies of this year presupposes such knowledge obtained in the previous courses. The teaching, therefore, will be to the end that the student may be enabled to rightly interpret the therapeutical indications and employ the appropriate remedies. Abundant opportunities are afforded during the course for putting into actual practice in the infirmary, under the careful guidance of the professor in charge, the instructions given in the class-room. By this means judiciousness and independence in the choice and employment of remedies is incalculated. The relation of systematic treatment to dental diseases will also be fully considered. A final examination will be given in materia medica at the end of the year.

#### ORAL SURGERY.

*Third year*—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 maxillæ; 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 to matriculates in this course. An abundance of material representing all the different 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 instructor of oral surgery.

Clinical lectures on the cases presenting will be given from time to time. The cases presenting, include alveo-dental abscesses; caries and necrosis of the maxillary bones; diseased conditions 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.

#### HYGIENE.

*Third year*—In the study of hygiene, personal and office, the latest modern appliances will be used. The importance of this subject cannot be overestimated when it is understood that decay of the teeth, suppuration of the pulp and other diseases, alveolar abscess, pyorrhœa alveolaris, and perhaps other of the diseases of the teeth and associate parts with which dentists have to deal, are the direct result of unhygienic conditions of the oral cavity. Full practical instruction in the process of fermentation, suppuration and infection in general will be provided. The student will be made conversant with the modes of cultivating germs and the manner of their growth; methods of disinfection and antiseptis to be used in the oral cavity. The care of instruments and the danger of infection by their use when not kept in an aseptic condition will be fully dwelt upon.

#### BACTERIOLOGY.

*Third year*—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.

#### PHYSICAL DIAGNOSIS.

*Third year*—The subject of physical diagnosis will be taught didactically and practically. The course will have direct bearing upon the subject of anæsthesia and will be as complete as its importance demands.

#### ANÆSTHESIA.

*Third year*—This subject will be taught didactically and clinically; the technics of anæsthetics, both general and local, receiving full consideration. Anæsthetics are administered in the clinic, and full instruction by thoroughly competent assistants as to the meth-



ods of examining the patients, and the use of ether and gas is given. The members of the senior class are required, under direction, to administer them and extract teeth under these agents.

#### OPERATIVE DENTISTRY.

In this department the work is thoroughly graded. No student will be excused from any of the lectures, technics or operations of the course, or advanced to a higher grade until he has demonstrated his proficiency. The operative clinic is under the direct supervision of the professors of operative dentistry who will give personal instruction in all those details which go to make up the routine of every-day office practice, including everything from the reception of the patient, through the minutiae of a discriminating diagnosis to the preparation and filling of the several classes of cavities in the teeth, in accordance with principles previously mastered, and the indications for each case in hand, with such one of the various materials used for the purpose as is most suitable. The judgment of the student will be carefully cultivated, and the reasons for any course determined upon will be fully explained. The management of children, while receiving dental ministrations, together with the personal relations which should exist between patient and operator will be inculcated by precept and practice.

A course in operative technics will be given at the beginning of the second year. The teeth selected in the course of dental anatomy will be mounted in a special articulator and studied in relation to classification, location and causes of cavity formation and the preparation of the same for filling. A study of the various filling materials and their insertion in the cavities already prepared. The various means of mechanical treatment of partially or wholly exposed pulps by protection or capping will be demonstrated, also canal treatments, in which methods for gaining entrance, removal of pulps, cleaning and filling pulp canals will be fully dwelt upon. Students are required to perform these operations themselves under close supervision until they have fully mastered the technique. Daily recitations will be given and written quizzes will be held at the completion of each division of a topic. The completed operations will also be handed in, and the student will receive credit for the skill and proficiency shown during the course.

*Second year*—Instruction in this year will be both didactic and clinical. In addition to the work in the infirmary, lectures will be given and recitations held upon the following subjects: deposits and their removal; extraction of teeth; separation of teeth; exclusion of moisture; mechanical principles of force and resistance; contour, contact, and occlusion; reviews upon cavity preparation and filling materials. At the close of the year the requisite markings upon lectures, recitations, technical and practical operations, together with a satisfactory written examination are required to qualify for the third year.

*Third year*—The teaching in this year consists largely of a series of clinics, by a corps of special instructors, and by the occupants of the chair, together with the didactic work, as shall be deemed necessary from time to time, to perfect the subject. The different forms of pathological lesions that pertain to daily office practice, such as pulpitis from exposures, etc., pericementitis, alveolar-abscess, caries and necrosis of the alveolar process, pyorrhœa alveolaris, suppuration of the antrum. The several forms of ulcerations, stomatitis and reflex neurosis will be treated by the student, who will carry the case 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.

#### PROSTHETIC DENTISTRY.

The instruction from this chair is both didactic and practical. In the technic laboratory all mechanical work is carefully taught, including the filing, tempering and polishing of steel, the taking of impressions in both plaster and modelling composition, pouring models, arranging and articulating the teeth, following the Bonwill law in all cases, vulcanizing and finishing; making dies and swaging metals, constructing regulating appliances, making crowns and bridges, constructing and baking continuous-gum dentures, etc. The materials

for this work are furnished by the University, and the various appliances constructed will be the property of the student at the close of his college course. The technic course extends through the three years.

*First year*—The work of the first year will be confined to the technic laboratory, only so much time being spent in lectures, recitations, etc., as is needed to explain the work in hand.

*Second and third years*—The student passes to the infirmary, where he will be given opportunity to apply to practical cases the knowledge acquired in the technic laboratory, and from the lectures and recitations of the didactic course.

In the didactic course, by a series of lectures, recitations and demonstrations, the mouth and associate parts will be considered from the standpoint of the mechanical clinician, and those principles which must govern in the construction and application of the mechanical appliances clearly stated.

#### ORTHODONTIA.

*Second year*—In the second year the consideration of irregular dentures will be taken up. A thorough course of technics has been arranged by which the student is taught how to make the various appliances in use, so that he will be able, in future practice, to construct, with tools and materials at hand in his laboratory, any apparatus he may need. The lectures will deal with the etiology of the subject, and the several systems which have been recommended for the treatment of such cases.

*Third year*—An ample clinic affords the senior student opportunity for practical experience.

#### METALLURGY.

*Third year*—A course of lectures and recitations covering the metals in use by dentists in their practice, and dealing with their characteristics, reduction and refining, will be given.

#### CROWN AND BRIDGE WORK.

The growing importance of this subject has necessitated giving it a separate classification, and a special effort will be made to make it one of the most attractive studies in the curriculum. The subject will be taught by lectures, technical courses and practice in the infirmary.

*Second year*—The student will be required to construct a crown of each approved kind in use, and one bridge, combining in itself a shell-crown, a Richmond-crown, a porcelain-faced dummy, a metal-shell dummy, and an extension-bar carrying a porcelain-faced tooth. The metals used in the technic course will be brass or bronze.

*Third year*—The lectures on crown and bridge work will comprehend a full consideration of the principles underlying this branch of dental art. The various instruments and materials employed will be exhibited and their application fully explained. A large number of casts and practical cases will be used to illustrate the subject.

In this year students will be assigned the care of cases presenting in the infirmary, and will be required to construct under direction a sufficient number of cases to demonstrate their knowledge of principles and technical proficiency.

#### RECAPITULATION.

##### FIRST YEAR.

- Anatomy; lectures.
- Physiology; lectures.
- Histology; lectures and laboratory.
- Dental anatomy; lectures and laboratory.
- Prosthetic technics; laboratory.

SECOND YEAR.

Anatomy; lectures and laboratory.  
 Chemistry; lectures and laboratory.  
 Materia medica, lectures and laboratory.  
 Therapeutics; lectures and recitations.  
 Pathology; lectures.  
 Operative technics, } laboratory.  
 Prosthetic technics, }  
 Operative dentistry, } infirmary practice.  
 Prosthetic dentistry, }

THIRD YEAR.

Pathology; lectures.  
 Histology. }  
 Bacteriology. } Lectures and laboratory.  
 Chemistry. }  
 Oral surgery, }  
 Physical diagnosis, } Lectures and practical.  
 Anaesthesia, }  
 Orthodontia, } Lectures, technics and practical.  
 Cleft palate, }  
 Operative dentistry, } infirmary practice.  
 Prosthetic dentistry, }

TEXT-BOOKS.

The following text-books will be required:

*First year*—Medical dictionary, Gould; anatomy, Gray, dental anatomy, Black; embryology, Quain; Histology, Piersol; materia medica, Bracken; dental therapeutics, Gorgas; operative technics, Weeks.

*Second year*—Physiology, Foster; pathology, Delafield and Prudden; chemistry, Remsen; operative dentistry; prosthetic dentistry, Richardson; orthodontia, Guilford; crown and bridge work, Evans.

*Third year*—Oral surgery, Garretson; physical diagnosis, Loomis; bacteriology, Abbott; dental metallurgy, Essig.

REFERENCE BOOKS.

American System of Dentistry; Tomes' Dental Anatomy; Miller's Microorganisms of the Human Mouth; Farrar's Irregularities of the Teeth; Talbot's Irregularities of the Teeth; Kingsley's Oral Deformities; Brunton's Materia Medica.

INSTRUMENTS, TOOLS AND MATERIALS.

Students will be required to provide themselves with instruments, tools and materials, as indicated in the following tables. The first installment must be procured before seats can be assigned in the technic laboratories.

FIRST YEAR—FIRST SEMESTER.

OPERATIVE.

- |                                |  |
|--------------------------------|--|
| 1 explorer, No. 6.             | *1 pair scissors, 5 inch.                  |
| 2 Talbot scalars, Nos. 2, 3.   | *1 dummy articulator.                      |
| 1 pin vise (screw chuck).      | *1 half-round file, 6 inch cut 1 (Grobet). |
| 1 broach holder (bone handle). | *1 file cleaning brush, fine.              |
| 1 jeweler's saw frame.         | *1 Excelsior ink pad.                      |
| 1 dozen saws for same.         | *1 rubber pad.                             |
| 1 Arkansas stone, boxed.       | *1 printing book.                          |
| 3 canal explorers, fine.       | *1 stick sealing wax.                      |
| *1 bundle piano wire.          | *1 tooth brush.                            |
| *Rubber tooth-forms.           | *1 salt mouth bottle, 2 oz.                |
| *2 sheets sand paper, 0, 00.   | *1 yard cotton cloth.                      |

## PROSTHETIC.

- |  |                                       |
|--|---------------------------------------|
| 1 note book.   | ¼ lb. modelling composition.          |
| 1 Lowell hand vise, large.                           | 1 star flask (brass).                 |
| 1 bench vise, 2 inch jaws.                           | 1 pair calipers.                      |
| 1 anvil, on base.                                    | 1 warding file, 4 inch.               |
| 1 bench knife.                                       | 1 vulcanite file, 9 inch, double end. |
| 1 whetstone.   | 2 Kingsley scrapers, Nos. 3, 5.       |
| 1 pair nippers, side cutting.                        | 1 composition cone, medium.           |
| 1 plate shears.                                      | 1 chisel for vulcanite.               |
| 1 plaster spatula.                                   | 3 brush wheels, Nos. 27, 30, 65.      |
| 1 plaster bowl, medium.                              | 1 Bonwill articulator.                |
| 1 wax spatula.                                       | *1 metal triangle.                    |
| 6 excavator blanks.                                  | *2 sheets emery cloth, 00, 1.         |
| 1 corundum wheel, No. 3 grit D, mounted on<br>chuck. | *1 school sponge.                     |
| 2 impression trays, No. 12 C, No. 14 H.              | 1 granite cup.                        |
| 4 lbs zinc (S. S. W.).                               | 1 flat-nose pliers.                   |
| 4 lbs. lead.   | 1 box, with lock.                     |

## SECOND YEAR—FIRST SEMESTER.

## OPERATIVE.

- |  |  |
|--|--|
| 1 dental engine.   | 1 rubber dam clamp forceps (Bowman-Allen).   |
| 5 Darby-Perry excavators, 3, 9, 10, 19, 20.                                | 1 dozen Swiss broaches (plain, small).   |
| 1 set U. of M. pluggers (10 instruments).                                  | 1 dozen broaches (barbed, assorted).   |
| 6 Royce pluggers, Nos. 1, 2, 3, 6, 7, 8.                                   | 1 Donaldson nerve bristle (hooked).  |
| 2 pluggers for tin (U. of M.)  | 1 iridium-platinum nerve broach.   |
| 2 socket handles, No. 2 (hand).  | 1 revolving-head bur-holder.   |
| 2 socket handles, No. 4 (mallet).  | 1 dozen cavity burs (S. S. W.), Nos. 1, 2, 5, 34,<br>36, 46, 50, 56, 58, 68, 91, 97; |
| 1 mallet (lead filled).  | 3 Brewer drills, Nos. 185, 188, 190.   |
| 5 burnishers, Nos. 2, 24, 26, 29, 39.                                      | 1 chip blower (plain).   |
| 2 Arrington amalgam instruments, No. 3, 4.                                 | 1 pair college foil pliers.  |
| 3 cement spatulas, Nos. 1, 2, 3.   | 5 impression trays.  |
| 12 excavators, Nos. 4, 8, 16, 74, 83, 86, 112,<br>143, 158, 175, 194, 195. | 1 spool knitting silk.   |
| 2 chisels, Nos. 47, 48.  | 1 alcohol lamp, with shield.   |
| 2 chisels, Nos. 48S, 52, (long handles).                                   | 1 glass slab.  |
| 2 Merriam chisels, Nos. 1, 2.  | 1 contouring file (double end), No. 113.   |
| 1 Smith trimmer, No. 23.   | 3 flexo separating files, 000, 0, 1.   |
| 1 Black trimmer, No. 10.   | 1 water syringe.   |
| 1 Weeks trimmer.   | 1 Elliott separator.   |
| 4 rubber dam clamps, 24, 25, 36, 37.                                       | 1 Kaeber saw frame (large).  |
| 2 finishing burs, Nos. 219, 230.   | 1 doz. saws for same (double edge).  |
| 1 burnisher (G. Smooth).   | 3 root canal pluggers.   |
| 3 mandrels, Nos. 301, 303, 317.  | 1 Peirce trimmer, No. 2.   |
| 1 screw clamp porte, No. 307.  | 2 Rhein trimmers, Nos. 31, 32.   |
| 6 wood points.   | 1 rubber dam holder.   |
| 1 rubber and corundrum disk (concave).                                     | ½ yard rubber dam.   |
| 2 hard rubber and corundrum points.  | 1 box polishing disks (assorted).  |
| 2 corundum points (mounted), Nos. 1, 11.                                   | 1 box finishing strips.  |
| 1 stump corundum, ¾-in. (plain).   | 1 oz. spunk.   |
| 1 mouth mirror, ¾-in. (plain).   | ¼ lb. absorbent cotton.  |
| 2 sickle scalers, Nos. 31, 32.   | 1 doz. small towels.   |
| 3 Darby-Perry scalers, Nos. 5, 6, 11.                                      | 2 doz. napkins.  |
| 3 Cushing scalers.   | 1 glass tumbler.   |
| 1 lancet, ebony handle, No. 1.   | Student's case for instruments.  |

PROSTHETIC.

- |  |   |
|--|---|
| 1 corundum wheel, No. 7, grit B. $\frac{3}{8}$ -inch thick, mounted. | 1 pair solder tweezers.                       |
| 1 asbestos soldering block.  | 1 borax slate.                                |
| 1 blow pipe (13 inch).   | 1 ounce borax.                                |
| 1 riveting hammer C. (S. S. W.).                                     | 1 wood or horn mallet.                        |
| 1 file, half round, 5-inch, cut 4 (Grobet).                          | 1 metal burnisher.                            |
| 1 file, flat, 5-inch, cut 3 (Grobet).                                | 1 box emery powder.                           |
| 1 plate punch.   | 1 stick rouge.                                |
| 1 plate nippers (medium).  | 2 ladles and handles.                         |
| 1 pair pliers, $4\frac{1}{2}$ inch, round.                           | $1\frac{1}{2}$ lbs. Babbitt metal (S. S. W.). |
| 1 metal scraper.   | 4 lbs. lead,                                  |
| 1 laboratory and office pliers.                                      | 1 lb. tin.                                    |
| 1 draw plate, Joubert, D.  | 1 collar pliers.                              |
| 1 screw plate, P. & M., 30 B.  | 1 pkg. Melotte's moldine.                     |
| *2 pkgs hair pins.   | 2 ingots Melotte's metal.                     |
| *1 pkg. Stubb's steel.   | 1 vulcanizer.                                 |
|  | 2 Twist drills.                               |

\*To be obtained of clerk at the desk.

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GENERAL INFORMATION.

THE COLLEGE YEAR.

The ninth course of lectures will begin October 1st, 1896, and close the first Thursday in June, 1897.

ADMISSION, ENROLLMENT, ETC.

For statement concerning enrollment and admission, see page 183; advanced standing, page 184; buildings and equipment, page 181; examinations, page 183; fees, page 185.

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 of dentistry has its annual meeting during commencement week.

For further information address Dean Thomas E. Weeks, Dayton Building, Minneapolis, Minn.

## The College of Pharmacy.

### THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*  
FREDERICK J. WULLING, PH. G., *Dean; Professor of the Theory and Practice of Pharmacology and Pharmaceutical Chemistry.*  
PERRY H. MILLARD, M. D., *Professor of Medical Jurisprudence.*  
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 (Organic.)*  
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry (Quantitative).*  
CONWAY McMILLAN, M. A., *Professor of Botany.*  
FRANCIS RAMALEY, M. S., *Instructor in Botany and Practical Pharmacognosy.*  
FRANK F. WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology.*  
GEORGE D. HEAD, B. S., *Assistant in Bacteriology.*  
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, PHM. D., *Quizzmaster and Assistant in Pharmacy.*

### 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 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 in lectures, quizzes and laboratory exercises. Students will find their time fully occupied. The work is of a nature that no student could accomplish it in the short term of five or six months. Students who may feel unable to apply themselves diligently enough to complete the work in two years may divide the work in a manner to complete it in three years. Practicing pharmacists who may be desirous of taking 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.
- MATHEMATICS—*Pharmaceutical*—*Chemical*.
- URINALYSIS—*Complete*—Chemical; microscopical.
- LATIN—*Elementary*—Medical; pharmaceutical.
- HYGIENE—*Lectures*.
- PHARMACAL JURISPRUDENCE—*Lectures*.
- MINERALOGY—*Elementary*—Pharmaceutical.
- PHYSICS—*Pharmaceutical*—*Chemical*.

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 are 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	" Org'nic Pharmac'utical	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, pharmacy laws, text-books, and works of reference. The pharmacopœia and dispensatories 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, forms of percolators, exhaustion, repercolation, continuous percolation, etc.

Filtration—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—separating, weighing, drying precipitate.

Practical pharmacy—the preparation of pills, solutions, mixtures, cachets, ointments, plasters, suppositories, powders, emulsions, lozenges, etc. Arrangement and appliances of dispensing department.

Inorganic, U. S. P.

*Senior course*—This course begins with the consideration in detail, of the pharmacy, of organic drugs principally, though the inorganic are not wholly omitted. It embraces a careful study of every important galenic preparation, with the methods of preparation, physical characteristics, reactions, impurities, adulterations and sophistications, etc.

A study of incompatibility will be one of the special features of this course; it will be 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 and extraction.

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 will be studied, and an exposition of their chemistry and pharmacy will be 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 time permits.

Text-books—U. S. P., U. S. D., Remington's Pharmacy, National Dispensatory.

## PHARMACOGNOSY.

This important subject is taught in the senior year and is taken up in the following order:

*Roots*—Sarsaparilla (Mexican, Para and Honduras), senega, saponaria, gentiana, fraxera, taraxacum, chicory, pyrethrum, inula, lappa, apocynum, stillingia, petroselinum, sumbul, asclepias, phytolacca, althæa, belladonna, bryonia, calumba, rheum, glycyrrhiza (Spanish and Russian), hydrangea, methysticum, ipecacuanha, gillenia, gelsemium, pareira, ceanothus, krameria.

*Rhizomes*—Aspidium, zingiber (Jamaca, East Indian and African), zedoaria, galanga, curcuma (Madras and Java), calamus, veratrum, iris versicolor, cyripedium, convallaria, polygonatum, ssguinaria, dioscorea, geranium, bistorta, podophyllum, valeriana, arnica, serpentaria, spigelia, hydrastis, caulophyllum, cimicifuga, leptandra, menispermum, berberis, xanthorrhiza.

*Tubers and Bulbs*—Jalapa, aconitum, colchicum, arum, scilla.

*Woods*—Quassia, hæmatoxylon, santalum rubrum and album.

*Bark*—Cinchona (Rubra and Flava); magnolia, liriiodendron, prunus virginiana, viburnum (of root and stem), hamamelis, salix, cornus, berberis, quercus, granatum, frangula, cascara sagrada (false and true), quebracho, cola, juglans, xanthoxylum, mezerium, gossypii radix, euonymus (of root and stem); quilliaia, ulmus, sassafras, angustura, cascarilla, cinnamomum (Ceylon, Saigon and cassia), wintera.

*Herbs and Flowers*—Santonica, caryophyllus, lavandula, sambucus, calendula, carthamus, arnica, matricaria, anthemis, pyrethri flores (Dalmatian and Persian), brayera, chondrus, cetraria, fucus, cannabis indica, pulsatilla, scoparius, eupatorium, erigeron, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, majoranum, origanum, thymus, hedeoma, marrubium, cataria.

*Leaves and Leaflets*—Rosmarinus, boldus, pilocarpus, laurus, myrcia, eucalyptus, chequen, uva-ursi, senna (Alexandria and India), erythroxyton (Bolivian and Truxillo), belladonna, stramonium, hyoscyamus, digitalis, matico, salvia, hamamelis, tussilago, castanea, eriodictyon, chimaphila, gaultheria, buchu (long and short), aconitum, conium.

*Fruits*—Juniperus, humulus, piper (longum, nigrum and album), cubeba, pimenta, rhamnus catharticus, cocculus, rhus glabra; capsicum, colocynthis, cassia fistula, chenopodium, xanthoxylum, illicium, cardamomum, lappa, granati fructus cortex, coriandrum; conium, anisum, ajowan, petroselinum, carum, carota, fœniculum (Roman and German), cuminum, anethum.

*Seeds*—Physostigma, amygdalus (dulcis and amara), pepo, dipteryx (English and Dutch), theobroma, cola, abrus, fœnum græcum, rapa, sinapis (alba and nigra); nuxvomica, ignatia, gynecardia, delphinium, staphisagria, ricinus, tigllium, stramonium, hyoscyamus, papaver, sabadilla, colchicum, cardamomum, granum paradisi, areca.

*Miscellaneous*—Guarana, lactucarium, aloe (Socotrina, Barbadosensis and Capensis), catechu, gambir, kino (Malabar and Pallas) saccharum lactis, acacia, tragacantha; mastiche, sandaraca, colophonium, damar, copal, guaiacum, draconis, benzoinum, cambogia, galbanum, ammoniacum; scammonium, myrrha, ergota (Spanish and German), sassafras medulla, galla (Allepo and Chinensis), cantharis, mylabris, kamala, lupulinum, lycopodium, amyllum.

This course will be extended to include the microscopic study of powdered drugs; the detection of adulterations in powdered drugs, and micro-chemistry.

Text-book—U. S. P.; Sayre's Organic Materia Medica and Pharmacology.

#### 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 and relates to these. This 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 extends through the entire first semester. 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—Harsley's Quantitative Analysis; Schimpf's Volumetric Analysis.

#### ORGANIC CHEMISTRY.

This course begins in the second half of the senior year and extends through the remainder of the year. The course 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.**

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 student's time throughout the college year. The course is a thorough one, including microscopy and a large amount of laboratory work.

The university is very admirably equipped in its botanical department. The latter occupies a suite of rooms, including lecture rooms, herbarium and seminar room, students' general laboratory, physiological laboratory, special laboratory, dark room and plant house. The herbarium contains over ninety thousand specimens, and the library about one thousand five hundred volumes of carefully selected works in all lines of botanical investigation. The department receives regularly about sixty special botanical periodicals.

**MATERIA MEDICA.**

The work in organic and inorganic materia medica, which includes some therapeutics and toxicology, extends throughout the two years, and occupies two hours weekly. It is taught by lectures, frequently illustrated with specimens belonging to the collection of the college. Pharmacodynamics, including the study of the antidotes for poisonous drugs, receives detailed attention in this course. The study of the identity, quality and characteristics of drugs, which is usually included in materia medica, shares fuller attention in the course in pharmacognosy.

Text-books—U. S. P.; Bracken's Materia Medica; Maisch's Materia Medica; U. S. D., 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.

**BACTERIOLOGY.**

The course in bacteriology is given to the seniors in the second half of the college year, 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 pathogenic bacteria. Opportunity will be afforded in the laboratory for special research work.

Text-books—Schenk's Bacteriology; Stenberg's Bacteriology; Frankel's Bacteriology.

**MATHEMATICS.**

Students in this college receive careful drill in the subject of pharmaceutical mathematics during the two years.

**URINALYSIS.**

This course comprehends both qualitative and quantitative determinations of the constituents of normal and pathological urine, and a microscopical examination of urinary 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.

**HYGIENE AND SANITARY SCIENCE.**

A course of from six to ten lectures is provided in this subject. Required of seniors.

Text-book—Parks.

**MEDICAL AND PHARMACEUTICAL JURISFRUDENCE.**

A course of from fifteen to eighteen 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 requirements in Latin. The latter will profit by taking this course as it is specially adapted to pharmacists. One hour weekly is given to the study during the school year.

**MINERALOGY.**

A 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, are, 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.

**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.

**PROFESSIONAL EXAMINATIONS.**

Examinations are held during the last two weeks of the regular session, 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 the year, and all students who have a standing of eighty per cent or more, in some of the branches, may not be required to take the final examination in those branches.

**DEGREE.**

This college confers the degree of doctor of pharmacy, Phm. D., 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.

## GENERAL STATEMENT.

Those who do not pass the entrance examinations, may enter this college and complete their work 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.

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 the branches. Text books may be obtained after coming to the University.

## FEES.

## FIRST YEAR.

Matriculation.....	\$ 10.00	
Annual dues.....	40.00	
Chemical laboratory.....	10.00	
Pharmaceutical laboratory.....	15.00	\$75.00

SECOND YEAR.

Matriculation.....	10.00	
Annual dues.....	40.00	
Chemical and histological laboratories.....	5.00	
Pharmaceutical laboratory.....	15.00	
Quantitative chemistry laboratory.....	5.00	
Organic chemistry laboratory.....	5.00	
Diploma.....	10.00	90.00
Total.....		\$165.00

Those students who divide their work into three years may pay their fees in the following order:

FIRST YEAR.

Matriculation.....	\$ 10.00	
Dues.....	25.00	
Chemical laboratory.....	10.00	\$45.00

SECOND YEAR.

Matriculation.....	\$ 10.00	
Dues.....	25.00	
Chemical laboratory.....	5.00	
Pharmaceutical laboratory.....	15.00	\$55.00

THIRD YEAR.

Dues.....	\$30.00	
Pharmaceutical laboratory.....	15.00	
Quantitative chemistry.....	5.00	
Organic chemistry.....	5.00	
Diploma.....	10.00	\$65.00
Total.....		\$165.00

No part of the laboratory fees are ever returned. If there is damage by breakage and waste, an additional fee will be required before the student will be allowed to complete the work in the laboratory.

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 reasons 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 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 meets at the college in January, April, July and October of each year.

For information concerning students' societies, scholarships, University publications, living expenses, etc., see the general catalogue of the University. Address all communications to the Dean, F. J. Wulling, University of Minnesota, Minneapolis, Minn., except during July and August, when he should be addressed at Carlstadt, New Jersey.

## Students.

## GRADUATE STUDENTS.

## CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—28.

Abbetmeyer, Rev. Charles A. <i>B. A. Northwestern Univ.</i> English Philology and Literature, French, German.	St. Paul. *
Angus, William, <i>B. A.</i> , '93. American Public Economy—Taxation, History.	Garfield.
Berkey, Charles Peter, <i>B. S.</i> , '92; <i>M. S.</i> , '93. Mineralogy, Chemistry, Physics, Geology.	Minneapolis.
Brough, Gustave O., <i>B. L.</i> , '89. Political Economy.	Red Wing.
Buck, Benjamin Frank, <i>Carleton College</i> Science of Government, Private Economy, Public Economy.	St. Charles.
Danner, Harry R., <i>B. A.</i> , '91. <i>Rutgers</i> . Political Science.	Minneapolis.
Dever, Charles S., <i>B. L.</i> , <i>LL. B.</i> International Law, Private International Law, Political Economy.	Minneapolis.
Elftman, Arthur Hugo, <i>B. L.</i> , '92; <i>M. S.</i> , '93. Lithological Geology, Chemistry, Physics, Mineralogy.	Minneapolis.
Fink, Bruce, <i>M. S.</i> , '94. <i>University of Illinois</i> . Botany, Zoology, Geology.	Dubuque, Ia.
Flaten, Nils, <i>B. A.</i> , '93. Romance Languages, Latin.	Minneapolis.
Friedmann, Aaron, <i>B. L.</i> , <i>University of Cincinnati, German Gymnasium</i> . History of Ethics, Philosophy.	Minneapolis.
Frost, William Dodge, <i>B. S.</i> ; <i>M. S.</i> Bacteriology, Botany, Chemistry.	Madison, Wis.
Griffiths, David, <i>M. S.</i> , <i>So. Dakota Agricultural College</i> . Botany, German, Chemistry.	Aberdeen. S. D.
—Griffiths, Hannah M., <i>B. A.</i> , <i>Carleton</i> . English, Gothic, German.	Minneapolis.
Hadden, Rev. Archibald, <i>B. D.</i> , <i>Yale</i> . History.	Muskegon, Mich.
Harding, Everhart Percy, <i>B. S.</i> , '94; <i>M. S.</i> , '95. Chemistry, Physics, Philosophy.	Waseca.
Kennedy, Joseph, <i>B. S.</i> , '86. Political Science, Constitutional History.	Grand Forks, N. D.
Leatherman, R. L., <i>M. A.</i> , <i>Roanoke College</i> . Psychology, History of Philosophy, Ethics.	Minneapolis.
McKee, Rev. William P., <i>B. A.</i> , <i>Wabash College</i> . American History, Economics.	Minneapolis.
Massey, Freedom Chester, <i>B. A.</i> , '93. Norman Dialect—Study of the Romance Languages and their development from the Latin, English.	Hamline.
Nilsson, Victor Alfred, <i>Higher Latin College, Gottenburg</i> . Scandinavian, English Philology, French.	Minneapolis.
—Sewall, Hannah Robie, <i>B. A.</i> , '84; <i>M. A.</i> Economics and Politics—The Doctrine of Value, History.	St. Anthony Park
Sheldon, Edmund Perry, <i>B. S.</i> , '94. Botany, Paleontology.	Minneapolis.

Soulé, Stephen Barber, <i>B. S.</i> , '05. Astronomy, Physics, Mathematics.	Hastings.
Trask, John J., <i>B. A. University of North Dakota.</i> Physics, Mathematics, Latin.	Macalester.
Tuckey, Edson N., <i>B. A.</i> , '03, <i>Hamline</i> , History, Philosophy, Political Science.	Eden Prairie.
Zeleny, Anthony, <i>B. S.</i> , '02; <i>M. S.</i> , '03. Physics, Theoretical Mechanics.	Minneapolis.
Zeleny, John, <i>B. S.</i> , '02. Physics—Higher Mathematical Analysis.	Minneapolis.

## CANDIDATES FOR THE DEGREE OF MASTER OF ARTS—11.

Anderson, Frank Maloy, <i>B. A.</i> , '04. History, Economics, Philosophy.	Minneapolis.
Anderson, Louis, <i>B. A.</i> , <i>Gustavus Adolphus</i> . Latin, English Philology, Philosophy.	St. Peter.
—Bailey, Clara Edith, <i>B. A.</i> , '02. Greek, French, Sanskrit, German.	Minneapolis.
Bunnell, Frank S., <i>B. A.</i> , <i>Yale</i> , '05. Greek, Latin, Engineering.	Minneapolis.
Darling, Rev. Charles W., <i>B. A.</i> , <i>Macalester</i> . History, Philosophy, Greek.	Warren.
—Glass, Martha Ruth, <i>University of North Dakota</i> . Latin, Greek, History, English.	Minneapolis.
Larson, Augustus Theodore, <i>A. B.</i> , '04. English Constitutional History, American History, Greek History, Science of the State, International Law.	Alexandria.
Norelius, Marion S., <i>B. A.</i> , <i>Gustavus Adolphus</i> . English Philology, Latin, History.	Minneapolis.
Peterson, George W., <i>B. A.</i> , '03. Latin, History, Political Science.	Minneapolis.
—Sanford, Mrs. Alice B., <i>B. A.</i> , '83, <i>Vassar</i> . History, Political Science, Latin.	Minneapolis.
Toftéen, Rev. Olaf A., <i>University of Upsala</i> . Semitic Languages and Literature, Sanskrit, Hieroglyphic Egyptian	Minneapolis.

## CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE—12.

Allen, Harry Winslow, <i>B. S.</i> , '05. Chemistry, Physics, Crystallography.	Red Wing.
Eckman, Erank A., <i>B. A.</i> , '05, <i>Gustavus Adolphus</i> . Politics, Philosophy, Public Economy.	Cokato.
Edquist, John A., <i>B. A.</i> , <i>Augustana College</i> . Lithological Geology, Animal Physiology, Political History of the United States.	St. Peter.
Fowler, Harry A., <i>B. S.</i> , '05. Philosophy, Chemistry, Histology.	Moorhead.
Hodgson, John Edward, <i>B. S.</i> , '05. History, Political Science, French.	Minneapolis.
Holtz, Fred Leopold, <i>B. S.</i> Botany, Animal Biology, Chemistry.	Mankato.
Hoverstad, Torger, <i>B. Ag.</i> , <i>B. S.</i> , Political Science.	Crookston.
Kendall, Charles H., <i>C. E.</i> , <i>Cornell</i> . Mineralogy, Municipal and Sanitary Engineering, Technical Chemistry, Electrical Transmission, Generators and Motors.	Minneapolis.
Olson, Carl Oscar Alexius, <i>B. S.</i> , '05. International Law, American Public Economy, Experimental Psychology, Icelandic.	Minneapolis.
Ramaley, Francis, <i>B. S.</i> , '05. Plant Morphology, Histology, Organic Chemistry.	St. Paul.
Stomberg, Andrew A., <i>B. A.</i> , '05, <i>Gustavus Adolphus</i> . History, Philosophy, Political Science.	Carver.
—Tilden Josephine E., <i>B. S.</i> , '05. Algology, Chemistry, Latin.	Minneapolis.



## CANDIDATES FOR THE DEGREE OF MASTER OF LITERATURE—13.

—Allen, Emma Frances, <i>B. L.</i> , '93. English, Philosophy, Pedagogy.	Ashland, Oregon.
Andrist, Charles Martin, <i>B. L.</i> , '94. French, German, Scandinavian, Spanish, Italian.	Minneapolis.
Boraas, Julius J., <i>B. L.</i> , '95. English, Scandinavian, French.	Red Wing.
—Colgrove, Maud Comfort, <i>B. L.</i> , '93. History, English, Latin.	St. Cloud.
—Comfort, Sarah Catherine, <i>B. L.</i> , '90. History, English, German.	Minneapolis.
—Cross, Nellie Malura, <i>B. L.</i> , '91. Botany.	Minneapolis.
Fulton, Thomas C., <i>B. L.</i> , '94, <i>Cornell</i> . History, Political Science, Psychology.	Minneapolis.
—Hillman, Ada Belle, <i>B. L.</i> , '95. English, Psychology.	Minneapolis.
—McCoy, Louise, <i>B. L.</i> , '93. History, German, English.	Algona, Ia.
Olson, Oscar L., <i>B. A.</i> , <i>Luther College</i> . English Literature and Philology, Scandinavian, History of Philosophy.	Minneapolis.
—Robinson, Louise Florence, <i>B. L.</i> , '92. English, German.	Minneapolis.
Simonton, William Adair, <i>B. L.</i> , '94. Political Science.	Sauk Centre.
Tone Knut Hjalmer, <i>B. L.</i> , '95. Philosophy, German, English.	Brewster.

## CANDIDATES FOR THE DEGREE OF CIVIL ENGINEER—7.

Bachtelder, Frank Leslie, <i>B. C. E.</i> , '93. Structural Iron Work, Pure Mathematics and Hydraulics, Jew- ish History.	Stillwater.
Bohland, John Adam, <i>B. C. E.</i> , '95. Steel Arch Bridges, Manufacture and Properties of Structural Steel, Astronomy.	St. Paul.
Chapman, Leslie Howard, <i>B. C. E.</i> , '95. Economics of Bridge Design, Hydraulics, Mathematics.	Litchfield.
Erf, John William, <i>B. C. E.</i> , '93. Structural Iron Work, Hydraulics, Masonry Construction.	Minneapolis.
Gilman, James B., <i>B. C. E.</i> , '94. Manufacture of Steel, Chemistry, Sanitary Engineering.	Minneapolis.
Graber, Albert, <i>B. A.</i> , '88. Civil Engineering.	Minneapolis.
Johnson, Noah, <i>B. C. E.</i> , '94. Goedsey, Structural Iron Work, Hydraulic and Sanitary En- gineering, Physics as pertaining to Goedsey.	Litchfield.

## CANDIDATES FOR THE DEGREE OF ELECTRICAL ENGINEER—2.

Chalmers, Charles Henry, <i>B. E. E.</i> , '94. Design for Dynamo, Electric Machinery, Alternating Currents, Structural Iron Work.	Minneapolis.
Eddy, Horace T., <i>B. E. E.</i> , '95. Alternating Currents, Structural Engineering, Prime Movers.	Minneapolis.

## CANDIDATE FOR THE DEGREE OF MINING ENGINEER—1.

Christianson, Peter, Mining, Metallurgy, Lithological Geology.	Minneapolis.
---	--------------

## CANDIDATES FOR THE DEGREE OF MASTER LAWS.—22.

Andrews, Sewall Dubois, <i>LL. B.</i> , <i>Cornell</i> .	Minneapolis.
Bond, Chas. E., <i>LL. B.</i> ,	Minneapolis.
Carroll, Walter N., <i>LL. B.</i> ,	Minneapolis.
Christello, Albert, <i>LL. B.</i> ,	Minneapolis.
Chute, Frederick Butterfield, <i>LL. B.</i> ,	Minneapolis.

Cormany, Montgomery L., <i>LL. B.</i> ,	Minneapolis.
Farnham, Charles Wells, <i>LL. B.</i> ,	St. Paul.
Gardiner, Harris Wells, <i>LL. B.</i> ,	St. Paul.
Griggs, Frank Hammond, <i>LL. B.</i> ,	St. Paul.
Hopkins, Earl P. <i>LL. B., U. of Iowa.</i>	St. Paul.
Hunt, William Franklin, <i>LL. B.</i> ,	St. Paul.
Jewett, William Franklin, <i>LL. B.</i> ,	St. Paul.
Kepner, Thomas Ervin, <i>LL. B.</i> ,	Rochester.
Kranz, John Valentine, <i>LL. B.</i> ,	Minneapolis.
Kyle, John P. <i>LL. B.</i> ,	St. Paul.
McDonald, William E., <i>LL. B.</i> ,	Minneapolis.
Merrill, George C., <i>LL. B.</i> ,	Minneapolis.
O'Brien, James Edward, <i>B. A., LL. B.</i> ,	Minneapolis.
Osborne, Rockwell Coleman, <i>LL. B.</i> ,	La Crosse, Wis.
Prendergast, Louis W. <i>LL. B.</i> ,	St. Paul.
Sardeson, Amos D., <i>LL. B.</i> ,	Minneapolis.
Sweet, John Cochrane, <i>LL. B.</i> ,	Mankato.

## OTHERS DOING GRADUATE WORK—42.

—Anderson, Martha Scott, <i>B. A., '92, Ohio Wesleyan University.</i>	Minneapolis.
History, English.	
—Andrews, Alice E. <i>B. A., Carleton.</i>	Hamline.
History, Latin, English.	
Avery, Henry Brinckerhoff, <i>B. M. E., '93.</i>	Minneapolis.
Bean, George Samuel, <i>B. A., Victoria University.</i>	Minneapolis.
Physics, Mathematics, Chemistry, Astronomy.	
Bryant, Julius Clarence, <i>B. A. '78.</i>	St. Paul.
Latin, History.	
Cassedy, George Albertus, <i>B. C. E., '95.</i>	Rochester.
—Chalmers, Mrs. Lillian Hatch, <i>B. S., '95.</i>	Minneapolis.
Psychology.	
—Gideon, Florence, <i>B. L., '88.</i>	Minneapolis.
Gill, James Herbert, <i>B. M. E., '92.</i>	Minneapolis.
Locomotive Engineering.	
Griffin, Lawrence E., <i>B. Ph., B. A., Hamline.</i>	Minneapolis.
Animal Biology.	
Head, George Douglas, <i>B. S., '92; M. D., '95.</i>	Minneapolis.
Animal Biology.	
Helliwell, Arthur Llewellyn, <i>B. A., '95.</i>	Minneapolis.
—Jenks, Gracia Latham, <i>B. L., Carleton.</i>	Minneapolis.
German, French, History.	
Knappen, Theodore McFarlane, <i>B. S., '91.</i>	Minneapolis.
History.	
Lovell, Alfred, <i>C. E., Worcester Polytechnic Institute.</i>	St. Paul.
Locomotive Engineering.	
McAndrew, James E., <i>B. L. '95.</i>	Iroquois, S. D.
History, English.	
—McDonald, Hope, <i>B. S., '94.</i>	Minneapolis.
History.	
—McMillan, Bertha, <i>B. A., '94.</i>	Minneapolis.
Drawing.	
—Maes, Emma, <i>B. L., '81.</i>	Minneapolis.
French, English.	
Mann, Eugene L., <i>B. A., Hobart; M. D., Hahnemann.</i>	St. Paul.
History.	
Manson, Frank Melville, <i>B. S., '94; M. S., '95.</i>	Minneapolis.
Animal Biology.	

—Michelet, Maren B. H., <i>B. L.</i> '93. Scandinavian.	Red Wing.
—Mulholland, M. Eetelle, <i>B. A. Vassar.</i> '95. Greek.	Minneapolis.
—Page, Dora, <i>B. A. Carleton.</i> English.	Minneapolis.
—Perkins, E. Anna, <i>B. L.</i> '95. Philosophy, German, Latin.	Minneapolis.
Pope, Jesse, <i>B. S.</i> '95. Latin, Philosophy, English.	Monticello.
—Potter, Franc Murray, <i>B. A., '93; M. A., '95.</i> History, Italian, Old French.	Minneapolis.
—Potter, Mrs. Jane B., <i>B. A., Michigan; M. A., '94.</i> English, French.	Minneapolis.
Rankin, Albert William, <i>B. A., '86.</i> History, German.	Minneapolis.
Rickey, James Walter, <i>C. E., Rensselaer Polytechnic Institute.</i> Assaying, Economic Geology, Chemistry.	Minneapolis.
—Robbins, Edith Anstis, <i>B. S., '95.</i> French.	Robbinsdale.
Sahlstrom, Lars A., <i>B. A., Amity.</i> History.	Minneapolis.
Smith, E. Fay, <i>B. L., '94.</i> Chemistry, Physics, Military Science, Geology.	St. Paul.
—Southworth, Mary L., <i>B. S., '87, Wellesley.</i> History, Latin.	Minneapolis.
Springer, Frank Wesley, <i>B. E. E.</i>	Minneapolis.
—Squires, Mrs. Carrie Ranson, <i>B. A., Hamline.</i> History, English.	Hamline.
Vaughn, Zenas Newton, <i>B. A., '84.</i> French, Latin.	Anoka.
—West, Martha B., <i>B. L., '79.</i> Scandinavian.	Minneapolis.
—Wright, Ella Theoline, <i>B. A., '94.</i> Greek.	Minneapolis.
Young, Charles Elon, <i>B. A., '93.</i> History.	Brainerd.

## UNDERGRADUATE STUDENTS.

### THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

#### SENIOR CLASS.—102.

##### CLASSICAL SECTION.—27.

Abernethy, William Shattuck, Minneapolis.	Morley, Frank Johnson, Minneapolis.
Adams, Charles Edward, Fargo, N. D.	Myers, Daniel Wilbur, Vermillion, S. D.
Anderson, Frank Leonard, Red Wing.	—Simmons, Rose Anthony, Hastings.
Austin, Lloyd Barrick, Woodburn, Ore.	Simpson, Marcus Julius, Long Beach, Cal.
Bratrud, Theodore, Spring Valley.	—Smith, Mary Chadbourn, Minneapolis.
—Breckenridge, Julia Reed, Decorah, Ia.	Sperry, Frederick James, Wasioja.
—Drew, Mary Ellen, Burlington, Vt.	—Tennant, Grace Mabel, Minneapolis.
Finlayson, George Albert Edward, Crookston.	—Tillotson, Frances Margaret, Sauk Center.
Garrity, Harry, Minneapolis.	—Walker, Alice Elinor, Minneapolis.
Gould, Chester Nathan, Owatonna.	—Webb, Alice Catharine, Minneapolis.
Hempstead, Clark, Minneapolis.	—Welles, Hattie E., Minneapolis.
Hewitt, Edwin Hawley, Red Wing.	Wingate, Charles Benjamin, Minneapolis.
Keyes, Charles Frederick, Minneapolis.	Yeager, Carlton S, Vermillion, S. D.
Lofstrom, Emery Elmer, Litchfield.	

## SCIENTIFIC SECTION—44.

- Beach, Elizabeth Sophia, Faribault.  
 Berg, John Nelson, Minneapolis.  
 —Blaisdell, Helen Elizabeth, Minneapolis.  
 Brooks, Harry Bayard, Renville.  
 Case, Martin William, St. Peter.  
 Chapman, Herman Haupt, St. Paul.  
 Condit, William Henry, Jersey, O.  
 Dalrymple, John Stewart, St. Paul.  
 Davies, John Milton, Courtland.  
 Day, Reuben Noble, Minneapolis.  
 Ellis, Sidney A., Austin.  
 Field, Peter, Meroa, Iowa.  
 Fowler, Carl Hitchcock, B. A., Minneapolis.  
 Galloway, Lee, Faribault.  
 George, James Woodward, Rockford.  
 Gregory, Joel Ernest, St. Paul.  
 Gruenberg, Benjamin Charles, Minneapolis.  
 Hartman, William David, Tower City, N. D.  
 —Holtz, Eleanor, Minneapolis.  
 —Kirtland, Rhodella, Minneapolis.  
 Lewis, John Hoover, Dean.  
 —Long, Jessie, Minneapolis.
- McCrea, Almeron Wallace, St. Paul.  
 McDermott, Thomas Ignatius, Stillwater.  
 Matteson, Herman Howard, Minneapolis.  
 Maxwell, Asa Frank, San Francisco, Cal.  
 Mayo Alfred David, Leavenworth, Kan.  
 —Miller, Grace Hannah, Minneapolis.  
 —Mitchell, Mildred Whittlesy, St. Cloud.  
 —Mortenson, Mary Ellen, Faribault.  
 Mosher, Wells John, Zumbrota.  
 Newell, Horatio S., Robbinsdale.  
 Osborn, William John, Mankato.  
 Perkins, Maynard Cyrus, Minneapolis.  
 Pickett, Victor Goodrich, Albert Lea.  
 —Roney, Katharine, Winthrop, Ia.  
 Ross, Hiram Earl, Minneapolis.  
 —Siegler, Lillian, Spokane, Wash.  
 —Stevens, Jessie Eliza, Minneapolis.  
 Thompson, Reuben Celius, Preston.  
 Tønning, Peter Christian, Taopi.  
 Uhl, Alfred Woodbridge, Winona.  
 Weatherson, Charles Edkin, Dundas.  
 Winchell, Alexander Newton, Minneapolis.

## LITERARY SECTION—31.

- Austin, Ella May, Minneapolis.  
 Bartholomew, Fred Roscoe, Chariton, Ia.  
 Beaven, Arthur Hubert, Minneapolis.  
 —Bennett, Frances Louise, Minneapolis.  
 —Daniels, Mary Anderson, Wernland Sweden.  
 —Davidson, Mary Isabella, Minneapolis.  
 Eliason, Adolph Oscar, Montevideo.  
 Ellingson, George Henry, Sogn.  
 Farmer, Ernest M., Spring Valley.  
 Foster, Wesley Sherman, Dover.  
 Fridley, Don Phelps, Becker.  
 —Fullerton, Caroline A., Minneapolis.  
 —Gibbs, Elsie Carolyn, Minneapolis.  
 Haugan, Otto Martin, Fergus Falls.  
 —Hawley, Mary E., Minneapolis.  
 —Holland, Mary Allen, Minneapolis.
- Hungerford, Josephene Louese, Minneapolis.  
 Kinney, Alvin C., Lake City.  
 —Levens, Nellie, Albert Lea.  
 —Parker, Marion Alice, Minneapolis.  
 —Porcher, Mary L., Minneapolis.  
 —Plummer, Lydia May, Minneapolis.  
 Rache, Elias, Granite Falls.  
 —Robb, Charlotte Estelle, Minneapolis.  
 —Robbins, Alice Greeley, Minneapolis.  
 Rønning, Nils N., Boe, Norway.  
 —Seeley, Blanche, Minneapolis.  
 —Smith, Elsie Blanche, Minneapolis.  
 —Trask, Mrs. Abbie Minerva, St. Paul.  
 —VanCleve, Mary Adams, Minneapolis.  
 —Woodward, Agnes Young, Minneapolis.

## JUNIOR CLASS—132.

## CLASSICAL SECTION—28.

- Ames, Clair Elwood, Minneapolis.  
 Anderson, Arthur Edward, Red Wing.  
 Barton, Edgar Reginald, Minneapolis.  
 Booth, Lawrence N., Willmar.  
 Brill, Hascal Russell, Jr., St. Paul.  
 Bursell, Herbert Edwin Raymond, Minneapolis.  
 —Dickinson, Lucy Evelina, Minneapolis.  
 Dunlap, George Crawford, St. Paul.  
 Faude, Frank Clement, Minneapolis.  
 Ferner, Roy Yalding, Hampton, Iowa.  
 Fisher, James V. S., Minneapolis.  
 Glasoe, Paul Maurice, Spring Grove.  
 Guilford, Paul Willis, Minneapolis.  
 Higbee, Paul A., Minneapolis.
- Hitchings, John Russell, Sutherland, Iowa.  
 Jewett, Edmund Gale, St. Paul.  
 Kannary, Edward Leroy, Northfield.  
 Nelson, Ralph William, Benson.  
 Newkirk, Burt Leroy, Minneapolis.  
 Otteson, Charles Bernard, Montevideo.  
 —Pratt, Helen Clare, Minneapolis.  
 Putnam, William Rowell, Red Wing.  
 Savage, Linnaeus Tyndal, Minneapolis.  
 Schmidt, Paul Gerhard, Minneapolis.  
 Tirrell, John Mahlon, Minneapolis.  
 —Ward, Mary, Minneapolis.  
 —Wheeler, Eva Gertrude, Minneapolis.  
 —White, Annie May, Wadena.

## SCIENTIFIC SECTION—57.

- Angle, Claribel, Minneapolis.  
 Artz, Emmanuel A., St. Paul.  
 —Austin, Helen Horace, St. Paul.  
 Baker, Axel Conrad, Rochester.  
 Burnap, Willard Lothrop, Clear Lake, Ia.  
 —Cahoon, Charlotte Deming, Minneapolis,  
 —Caplin, Jessie F., Minneapolis.  
 Carlson, Carl Floyd Wolner, Stillwater.  
 —Chase, A. Isabel, Minneapolis.  
 Childs, Hubert Guy, San Diego, Cal.  
 Cox, Norman J., Wasioja,  
 Dixon, Harry Lester, Northfield.  
 —Donaldson, Susanne Thorne, St. Paul.  
 Foss, August, Rushford.  
 —Foss, Elizabeth H., Minneapolis.  
 —Grant, Nellie Harriet, Peoria, Ill.  
 —Gray, Janet, Minneapolis.  
 Grusendorf, Diedrich August, New Ulm.  
 Hannay, John Robert Rigby, Fort Snelling.  
 Hare, Edward Taylor, Minneapolis.  
 Hastings, Robert A., Minneapolis.  
 —Hendrix, Julia May, Minneapolis.  
 Horton, George Reed, Algona, Ia.  
 Horton, Lawrence Eustace, Duluth.  
 Huxley, Fred, Plainview.  
 Johnson, John O., Hanska.  
 Johnston, George Henry, Minneapolis.  
 Kenyon, Fayette C., Owatonna.  
 Kunze, William Frederick, Sleepy Eye.  
 Lange, Deitrich, St. Paul.  
 —Langmaid, Abbie Bailey, Granite Falls.  
 Lawrence, William Hamilton, Wabasha.  
 Lee, Algernon Herbert, Minneapolis.  
 Lincoln, Robb E., Fergus Falls.  
 Loe, Daniel O., Minneapolis.  
 Loye, Albert Bushnell, Minneapolis.  
 —McDermid, Kate, Minneapolis.  
 —Mantor, Flora M., Willmar.  
 Miner, J. Burt, Berlin, Wis.  
 Norton, Alfred A., Minneapolis.  
 Parker, William James, Camden Place.  
 Pitts, Fred, Minneapolis.  
 Ring, Merritt Mellen, Owatonna.  
 —Ripley, Abigail, Minneapolis.  
 Roberts, William Burchard, Minneapolis.  
 —Robinson, Mabel, St. Paul.  
 Simmons, Harry F., Minneapolis.  
 Smallidge, Joseph Franklin, Faribault  
 Smith, Harry Benjamin, Dubuque, Ia.  
 Spicer, Russell Paul, Willmar.  
 Spratt, Charles Nelson, Minneapolis.  
 Thompson, Will T., St. Croix Falls, Wis.  
 Updyke, Stephen Gould, Jr., Waseca.  
 Wendell, William Fuller, Minneapolis.  
 —Weston, Florence Mabel, Minneapolis.  
 Willius, Otto, St. Paul.  
 Wold, Carl Angell, Brandon.

## LITERARY SECTION—47.

- Austin, J. Frederick, St. Paul.  
 —Baker, Helen Josephine, Monticello.  
 Bergheim, Nels N., Madison, S. D.  
 —Belden, Agnes Emily, Minneapolis.  
 Bonwell, Arthur Gano, Blue Earth City.  
 —Brewer, Flora Elizabeth, Minneapolis.  
 —Case, Lucy Roberts, Aberdeen, S. D.  
 Castle, Harry Jacques, St. Paul.  
 —Crosby, Marion, Hastings.  
 Devereaux, Thomas, Minneapolis.  
 Dewart, Murray Wilder, St. Cloud.  
 —Dunham, Lucy Bertha, Anoka.  
 —Durkee, Caroline May, St. Paul.  
 —Eaton, Jessie Gale, Minneapolis.  
 —Evans, Mary Sophronia, Minneapolis.  
 —Evans, Tamazine McKee, Minneapolis.  
 —Fish, Elizabeth Mabel, Minneapolis.  
 Flanagan, Charles Gibbons, Mankato.  
 Frankel, Louis Rudolph, St. Paul.  
 Garfield, William Henry, Glendive, Mont.  
 —Gould, Gertrude Helen, Minneapolis.  
 —Grant, (Mrs.) Avis Winchell, Minneapolis.  
 Hansen, George Alfred, Rushford.  
 —Hawley, Anna McDonald, Minneapolis.  
 Hill, Lincoln, Creston, Ill.  
 Holmes, James Elliot, Moorhead.  
 —Hooker, Mary Loomis, Minneapolis.  
 Johnston, George Smith, Minneapolis.  
 —Kennedy, Katharine, Minneapolis.  
 Koren, Harold, Montevideo.  
 Longfield, Frank Bertrand, St. Paul.  
 —Luce, Elizabeth, Minneapolis.  
 McClure, Charles, St. Louis, Mo.  
 —MacDonald, Harriet, Minneapolis.  
 —McGregor, Lulu, Minneapolis.  
 Mann, William Seward, Minneapolis.  
 —Mattison, Hannah, Minneapolis.  
 Mills, Ernst B., St. Paul.  
 Otis, Willis Clarke, Janesville, Wis.  
 Pfaender, Albert, Minneapolis.  
 —Potter, Marion Effie, Minneapolis.  
 —Rogers, Martha, Minneapolis.  
 Simpson, Earl, Winona.  
 —Thompson, Adelaide M., Hastings.  
 —Tobin, Frances Marion, Minneapolis.  
 —Woodman, Helen Celestia, St. Paul.  
 —Yancy, Ellen May, Edina Mills.

## SOPHOMORE CLASS, 183.

## CLASSICAL SECTION, 26.

- Beede, Harry R., Northfield.  
 Caldwell, George Baird, St. Paul.  
 Carson, Charles Frederic, Toledo, Ore.  
 Christopherson, Conrad H., Albert Lea.  
 —Clay, Florence, Cedar Falls, Iowa.  
 Dickinson, Albert Justin, St. Paul.  
 Dodge, Clayton James, Claremont.  
 —Donaldson, Elizabeth, Minneapolis.  
 —Eddy, Esther Mabel, Minneapolis.  
 Foot, Edwin H., Red Wing.  
 —Harris, Mary Cone, Faribault.  
 —Haughwout, Evelina M., Minneapolis.  
 Koren, Finn, Montevideo.  
 Lawrence, Jacob Sidle, Minneapolis.  
 —McCann, Alice, Minneapolis.  
 —Mather, Abbie Grace, Minneapolis.  
 Page, Irving Gonyer, Anoka.  
 Pfeiffer, Henry John, Red Wing.  
 Sheldon, Benjamin Cushing, Prospect Park.  
 —Steele, Edith C., Minneapolis.  
 Stephens, Ralph Brown, Minneapolis.  
 Swensen, Kristian, Minneapolis.  
 Tallman, Roy Warner, St. Paul.  
 TenBroeck, Louis Leonard, Faribault.  
 —Tryon, Josephine Phelps, Minneapolis.  
 Warren, William Edward, Key West, Fla.

## SCIENTIFIC SECTION, 79.

- Adair, Fred Lyman, Anamosa, Iowa.  
 Adams, Bertram Sage, Lisbon, N. D.  
 Adams, John Lester, Fargo, N. D.  
 Alger, Edmund Whitney, Minneapolis.  
 Allen, Hugh Neil, Minneapolis.  
 Allis, Roy Wirt, Oronoco.  
 Armstrong, John Milton, St. Paul.  
 Arness, Ole John, Terrace.  
 Arzt, Herbert, St. Paul.  
 —Beach, Annabel Wilson, Faribault.  
 Billings, Wall Marion, Minneapolis.  
 —Bingham, Alice Jennie, Sleepy Eye.  
 Blaisdell, Alfred, Fairmont.  
 —Blake, Lydia Mann, St. Anthony Park.  
 Bren, Joseph David, Hopkins.  
 Bruckart, Leigh Dudley, St. Cloud.  
 Burglehaus, Theron W., Minneapolis.  
 Campbell, John Elisha, Minneapolis.  
 Case, Frank Waller, Marshall.  
 —Chase, Daisy, St. Paul.  
 Cosgrove, Grace Anna, Le Sueur.  
 Cosgrove, Robert Hugh, Le Sueur.  
 Couper, Everett Wilson, Blue Earth City.  
 Crawford, Wm. Miles Noble, Monticello.  
 Cunningham, Emery Matthew, Delano.  
 Curtis, John Peter, Minneapolis.  
 Davis, Fred U., Mankato.  
 —Davis, Lu M., Madelia.  
 Davis, Perley Alton, Faribault.  
 Dean, Frank Edson, Blakeley.  
 —Dobie, Elen, Hastings.  
 Dyer, George Elmore, Houston.  
 —Erichsrud, Julia Pauline, Blue Earth City.  
 Flanders, Romanc Cecil, Minneapolis.  
 Freeman, Edward Monroe, St. Paul.  
 —Gerhard, Katherine, Minneapolis.  
 Gerdson, Wm. Cornelius, Victoria.  
 Grant, James DeGoliar, Fargo, N. D.  
 —Gray, Stella E., Preston.  
 —Hagar, Etta Mabel, Minneapolis.  
 Hamlin, Ernest Fay, Minneapolis.  
 Hanson, Perry Oliver, Clear Lake, Ia.  
 Heath, Elbridge Lionel, Mazeppa.  
 Heffner, John McKee, St. Paul.  
 Hooker, Roy Frederick, Minneapolis.  
 Humphrey, Edward Frank, Winnebago City.  
 Hursh, William, Long Lake.  
 Keyes, Williard Collins, Minneapolis.  
 Kirk, John Howarth, Niagara, N. D.  
 Knight, Bertram Glover, Glencoe.  
 —Koch, Gesena Wilhemina, Ashmore Flats.  
 Lehman, Max A., Blue Earth City.  
 —Lovejoy, Edith D., Minneapolis.  
 Luby, Michael John, Minneapolis Park.  
 —Marvin, Lillian Bessie, Zumbrota.  
 Monfort, George Dickinson, Litchfield.  
 Murphy, Francis James, Minneapolis.  
 —O'Donnell, Emma Cecelia, Stillwater.  
 —Olson, Mary Emma, Zumbrota.  
 Pitts, Harold, Minneapolis.  
 Plymat, Harry Eldon, Mankato.  
 Porter, Summer Frank, Adrian.  
 Rich, Clarence Stewart, Red Wing.  
 —Simmons, Echo, Minneapolis.  
 —Smith, Mable Frances, Algona, Ia.  
 —Smith, Rubie Evans, Algona, Iowa.  
 Stanford, Harold Melvin, Kandiyohi.  
 Swenson, David F., Minneapolis.  
 Swenson, Harry Sylvester, Minneapolis.  
 Taresh, John, Sauk Center.  
 Thomas, Philip Ralston, Minneapolis.  
 —Todd, Marie Annette, Minneapolis.  
 Van Dyke, Cleve W., Alexandria.  
 —Wadsworth, Alice Rebecca, Algona, Ia.  
 Wakefield, Bert, Monticello.  
 Washburn, Orson Monroe, Monticello.  
 —Williams, Carrie Ella, Mankato.  
 Wolf, Samuel Henry, Faribault.  
 Zeleny, Charles, Minneapolis.

## LITERARY SECTION—59.

- Breckenridge, Anna, Decorah, Ia.
- Bruegger, Vida, Minneapolis.
- Byrnes, Mary Russell, Minneapolis.
- Castle, Margaret, St. Paul.
- Cogelow, William J., St. Paul.
- Costello, Julia Marie Madeline, St. Paul.
- Custer, Junie Louise, Minneapolis.
- Daniels, Ada Ethelyn, Minneapolis.
- Davis, Isabelle Haven, St. Peter.
- Doty, Mable Olive, Courtland.
- Fisher, Lizzie Anna, Minneapolis.
- Fletcher, Nelle Camp, Minneapolis.
- Graves, Ethel Snow, St. Paul.
- Haecker, Elfrida, St. Anthony Park.
- Hall, Minna, Minneapolis.
- Hankenson, Helen, Glencoe.
- Helliwell, Clare Frances, Minneapolis.
- Helliwell, Harriet Ethel, Minneapolis.
- Herrick, Mary Laura, Minneapolis.
- Hill, Oliver, Minneapolis.
- Hoeffing, Elfa C., Fergus Falls.
- Holtz, Hattie, Minneapolis.
- Hotchkiss, Zoe, Minneapolis.
- Hunt, Emma Sinclair, Minneapolis.
- Jordahl, Sivert Anton, Manchester.
- Loomis, John Breinen, Minneapolis.
- Lougee, Helen Elizabeth, Minneapolis.
- McComber, Effie Adeline, Clear Lake, Ia.
- Maxwell, Clara, Minneapolis.
- Means, Jennie May, Geneva, N. Y.
- Merrick, Annie Grace, Austin.
- Mitchell, Eleanor Darlington, Minneapolis.
- Paige, Alice Maude, Minneapolis.
- Penny, Edith M, Minneapolis.
- Pettit, Mary S., Minneapolis.
- Redfield, Jane, Minneapolis.
- Rich, Martha Louise, Hastings.
- Ringstad, Edward O., Hader.
- Roche, Marie Agnes, Minneapolis.
- Rogers, Gertrude, Minneapolis.
- Rosenthal, Francis Joseph, St. Paul.
- Sergeant, Ethel E., Minneapolis.
- Savage, Nellie, Minneapolis.
- Scandrett, Henry Alexander. Faribault.
- Shafer, Laura, Minneapolis.
- Shepard, Henry Lee, Jr., Minneapolis.
- Slincy, Margaret Irene, Oakdale.
- Smith, Gustavus Foster, Alco, Ala.
- Smith, Mildred Alice, Minneapolis.
- Smith, G. Foster, Minneapolis.
- Sommers, Henry Stern, St. Paul.
- Sperry, Mary Halesia, Wasioja,
- Stock, Edna May, Mitchell, Ia.
- Thayer, Myrtle M., Spring Valley.
- Upson, Arthur Wheelock, Minneapolis.
- Wedge, Jessie C., Plainview.
- Welchli, Harriet, Bay City, Mich.
- Weigel, William Barton, Plainview.
- West, Veta A., Austin,

## TEACHERS' SECTION—19.

- Alterton, Claire, Minneapolis.
- Berry, Clara Helen, Anoka.
- Chase, Inez May, Madelia.
- Clark, Almira Lavinia, Minneapolis.
- Clement, Julia Isabel, Kasson.
- Furlong, Bridget, Pine Bend.
- Gould, Luella Elizabeth, Owatonna.
- Hambleton, Lina, St. Paul.
- Kellam, Collins Marcus, Winona.
- Kimball, Marion, Minneapolis.
- McMullen, Jennie May, Minneapolis.
- Moody, Cora Louise, Minneapolis.
- Peterson, Matilda, Minneapolis.
- Quale, Eric C., Sunburgh.
- Sawyer, Mabel, Minneapolis.
- Schulten, Jessie Lightner, Minneapolis.
- Shaw, Maud C., Minneapolis.
- Smith, Ai Biley, Minneapolis.
- Towler, May Belle, Minneapolis.

## FRESHMAN CLASS, 306.

## CLASSICAL SECTION, 45.

- Baxter, Stephen Henry, Minneapolis.
- Bessesen, Henry John, Albert Lea.
- Brearley, Mattie Lyle, Minneapolis.
- Burton, Will David, Minneapolis.
- Clark, Charles Allen, Minneapolis.
- Colwell, Charles Edward Payson, Minneapolis.
- Crouse, Emma S., Minneapolis.
- DeCoster, Esther Louise, Litchfield.
- Dillman, Willard Fleming, Revillo, S. D.
- Ditenhoffer, Sam William, St. Paul.
- Doeltz, Paul, Minneapolis.
- Donaldson, Eleanor Lavinia, Minneapolis.
- Dumas, Emily Francis, Minneapolis.
- Finch, Arthur James, Clinton Falls.
- Fish, Florence Adams, Minneapolis.
- Fisher, Caleb Ellis, Fargo, N. D.
- Goldsbury, John, Minneapolis.
- Harrison, Jesse McVeigh, Hanibal Mo.
- Herriott, Clarence Dillway, Minneapolis.
- Hotchkiss, Foi, Minneapolis.

- Hutchinson, Effie Hinkley, Minneapolis.  
 Keith, Albert Jackson, Sioux Falls, S. D.  
 Kingston, Howard William, St. Paul.  
 Linsley, Emery, Burton, Morris.  
 Kottaba, Francis, Gregory, Winona.  
 Lothrop, Daniel John, Minneapolis.  
 Lowell, Jacob, Jr., Fargo, N. D.  
 Mann, Leonard Loumino, Money Creek.  
 Newkirk, Harris Dana, Minneapolis.  
 —Newman, Fannie Sophia, Minneapolis.  
 —Nichols, Georgia Lenore, Fergus Falls.  
 Phelps, G. Sidney, Denver, Colo.  
 —Quirk, Nellie Faragher, Minneapolis.

## SCIENTIFIC SECTION—121.

- Anderson, George Emil, Austin.  
 —Arnold, Anna Olive, Minneapolis.  
 Babcock, George Lucius, Minneapolis.  
 Barber, Harry Sidle, Minneapolis.  
 —Basford, Alice Whitnee, Minneapolis.  
 Baum, Clarence Carr, Litchfield.  
 Benedict, Walter Lewis, Minneapolis.  
 Bisbee, Arthur Leonard, Madelia.  
 —Bissell, Emily M., Litchfield.  
 Blanch, Fred, W., Mantorville.  
 Boardman, Ralph Todd, Minneapolis.  
 Bothe, Edwin Benjamin, St. Paul Park.  
 —Bowen, Lucia Bertina, Minneapolis.  
 Bowman, Frank Atherton, Rainy Lake.  
 Boyer, Ralph, Waldo, Merriam Park.  
 Brace, Emory Chase, St. Anthony Park.  
 Bradford, Charles Sidney, Farmington.  
 Brown, Minot James, Owatonna  
 Brubaker, Guy, Waseca  
 Butters, Frederic King, Minneapolis.  
 Carney, Harry Emmet, Mankato  
 Chambers, Winslow Clark, Owatonna  
 —Chapman, Fanny Belle, Minneapolis.  
 Charles, Alfred William, Faribault.  
 Clement, Arthur, Waseca.  
 Clement, Lucian Orville, Waseca.  
 Colgrove, Pitt Payson, Clearwater  
 Collins, Everett Foster, Stillwater  
 —Dawley, Etha, Ada  
 Dean, Sidney Walter, Camden Place  
 Dinehart, Clarence Christopher, Slayton  
 Duncan, Theodore L, Fargo, N D  
 Dunlap, Alexander Hamilton,  
     Manistec, Mich  
 —Durkee, Ella Shaw, Mankato  
 —Edwards, Grace, Minneapolis  
 Ellsworth, Amos Dolbier, Winona  
 Emmons, Frank Williams, Minneapolis  
 —Erickson, Wilhelmina, Red Wing  
 Espy, Olin Harvey, St. Paul  
 —Everest, Georgiana, Duluth  
 Fitch, Lester John, Minneapolis
- Roberts, Guy Hall, Minneapolis.  
 —Sandberg, Matilda, Minneapolis.  
 —Sardeson, Eva Rossing, Minneapolis.  
 Slattery, Joe, Wahpeton, N. D.  
 —Smith, Edna Lamb, Minneapolis.  
 —Smith, Gratia Amanda, Minneapolis.  
 Tyler, Arthur Peck, Lyons, Iowa.  
 —VanVliet, Flora, Burlington, Vt.  
 —Williams, Essie Winning, Hudson, Wis.  
 Wilson, Paul Eldredge, Minneapolis.  
 Wyer, Malcolm Glenn, Excelsior.  
 Yale, William Hoyt, Winona.
- Fleming, Ellsworth, Garden City  
 Fogle, James Underhill, Stillwater  
 Folwell, Wm. Bainbridge, Minneapolis  
 Furst, William, St. Paul  
 Geist, Emil Sebastian Thomas, St. Paul.  
 —Grant, Sarah Catherine, St. Paul  
 Green, George Heigert, St. Peter  
 Guthrie, Joseph Edward, York, N Y  
 Hage, George Simon, Madelia  
 —Hall, Sarah Phoebe, Zumbrota  
 —Hallock, Olive Nilson, Faribault  
 Harrison, Merton Echo, Minnehaha  
 Hart, Albert, Harmony  
 Hauck, Edward William, Arlington  
 Hudson, Walter Gibbs, Minneapolis  
 Huff, Charles, Little Falls  
 Humphrey, Harry Baker, Elk River  
 Huntington, Paul, Green Bay, Wis  
 —Jacobson, Effie Mable, Luverne  
 Johnson, Charles Anton, Sauk Centre  
 Jones, Thomas Linley, Sabin  
 Kierland, Iver, Moorhead  
 Kinyon, Wm. Ward, Owatonna  
 Knapp, Hugh Lloyd, Clinton Falls  
 Kyed, John Martin, Alexandria  
 La Due, Samuel John, Fertile  
 Lanpher, Rollin Auerbach, Jr. St. Paul  
 Lee, Rudolph Alfred, St. Cloud  
 Loomis, Harry Charles, Minneapolis  
 Luse, Claude Zeph St. Paul  
 Mabey, Perl William, Lake City  
 McBride, Arthur Andrew, Austin  
 McCrady, Willis Gorman, Owatonna  
 McIntyre, James, Manannah  
 —McIntyre, Mary Stewart, Minneapolis  
 McMullen, Guy, Minneapolis  
 —Maechler, Alice Gertrude, Campbell  
 —Maechler, Dora Elizabeth, Campbell  
 Mahler, Fredrick Elijah, St. Paul  
 Mantor, George Crane, Mantorville  
 March, Samuel Albert, Minneapolis.  
 —Mealey, Olive Agatha, Minneapolis.



- Messenger, Etta Louavisa, St. Paul.  
 Moore, Harry Nathan, Algona, Ia.  
 Moren, Edward, Minneapolis.  
 Morgan, Wm., St. Paul.  
 Nickerson, Bernard Smith, Monticello.  
 Nicoulin, Claude, Algona, Ia.  
 Olds, Chas. Samuel, Luverne.  
 —Paine, Avis, Minneapolis.  
 Parker, Lorenzo Eugene, Minneapolis.  
 —Parker, Mary Adaline, Minneapolis.  
 Parsons, George Beardsley, Willmar.  
 Pennington, Archer Frederick, Minneapolis.  
 —Phillips, Jennie Crays, Minneapolis.  
 Pickard, George Edwin, Minneapolis.  
 Plymat, Walter Ashton, Mankato,  
 Pratt, Burton Atwood, Minneapolis.  
 —Riggs, Annie Isabel, Monticello.  
 —Robinson, Agnes Luella, Minneapolis.  
 Rogers, Walter Spottswood, Farmington.  
 Schussler, Otto Fred, Minneapolis.  
 Shearman, Bradley Wilson, Minneapolis.  
 —Skoog, Lillian Augusta, Red Wing.  
 Staples, Alvin Clarence, Stillwater.  
 Stone, Marshall Edwin, St. Peter.  
 Stone, Royal Augustus, Morris.  
 —Talbot, Alta Wenonah, St. Charles.  
 Taylor, Daniel Woodward, Minneapolis.  
 —Thompson, Flora Marguerite, Minneapolis.  
 Tone, Aad, Gilman, Ia.  
 Tuckey, Loring Henry, Eden Prairie.  
 —Turner, Georgia Alice, Minneapolis.  
 Van Dyke, John Henry, Alexandria.  
 —Wales, Harriet Emma, Minneapolis.  
 Waterman, John Krum, Minneapolis.  
 Whitacre, John Clifford, St. Paul.  
 Whitney, Arthur Byron, Slayton.  
 Wilder, Vernon, Delano.  
 Wyman, Guy Addison, Minneapolis.

## LITERARY SECTION—112.

- Adams, Wilber Henry, Nora Springs, Ia.  
 —Atwood, Sadie May, Minneapolis.  
 —Balch, Helene, Minneapolis.  
 —Baldwin, Elizabeth, St. Paul.  
 —Bennett, Kate Townsend, Minneapolis.  
 —Boeye, Ida, Clear Lake, Ia.  
 —Brill, Ethel Claire, St. Anthony Park.  
 —Browne, Harrietta Stuart, Minneapolis.  
 —Brown, Marguerite Minier, St. Paul.  
 —Buck, Clemma, Minneapolis.  
 —Buell, Mary Emma, Minneapolis.  
 —Burnes, Amelia May, Hopkins.  
 —Burt, Florence, Minneapolis.  
 —Butler, Mina Maud, St. Paul.  
 —Caplin, Grace, Minneapolis.  
 —Chadwick, Isabel Clare, Owatonna.  
 —Chapman, Lucy Lord, St. Paul.  
 —Christison, Isabelle, St. Paul.  
 —Clarke, Lulu, Algona, Ia.  
 Cooley, Bret Eugene, Otsego.  
 —Craig, Alice, Evelyn, St. Paul.  
 —Craig, Marguerite Belle, St. Paul.  
 —Cravens, Tennie, Princeton.  
 —Crocker, Frances Edna, Minneapolis.  
 —Crozier, Mary Ruth, Elk River.  
 —Cunningham, Ella Alberta, St. Paul.  
 —Daniel, May, Minneapolis.  
 —Dixon, Ella Terrell, Minneapolis.  
 Dresser, Mark Alfred, St. Paul,  
 Eliason, Simon George, Montevideo.  
 —Elton, Agnes, Owatonna.  
 —Farmer, Grace, Owatonna.  
 —Featherstone, Ora Marie, Red Wing.  
 —Felch, Fanny Barclay, Elk River.  
 —Field, Vergie Althea, Minneapolis.  
 —Flournoy, Agnes Letitia, Clinton, Ia.  
 —Follett, Posy Ainsworth, Minneapolis.  
 —Foote, Clara DeMars, Minneapolis.  
 Force, Frank Eugene, Minneapolis.  
 —Ford, Elizabeth Katharine, Owatonna.  
 —Forsyth, Olga Berliot, La Crosse, Wis.  
 —Fritzsche, Frances Pauline, Fargo, N. D.  
 —Funk, Gertrude Elizabeth, Minneapolis.  
 —Gallup, Julia Anna, St. Paul.  
 —Grant, Bessie Robertson, St. Paul.  
 —Gulick, Jeanette Taylor, Minneapolis.  
 —Hand, Richardine, St. Paul.  
 —Hannum, Mary Hunt, Minneapolis.  
 —Harrington, Clara Nan, Minneapolis.  
 —Henry, Laura Alice, Minneapolis.  
 —Hern, Ethel Theodora, St. Paul.  
 —Hicks, Phallie Francisca, Minneapolis.  
 —Hills, Martha Ford, Minneapolis.  
 —Hunt, Alice Ray, Minneapolis.  
 —Jackson, Jeanie Moore, Minneapolis.  
 —Jamieson, Gertrude Elizabeth, Devils Lake,  
 N. D.  
 —Kennedy, Georgine Frances, Minneapolis.  
 Klove, Lewis, Dunbar, Ia.  
 Langemo, Peter Cornelius, Kenyon.  
 —Lloyd, Ethel Alice, Decorah, Ia.  
 Logan, Gilbert, Minneapolis.  
 McGinnis, Edward Francis, Benson.  
 —McKusick, Jennie Eliza, Minneapolis.  
 —McVoy, Maud Emma, St. Paul.  
 Magee, Harry Cushman, St. Paul.  
 Marlow, Kyle Fayette, Morris.  
 —Marsh, Olive Vincent, Minneapolis.  
 Masted, Louis Larson, Mt. Vernon, S. D.  
 —Mattison, Sarah, Minneapolis.  
 Miller, Carl Henry, St. Peter.  
 Mock, Hugo, St. Paul.

- Moody, Helen Augusta, Minneapolis.
- Morgan, Abbie, Minneapolis.
- Nickerson, Alice, Elk River
- O'Hair, Anna Mary Grace, Delano.
- Olsgard, Edwood Cornelius, Bue, N. D.
- Ormond, James Butler, Hegbert.
- Parker, Isabel Davis, St. Anthony Park.
- Pennington, Georgiana, Decorah, Ia.
- Peterson, Theodore F., Meroa, Ia.
- Phelps, Florence, Minneapolis.
- Pickard, Samuel, Minneapolis.
- Pierce, Belle, Minneapolis.
- Pierce, Elizabeth Armena, Minneapolis.
- Poehler, Ella Amalia, Minneapolis.
- Porter, Mary Luce, Minneapolis.
- Powers, Irma Lucile, Minneapolis.
- Priest, Janet, Minneapolis.
- Rector, Grayce Williamnia, Minneapolis.
- Reed, Bonnybelle, Minneapolis.
- Robinson, Iva Belle, Minneapolis.
- Rogers, George William Carney, St. Paul.
- Rudberg, Lavinia, Dassel.
- Scofield, Harriet E., Minneapolis.
- Shortt, Edith M., Minneapolis.
- Smith, Agnes Mae, Minneapolis.
- Snow, Edwin Augustus, Eau Claire, Wis.
- Snow, Winifred, Minneapolis.
- Syfford, Julius Charles, Sauk Center.
- Taylor, Anna Rachel, Minneapolis.
- Teigen, Martin, Jackson.
- Thomas, Alice Agnes, Mankato.
- Towne, Marion, Minneapolis.
- Wagner, Lilian E., Minneapolis.
- Waldmann, Cecilia Susaune, Minneapolis.
- Welles, Henry Journeay, Minneapolis.
- Whitten, Lena Gertrude, Anoka.
- Wilbur, Clara Louise, Fayetteville, N. Y.
- Williams, Bessie Adelaide, Minneapolis.
- Williams, Nella Adelaide, Minneapolis.
- Wiren, Frances, Milwaukee, Wis.
- Wiren, Jennie, Milwaukee, Wis.

## TEACHERS SECTION—28.

- Adley, Lafayette Roswell, Maine.
- Alexander, William August, Carver.
- Browne, Mary Douglas, Austin.
- Bruchman, William John, Lake City.
- Buckley, Mary, Farmington.
- Cameron, Donald Monroe, Minneapolis.
- Child, (Mrs.) Bertha, St. Peter.
- Cook, Minnie May, Rochester.
- Emery, Mrs. Florence Stokes, Monticello.
- French, (Mrs.) Francis Park, Minneapolis.
- Halpin, Agnes, Springfield.
- Harbert, Virginia, St. Paul.
- Harn, Margaretta Helen, Faribault.
- Lee, Mary Frances, Minneapolis.
- Lenhart, Nellie Marguerite, Minneapolis.
- Muedeking, Galena, Owatonna.
- Ozias, Lolah Lucinda Temperance, Independence, Ia.
- Plant, Mary, Hampshire Arms.
- Reid, Lucy, Sauk Center.
- Roher, Ida Kate, Kasson.
- Smith, Morton Albert Gardner, Minneapolis.
- Sylvester, Mabel Clara, Madelia.
- Tengwall, Millicent, Minneapolis.
- Tucker, Florence M., Minneapolis.
- Wallace, Ethel, Hamline.
- Waufle, Mary Elizabeth, St. Paul.
- Webster, Jennie Sarah, Owatonna.
- Woods, Elizabeth, West Concord.

## UNCLASSED—96.

- Adams, Emroy Cynthia, Faribault.
- Andrist, (Mrs.) Emily Miller, Minneapolis.
- Armstrong, Isabella, Minneapolis.
- Barnard, Mrs Mildred M., Minneapolis.
- Bears, Edith Goodspeed, Minneapolis.
- Bryant, Mrs. Jessie Whitney, Minneapolis.
- Baker, Lucia Marian, St. Paul.
- Burt, Grace S., Minneapolis.
- Cable, Cora Celeste, Minneapolis.
- Clark, Ella Ophelia, St. Louis, Mo.
- Cleavenger, June Ola., Blanchester, O.
- Cole, Ruth B., Minneapolis.
- Couper, Chlora Ella, Blue Earth City.
- Cross, Nellie M., Minneapolis.
- Dakin, William Wesley, Royalton.
- Derr, (Mrs.) Anna L., Minneapolis.
- Dewart, Helen Hanna, St. Cloud.
- Downey, Mrs. Margaret Elsie, Minneapolis.
- Dyer, Alice C., Minneapolis.
- Eisele, Emma Caroline, Buffalo, N. Y.
- Evans, Jeannette Robertson, Hamline.
- Farrington, M. Grace, Preston.
- Flatau (Mrs.), Katherine Gregory, Minneapolis.
- Flitner, Charles Edward, St. Paul.
- Fronney, Florence, Kewaune, Wis.
- Gardner, Helen M., Minneapolis.
- Getz, Elizabeth Miller, Cincinnati, O.
- Glidden, Lucia Mabel, Minneapolis.
- Gregory, Alice Elizabeth, Addison, Vt.
- Hale, Gertrude Louise, Minneapolis.
- Hall, Charlotte Van Cleve, Honolulu, H. I.
- Halloran, Kate, Minneapolis.
- Halloran, Juliet, Minneapolis.

- Hanford, (Mrs.) Alice Eddy, Minneapolis. —Patten, Mary Aletha, Charles City, Ia.  
 —Hanson, Bertha, Clear Lake, Iowa. Peabody, Eleanor Butler, Star Prairie, Wis.  
 —Hayes, Annie Marie, Minneapolis. —Peebles, Gertrude, St. Paul.  
 —Hayes, Bridget Theresa, Minneapolis. Peterson, Alfred Emanuel Litchfield.  
 —Hays, Grace A., Minneapolis. —Pike, (Mrs.) Helen L., Minneapolis.  
 —Hennings, Bernice, Willmar. —Potter, Electa M., Minneapolis.  
 —Hill, Elizabeth Mabel, Clear Lake, Ia. Prucha, Vaclav, Minneapolis.  
 —Hiscock, Harriet Leonora, Minneapolis. —Rome, Jean M. N., (Mrs. R. R.) Minneapolis.  
 —Jacobson, (Mrs. Jean Clark, St. Anthony Pk.—Ringheim, Emma Christina, Nevada, Ia.  
 —Johnson, Anna Carline, Minneapolis. —Rolfe, (Mrs.) Joseph H., Minneapolis.  
 —Jordan, Mary Elizabeth, Minneapolis. Sakagami, Yasuzo, Japan.  
 —Judd, Nellie G., Minneapolis. —Seamens, Maria, Minneapolis.  
 —Leavitt, Olive, Long Prairie. —Schureman, Winnifred, Geneseo, Ill.  
 —Lee, Mary Frances, Minneapolis. Sewall, Herbert Franklin, Minneapolis.  
 —Long, Mary Alves, Minneapolis. Smart, John Franklin, Rice.  
 —McCollom, Millicent, Minneapolis. —Smith, Dixie, Minneapolis.  
 —McDaniel, Orianna, Minneapolis. —Smith, Greta Eulalia, Minneapolis.  
 McIntyre, William Adelbert, Minneapolis. —Spencer, Nellie C., Minneapolis.  
 McQueary, Rev. Howard, Minneapolis. Squires, Roy White, Minneapolis.  
 —Meier, Minnie, New Ulm. —Tallmadge, (Mrs.) Mary L., St. Paul.  
 —Melby, Agnes Theodora, New Richland. —Tomlinson, Carrie Fowler, Le Sueur.  
 —Moorhead, Martha Bell, Minneapolis. —Verge, Florence Louise, Minneapolis.  
 —Nelson, Mary A., St. Paul. —Wales, Esther, River Falls, Wis.  
 —Nessel, Ida, Rush City. —Wertz, Adda Patterson, Bloomington, Ill.  
 —Nixon, Ellen May, Pembina, N. D. —Wilder, Helen Augusta, Philadelphia, Pa.  
 —Nixon, Lillian Edith, Pembina, N. D. Willard, Harold Burney, Mankato.  
 O'Brien, Mary Editha, Detroit, Mich. —Williamson, Emma Margaret, Cannon Falls  
 —Olson, Carolena, Faribault. —Wilson, Eliel Fletcher, Minneapolis.  
 Olson, John William, Dassel. —Wilson, (Mrs.) Justina L., Minneapolis.  
 —Parry, S. Belle, Minneapolis. Wyer, James Ingersoll, Jr., Excelsior.  
 —Pattee, (Mrs.) Una Z., Minneapolis. —Young, Alice, Duluth.  
 —Pattee, Rowena, Minneapolis.

## THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

### SENIOR CLASS—18.

#### CIVIL ENGINEERS—5.

- |  |                               |
|--|-------------------------------|
| Beyer, Adam C., St. Paul.                | Jones, Cloyd Paul, Sabin.     |
| Burch, Albert Morgan, Anamosa, Ia.       | Long, Fred Winston, St. Paul. |
| Graber, Albert, B. A., '88, Minneapolis. |                               |

#### MECHANICAL ENGINEERS—4.

- |                                     |                              |
|-------------------------------------|------------------------------|
| Hastings, Clive, Bermuda Islands.   | Hugo, Victor, Duluth.        |
| Hilferty, Charles Dutton, Hastings. | Lang, James S., Minneapolis. |

#### ELECTRICAL ENGINEERS—6.

- |  |  |
|--|--|
| Abbott, Arthur Laurie, Albert Lea.       | Hibbard, Truman, Minneapolis.              |
| Blake, Robert Pennell, St. Anthony Park. | Magnusson, Chas. Edward, Stark.            |
| Erikson, Henry Anton, Fertile.           | Wheeler, Herbert Merrill, Marshfield, Wis. |

#### MINING AND METALLURGY—3.

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| Hughes, Thomas Moffat, Hudson, Wis. | Tanner, Wallace North, Minneapolis. |
| May, Albert E., Minneapolis.        |                                     |

*The University of Minnesota.*

## JUNIOR CLASS—32.

## CIVIL ENGINEERS—6.

Hewett, Frank M., Minneapolis.  
 Lee, Engbert A., Grand Meadow.  
 Neil, Victor Adolph, Vasa.

Swem, Daniel Roy, St. Paul.  
 Walker, Frank B., Minneapolis.  
 Woodman, Howard Howe, St. Paul.

## MECHANICAL ENGINEERS—5.

Craig, Robert, Robbinsdale.  
 Cross, Charles H., Norman, Ia.  
 Derr, Homer M., Minneapolis.

Garvey, James Jessie, Richfield.  
 Silliman, Henry Dickinson, Hudson, Wis.

## ELECTRICAL ENGINEERS—13.

Buck, Daniel, Eau Claire, Wis.  
 Chestnut, George L., Minneapolis.  
 Dahl, Hans F. M., Rotha P. O., Iowa.  
 Lonie, James Henry, Fremont.  
 Markus, Olaf Gottlieb Frederick, Red Wing.  
 Maughan, Herbert Chas., Brainerd.  
 Miller, William Lot, Winona.

Mills, Eugene Clarence, Minneapolis.  
 Myers, Mortimer A., Minneapolis.  
 Phelps, Clyde Samuel, Minneapolis.  
 Savage, Edward Snoad, Minneapolis.  
 Zimmerman, Frank, Rochester.  
 Zintheo, Clarence Janne, Minneapolis.

## MINING AND METALLURGY—4.

Becker, George, Minneapolis.  
 Curtiss, Frederic H, Minneapolis.

Mooney, Frank Xavier, Minneapolis.  
 Wales, Roland Thompson, Minneapolis.

## CHEMICAL ENGINEERS—4.

Chapin, Lewis Paul, Loeminister, Mass.  
 Hamilton, Herbert Clifton, Sandy Lade, Pa.

Linton, James H., Minneapolis.  
 Webber, Frederick Walter, St. Paul.

## SOPHOMORE CLASS—36.

## CIVIL ENGINEERS—7.

Atty, Normon Belmont, St. Paul.  
 Glass, Clifton A., Luverne.  
 Hatch, Fred W., Minneapolis.  
 Herzog, John Seward, West Superior, Wis.

McKinstry, Willian, Red Wing.  
 Taylor, Edward W D, St. Anthony Plrk.  
 Woodford, George B., Deephaven.

## MECHANICAL ENGINEERS—6.

Larson, Charles August, Minneapolis.  
 Moore, Josiah Willard, Minneapolis.  
 O'Brien, John Erwin, Stillwarer.

Partridge, Elbert D., Fergus Falls.  
 Willson, Manton Fletcher, Richfield,  
 Zeleny, Frank, Minneapolis.

## ELECTRICAL ENGINEERS—13.

Anderson, Oxel Leonard, Austin.  
 Coleman, Lee M., Minneapolis.  
 Gilchrist, Charles Chandler, Chicago, Ill.  
 Irwin, John Borland, Richfield.  
 Keller, Frank Hayes, Lock Haven, Pa.  
 McKellip, Frank Woodman, Faribault.  
 Pratt, Arthur Clarence, Anoka.

Pratt, Sidney, Minneapolis,  
 Shumway, Ernest J., Robbinsdale.  
 Towne, Burton A., Minneapolis.  
 Wagner, Adolph, New Ulm.  
 Withers, Finney George, Marion, Ia.  
 Wright, Roydon Vincent, St. Paul.

## MINING AND METALLURGY—8.

Davis, Samuel Edward, Minneapolis.  
 Harrison, John M., Minneapolis.  
 Pratt, George Albert, Minneapolis.  
 Rich, Mortimer B., Minneapolis.

Roberts, William H., Bristol.  
 Smith, Hoval A., St. Ansgar, Ia.  
 Walker., Clinton, Minneapolis.  
 Warren, Frank Merton, Minneapolis.

## CHEMICAL ENGINEERS—2.

Hubbell, Joseph Goodwin, Winona.

Pease, Levi B., Minneapolis.

## FRESHMAN CLASS—71.

## CIVIL ENGINEERS—8.

Brush, Carl Fletcher, Eyota.	Holmes, Charles Duane, Detroit.
Hayward, Frank Eugene, Minneapolis.	Hudson, Harold Walter, Pittsburg, Pa.
Higbee, Matt L., Minneapolis.	Merrill, Clarence, Janesville.
Hirschman, Hugo, St. Paul.	Whitman, Edward Augustus, New Brighton.

## MECHANICAL ENGINEERS—9.

Armstrong, Chas. Palmer, Minneapolis.	Northway, Leroy Woodworth, Minneapolis.
Bailey, Campbell Luran, Minneapolis.	Richardson, Wilbur Percy, Lake City.
Bayless, Harry Cornelius, Minneapolis.	Stussy, William, Berne.
Fulton, James Cooper, White Bear.	Wennerlund, Elias Carl, Willmar.
Merriam, Raymond Fogg, Minneapolis.	

## ELECTRICAL ENGINEERS—44.

Atkins, Joseph Clark, Minneapolis.	Kinsell, William Leonard, Minneapolis.
Anderson, John Gunerius, Minneapolis.	Latham, William Harris, Waseca.
Arnell, Paul Brown, Minneapolis.	Leedy, John Wentworth, Rapid City, S. D.
Bass, William Carroll, Minneapolis.	Loetscher, Emil Christian, Dubuque, Ia.
Blake, Henry Barnard, St. Anthony Park.	McAdam, John Vaughan, St. Paul.
Brown, Edw. Milton, St. Paul.	Mac Kusick, Elwood Mansfield, Minneapolis.
Campbell, Sidney Ashton, Winnipeg, Man.	Muir, John Corunna, St. Paul.
Cooley, George Robert, Minneapolis.	Neyhart, Arthur Raymond, Cassleton, N. D.
Crickmore, Charles, Owatonna.	Nye, Charles Munson, Wells.
Donaldson, William Thomas, St. Paul.	Peterson, Andrew, Red Wing.
Forbes, Thomas Clark, Minneapolis.	Pratt, Raymond, Stillwater.
Fuller, Willis Charles, River Falls, Wis.	Roberts, John Nelson, Minneapolis.
Goodwin, Robert Dwight, Chicago, Ill.	Scofield, Frank Martyn, Zumbrota.
Graling, Verney, Spring Valley.	Searles, Jasper Eugene, Stillwater.
Grote, Paul, Minneapolis.	Stocking, Homer, Minneapolis.
Gunderson, Charles, Minneapolis.	Tibbetts, Frank Ridgway, Wayzata.
Hildebrandt, Henry August Gustav, St. Peter.	Wallace, Howard James, Algona, Ia.
Hoffman, Fred Lawrence, Little Falls.	Way, Buell Knapp, Luverne.
Houlton, Sam Randolph, Elk River.	Wheaton, Walcott, Minneapolis.
Johnson, Frank Edward, Vicksburg.	Wheeler, James Lee, Jr., Minneapolis.
Joy, Charles Pickering, St. Paul.	Wiltgen, Edward, Minneapolis.
Kimball, Parker William, Austin.	Wright, William Henry, St. Paul.

## MINING AND METALLURGY—6.

Andrews, Fred Edward, St. Paul.	Faude, Frederic Morris, Minneapolis.
Bartley, Edward Wright, Minneapolis.	Ridgeway, Charles Arthur, Cottagewood.
Currier, Harry Locke, River Falls, Wis.	Schlegell, Gustav von, Minneapolis.

## CHEMICAL ENGINEERS—4.

—Cole, Lousie, Minneapolis.	—Marlow, Cora Emilie, Morris.
—Hosmer, Josephine, Minneapolis.	Ritzinger, John Ramsey, St. Paul.

## UNCLASSIFIED STUDENTS—34.

—Brown Editha, Minneapolis.	—Kelsey, Alice, Minneapolis.
Bryant, Leroy Fred, Monticello.	—Kimball, Grace Elizabeth, Austin.
Christianson, Peter John, Minneapolis.	Lohman, John, White Rock, S. D.
Connor, Addison W., Minneapolis.	Lovell, Alfred, St. Paul.
Carsley, George Henry, Helena, Mont.	Mather, George E., Minneapolis.
—Dakin, Ina Lynette, Royalton.	Moberg, John Emil, Minneapolis.
DeLambert, Robert Marmaduke, St. Paul.	Myrdal, John, St. Anthony Park.
Holmes, Frederick Augustus, Minneapolis.	Noerenberg, John William, Minneapolis.
Jerome, Charles W., Minneapolis.	Paulson, Harry Wan, Minneapolis.

Pettibone, George Taylor, Minneapolis.	—Sprague, Mildred, St. Anthony Park.
Rich, Watson Wellman, Minneapolis.	—Stevens, Margaretta A., Minneapolis.
—Schutt, Hallie, Minneapolis.	Thaler, Joseph Anken, Koesen, Austria.
Siley, Charles, A., St. Paul.	Ulvestad, Julius, Christian, Grogan.
Sherburne, Walter H., Minneapolis.	Walker, Fletcher L., Minneapolis.
—Simpson, Mary E., Minneapolis.	Walker, Willis J., Minneapolis.
Slagle, Robert Lincoln, Brookings, S. D.	—Way, Laura R., Minneapolis.
—Smith, Marion L., Minneapolis.	Wheeler, Roy M., Creston, Ill.

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THE DEPARTMENT OF AGRICULTURE.

COLLEGE OF AGRICULTURE—10.

SENIOR CLASS.

Pendergast, Warren W., Hutchinson.

JUNIOR CLASS.

Smith, William George, New Duluth.      Winkjer, Joel Gunderson, Garfield.

SOPHOMORE CLASS.

Shaw, Thomas William, St. Anthony Park.

FRESHMAN CLASS.

Glover, Arthur James, Zumbro Falls.	Major, Ernest William, St. Anthony Park.
Haecker, Archibald Louis, St. Anthony Park.	Stene, Andrews Edward, Ashby.
Hummel, John Adolph, Cottage Grove.	Tuve, Spencer, Osakis.

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SCHOOL OF AGRICULTURE.

GRADUATE STUDENTS—7.

Clark, Robert Wallace, Northfield.	Nelson, Arthur Herbert, Albert Lea.
Crippen, George, Cottage Grove.	Porter, Edward Harry, Red Wing.
Flaten, Ove, Granite Falls.	Scofield, Carl Schurz, Bloomington.
Hopkins, Merle Robert, Bloomington.	

A CLASS—28.

Agre, Hans, Sacred Heart.	Herrick, Roger William, Minneapolis.
Agre, John, Sacred Heart.	Holmquist, David Markus, St. Anthony Park.
Aldrich, George Simonds, Freeborn.	Hoyt, Benjamin Terrell, St. Paul.
Andersen, Lewis, London.	Kato, Yasuharu, Tokio, Japan.
Austin, George Leslie, Fergus Falls.	Morris, Edwin Day, Lake City.
Bailey, John Vincent, Newport.	Nelson, Charles, Rosendale.
Bassett, Louis Benjamin, Rushmore.	Nygren, Carl Sigfried, Lake City.
Clark, Roy Ralph, Janesville, Ia.	Orman, Frederick Fritz Clarence, Rochester.
Craig, George, Eldoro, Ont., Can.	Riley, Edward Henry, Hammond.
Crippen, Frank, Cottage Grove.	Seaman, Mead Truman, Alma City.
Cross, Albert Davis, Childs.	Strunk, Lee Roy, Faribault.
Currie, William Coe, Euclid.	Taylor, Charles Philip, Hamline.
Disney, Eugene Nathan, Zumbro Falls.	Walters, Thomas Joseph, Lake City.
Hageman, John William, Hastings.	Wolner, Oscar Herbert, St. Anthony Park.

B CLASS—41.

Anderson, James Theodore, Vasa.	Burton, Horace Heeny, Minneapolis.
Aune, Beyer, Starbuck.	Burton, Paul Haney, Minneapolis.
Berkey, Oscar Frank, Farmington.	Chaffer, Harley Ezra, Worthington.
Brand, John Sparrow, Faribault.	Denison, Lyman B., Oak Center.

Eustis, John Clark, Minneapolis.  
 Finseth, Knute Olaus, Kenyon.  
 Geoghegan, Thomas, Webster.  
 Grout, George P., Luverne.  
 Haugen, Iver, Kenyon.  
 Hopkins, Keigh Harrison, Bloomington.  
 Hovland, Henry, Norseland.  
 Hunter, Clarence C., St. Anthony Park.  
 Krogstad, Otto, Pelican Rapids.  
 Lamont, Geo. E., Wabasha.  
 Lancaster, Albert William, St. Paul.  
 Lemery, George William, Inkster, N. D.  
 McGuire, Arthur James, Hegbert.  
 Newman, William Henry, Albert Lea.  
 Norton, Phillip Henry, Oakland.  
 Olstad, Carl, Hanska.  
 Paulson, William Walter, Cando, N. D.

Pennington, Sidney Lloyd, Minneapolis.  
 Per Lee, Harry Boyd, Stillwater.  
 Raveill, Edgar Eaton, St. Paul Park.  
 Ryder, Frank James, Buffalo.  
 Sanburg, Victor Alfred, Albert Lea.  
 Sayers, Albert Lee, Lakeville.  
 Strand, George William, Taylor's Falls.  
 Swenson, Frank Kelly, Ortonville.  
 Thompson, Porteous, Houston.  
 Thorson, Thor Dover, St. Paul.  
 Trulson, Fred Burke, Prescott, Wis.  
 Uhlhorn, Otto Oscar, St. James.  
 Van Slyke, Asa Weldon, Castle Rock.  
 Whitaker, Clarence, Point Douglas.  
 Woodburn, Robert Henry, Tenney.  
 Ziemer, John Fredrik, Waltham.

## C CLASS—46.

Agre, Ole, Sacred Heart.  
 Bacon, Charles John, Northfield.  
 Beaty, Arnold Winfred, Oak Center,  
 Becksted, Jessie, Chadbourne.  
 Berger, Lars, Northfield.  
 Bratrud, Albert, Spring Valley.  
 Buell, Max Whitney, St. Anthony Park.  
 Carroll, Frank, Anoka.  
 Erickson, John Adolph, Minneapolis.  
 Erwin, Arthur, Fisher.  
 Frame, Matthew, Castle Rock.  
 Hall, Fred Leslie, Fairmont.  
 Jewett, Percy Charles, Hamline.  
 Jorstad, Thomas Olaus, Kenyon.  
 Larson, Charles Ludwig, Winthrop.  
 Larson, Henry Ludwig, Rosendale.  
 Lund, George Fritoph, Dawson.  
 Mackenzie, Allen Ramsey, Herman.  
 Mathews, Charles Parker, Breckenridge.  
 Mosher, Willard Glenn, Minneapolis.  
 Ness, Oscar, Providence.  
 Newdall, Axel, Springfield.  
 Newman, Charles Taft, Withrow.

Oleson, Ever William, Minneapolis.  
 Osborn, Jay Ira, Daisy, N. D.  
 Peterson, Peder Ole, Hankinson, N. D.  
 Perkins, Arthur, Hamlin.  
 Perkins, Timothy Leroy, Red Wing.  
 Pryor, Henry Lovern, Castle Rock.  
 Remmen, Anton, Wangs.  
 Rich, Arthur, Lakeside.  
 Rosetter, Louis Colver, Clarkfield.  
 Schwartz, Ferdinand, Sargeant,  
 Selnes, Thomas, Vesper, Ia.  
 Short, Thomas Winter, Faribault.  
 Smith, Louis Stanley, Minneapolis.  
 Solomonson, Herman, Kimbrac.  
 Stewart, Chester, St. Francis.  
 Stillman, Grove, Albert Lea.  
 Tasa, Helga Ludwig, Holden.  
 Tyson, George Howard, Lakeside.  
 Wagner, August, Fisher.  
 Walker, Hiram LeRoy, Minneapolis.  
 Ware, Robert Edward, St. Paul.  
 Watkins, Dutton Turner, Austin.  
 Wuerz, Charles, St. Paul.

## PREPARATORY CLASS—74.

Anderson, Anker, Artichoke.  
 Backer, August, New Ulm.  
 Bakke, Eric Nels, Sacred Heart.  
 Banker, Charles.  
 Bartel, Aaron, Kasson.  
 Beardsley, Albert, Oak Center.  
 Birch, George William, Faribault.  
 Brandborg, Nels Lloyd, Henning.  
 Carlyle, Adam, Camden.  
 Clark, Bertram, Hankinson, N. D.  
 Crawford, James Levi, Morristown.  
 Davison, Perry, Austin.

Engle, Chauncy Hobart, Preston.  
 Essery, Maurice, St. Paul.  
 Flaten, Ingewald, Dennison.  
 Flaten, John William, Granite Falls.  
 Foote, Charles Cowles, Worthington.  
 Halvorsen, Benjamin John, Norway Lake.  
 Handke, John Gilbard, Waltham.  
 Hanley, Michael, Hagud.  
 Heidman, Fred John, Montevideo.  
 Henjam, John, Kerkoven.  
 Herberger, Edward, Osakis.  
 Holman, John, Aspelund.

Hval, Amnd, Clarkfield.  
 Jarmar, Henry, Merriam Park.  
 Jenks, Clarence Ray, Stillwater.  
 Johnson, Albert Maynard, Claybank.  
 Johnson, Gunder Martin, Springfield.  
 Johnson, Julius, Sacred Heart.  
 Kamrud, Edwin Theodore, Starbuck.  
 Kiene, Frank, Kennedy.  
 Kittleson, Martin, Montevideo.  
 Larson, Gustav Edward, Winthrop.  
 Lawrence, Christopher, Springfield.  
 Liggett, Russell, St. Anthony Park.  
 Lightly, Charles Herbert, Oakland.  
 Lomen, George Edward, St. Paul.  
 Lommen, John Tosten, Comstock.  
 Lugger, Humboldt, St. Anthony Park.  
 Lund, Daniel Albert, Minneapolis.  
 Lund, Melvin Bethnel, Vinning.  
 Malberg, Sidney John, Cannon Falls.  
 Mattson, Martin, Bernadotte.  
 Meyer, George, Sargeant.  
 Meyer, Leo, Sargeant.  
 Neerland, Charles, Minneapolis.  
 Nokleby, Jacob, Montevideo.  
 Oleson, Oscar Edward, Welch.

Oslie, Oscar Peter, Sacred Heart.  
 Pratt, Sumner William, Bethel.  
 Prinz, William Carl, Stewardville.  
 Roberts, Wilson Clay, Fergus Falls.  
 Rogne, Albert Olai, Newmarket.  
 Rosenthal, John, Graceville.  
 Russell, Alexander, Cottonwood.  
 Ruud, Henry, Willmar.  
 Sanders, Charles, Houston.  
 Sick, Fred Martin, Duluth.  
 Siqueland, Jens, St. Paul.  
 Smith, George Washington, Cannon Falls.  
 Sorenson, John Sivert, Milan.  
 Soule, Reuel Jesse, Widthrow.  
 Southam, Albert Edward, Detroit.  
 Stearns, Richard, Monticello.  
 Sundberg, John Edward Garfield, Kennedy.  
 Thompson, Austin, Cook.  
 Thorsness, George, Kerkhoven.  
 Tinnes, Lewis Alfred, Bird Island.  
 Ulland, Lewis, Corning.  
 Utley, William Thomas, Graceville.  
 Webb, William Wilson, St. Paul.  
 White, John, Hamline.  
 Wilson, Clarence Edward, Hazel Run.

## SPECIAL--27.

Albertson, Robert Craig, Keilogg.  
 Anderson, Albert, Crow River.  
 Anderson, Egan, Artichoke.  
 Anderson, Frank Medford, Vasa.  
 Biederman, Richard, Faribault.  
 Boss, James, Zumbro Falls.  
 Bregvig, Harry Louis, Hancock.  
 Cayford, Luther Allen, Skowhegan, Maine.  
 Haggerty, John, Hammoud.  
 Hawkins, Alfred, Minneapolis.  
 Kellom, Alfred Calvin, Plainview.  
 Lambrecht, Thorfin, Montevideo.  
 Larson, Nels, St. Anthony Park.  
 Leaf, Martin, Pennock.

McHugh, Martin, St. Anthony Park.  
 McShane, William, Ellendale, N. Dak.  
 Meyer, Elbert, Springfield.  
 Moore, David L., Minneapolis.  
 Nygren, Oscar W., Lake City.  
 O'Brien, Richard, St. Paul.  
 Peterson, Arthur, Olivia.  
 Phelan, Thomas Michael, St. Paul.  
 Polk, Robert Caldwell, St. Anthony Park.  
 Rider, Ernest Edward, Lake City.  
 Solem, Olai M., Solem.  
 Thompson, Thomas, Freeborn.  
 Wilke, Emil, Dodge Center.

## SUMMER SCHOOL--46.

--Agre, Martha, Sacred Heart.  
 --Berg, Elma, Belgrade.  
 --Biery, Lizzie, Wasioja.  
 --Blair, Margaret, Minneapolis.  
 --Boss, Jean, Wabasha.  
 --Braak, Laura, Biscay.  
 --Brewster, Florence, St. Anthony Park.  
 --Comstock, Sarah, Elysian.  
 --Cory, Elizabeth, Minneapolis.  
 --Day, Nellie, Minneapolis.  
 --Evenson, Mary, Sacred Heart.  
 --Fleckten, Alma, Kandiyohi.

--Frandsen, Katie, Minneapolis.  
 --Giesmann, Clara, St. Paul.  
 --Gluek, Carrie, Minneapolis.  
 --Gluek, Lizzie, Minneapolis.  
 --Green, Alice, St. Anthony Park.  
 --Hawkinson, Rosa, Minneapolis.  
 --Hayward Harry, State College, Pa.  
 --Holt, Esther, East Union.  
 --Johnson, Josephine, Cokato.  
 --Kelly, Kate, St. Paul.  
 --Kleven, Mrs. Peter, East Union.  
 --Klinkhammer, Clara, Hamline.



- Lee, Mary, Minneapolis.
- Lindig, Louise, St. Anthony Park.
- Neegard, Hannah, West Lake.
- Nelson, Alma, Albert Lea.
- Pattee, Adeline, St. Paul.
- Pearce, Delilah, Minneapolis.
- Peterson, Hattie, Minneapolis.
- Peterson, Thora, St. Anthony Park.
- Reiquam, Lillian, Belgrade.
- Reynolds, Mary, St. Anthony Park.
- Rud, Otelia, Sacred Heart.
- Russell, Cora, Minneapolis.
- Snyder, Adelaide, St. Anthony Park.
- Talle, Susie, Kenyon.
- Thompson, Amanda, Minneapolis.
- Thompson, Eva, Minneapolis.
- Tracy, Susie, Minneapolis.
- Wilson, Annie, Hazel Run.
- Wilcox, Mrs. W. F., Benson.
- Wilson, Ella A., Lake City.
- Wilson, Ella, Hazel Run.
- Young, Ellen, Minneapolis.

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 DAIRY SCHOOL—97.

- Alexander Allie, Stanton.
- Almquist, A. L., New London.
- Altman, Frank, New Ulm.
- Aune, B., Starbuck.
- Bakke, August, New Ulm.
- Bartel, Aaron, Kasson.
- Beck, Olaf, Geneva.
- Bergsather, R. S., Wells.
- Berkey, O. F., Farmington.
- Birch, Geo., Faribault.
- Burton, H. H., Minneapolis.
- Carter, Will A., West Mitchell, Ia.
- Cayford, L., Skowegan, Maine.
- Childs, E. R., Sedan.
- Christiansen, C. H., Linden.
- Clark, R. W., Northfield.
- Comstock, D. E., Elysian.
- Crippen, Geo., Cottage Grove.
- Cross, A. D., Childs.
- Dokken, Albert, Springfield.
- Drivdal, Christ, Cyrus.
- Emily, R. K., Dakota, Minn.
- Erickson, A. M., Winthrop.
- Filbin, James, Crookston.
- Finch, Frank, Clinton Falls.
- Flaten, John, Granite Falls.
- Garlid, O., Wannamingo.
- Glorvigan, O. C., Fergus Falls.
- Graham, Arthur, Cream.
- Gronseth, L. I., Sunburg.
- Grout, G. P., Hamline.
- Guhlt, Frank, Cobden.
- Hallan, J., Underwood.
- Hamilton, J. C., Cedar Mills.
- Hammer, E. G., Wannamingo.
- Hansen, Henry A., Franklin.
- Hanson, H. P., Sleepy Eye.
- Henry, E. J., Albert Lea.
- Hert, Harry, Belle Plaine.
- Hobart, L. R., Lake Park.
- Holmberg, Gust, St. Paul.
- Huffman, Horace, Brownton.
- Hughes, Ernest, Courtland.
- Hval, A., Clarkfield.
- Johnson, F. C., Austin.
- Johnson, F. O., Sacred Heart.
- Johnson, Joseph, Bird Island.
- Johnson, H. L., Osseo.
- Jones, Edward, Le Sueur.
- Joslin, J. C., Royalton.
- Lange, Albert, New Ulm.
- Larson, G. E., Winthrop.
- Larson, J. P., Willmar.
- Linsheid, Alfred, Kemi
- Loucks, C. H., Trent, S. Dak.
- Mattson, M., Bernadotte.
- McShane, W. B., Ellendale, N. Dak.
- Meyer, Ebert, Springfield.
- Moller, Peter, Belgrade.
- Mortensen, C., Owens, Ia.
- Nelson, A. H., Albert Lea.
- Nelson, Henry, Litchfield.
- O'Brien, R. T., Slayton.
- O'Donnell, Frank, Avoca.
- Olson, J. A., Litchfield.
- Ostlund, John, Pennock.
- Parsons, T. S., Byron.
- Payne, Dio C., Kasota.
- Peters, Adolph, Biscay.
- Peterson, Geo., Evan.
- Peterson, Peter, Sveadahl.
- Quenold, Ed., Cooleyville.
- Rasmussen, H. P., Pennock.
- Roesler, Fred, Waseca.
- Rosenthal, Miss Anna, Graceville.
- Ryder, A. L., Fairmont.
- Sandgren, Carl, Starbuck.
- Sayers, A. L., Farmington.
- Schultz, Albert, Cobden.
- Shild, John, Dundee.
- Short, T. W., Faribault.
- Smith, F. F., Sioux Falls, S. D.
- Solem, O. M., Solem.
- Sommer, Peter, Bird Island.

Springer, Henry, Armstrong.  
 Stiller, Frank, Becker.  
 Swensen, M. R., Willmar.  
 Therkelsen, Roy, Struble, Iowa.  
 Thiermann, W., Dodge Center.  
 Tollefson, C. O., Willmar.  
 Trulson, F. B., Prescott, Wis.

Vanderhyde, B., West Concord.  
 Washburn, R. M., St. Michael's Station.  
 Watkins, D. T., Austin.  
 Westergard, Peter, Belgrade.  
 Wilke, Emil, Dodge Center.  
 Wise, Charles, Lake City.

## COLLEGE OF LAW—371.

### GRADUATE STUDENTS—23.

Andrews, Sewell Dubois, *LL. B.*, Cornell, Minneapolis.  
 Appleton, George Holmes, *LL. B.*, Minneapolis.  
 Bond, Chas. E., *LL. B.*, Minneapolis.  
 Carroll, Walter N., *LL. B.*, Minneapolis.  
 Christello, Albert, *LL. B.*, Minneapolis.  
 Chute, Frederick Butterfield, *LL. B.*, Minneapolis.  
 Cornany, Montgomery L., *LL. B.*, Minneapolis.  
 Farnham, Charles Wells, *L. I. B.*, St. Paul.  
 Gardiner, Harris Wells, *LL. B.*, St. Paul.  
 Griggs, Frank Hammond, *LL. B.*, St. Paul.  
 Hopkins, Earl P., *LL. B.*, *U. of Iowa*, St. Paul.  
 Hunt, William Franklin, *LL. B.*, St. Paul.  
 Jewett, William Franklin, *LL. B.*, St. Paul.  
 Kepner, Thomas Ervin, *LL. B.*, Rochester.  
 Kranz, John Valentine, *LL. B.*, Minneapolis.  
 Kyle, John P., *LL. B.*, St. Paul.  
 McDonald, William E., *LL. B.*, Minneapolis.  
 Merrill, George C., *LL. B.*, Minneapolis.  
 O'Brien, James Edward, *B. A.*, *LL. B.*, Minneapolis.  
 Osborne, Rockwell Coleman, *LL. B.*, La Crosse, Wis.  
 Prendergast, Louis W., *LL. B.*, St. Paul.  
 Sardeson, Amos D., Minneapolis.  
 Sweet, John Cochrane, *LL. B.*, Mankato.

### SENIOR CLASS—DAY SECTION—91.

Allen, Nelson Peter, Minneapolis.  
 Angus, William, *B. A.*, Garfield.  
 Booker, Lewis Bennet, Pembina, N. D.  
 Borchert, Frank H., Bird Island.  
 Bowler, Burton Haskell, Bird Island.  
 Bregstein, Joseph S., Minneapolis.  
 Brewster, Morton Wilkinson, Wells.  
 Broeffle, Cyrus Asaph, West Superior, Wis.  
 Brown, Clarence Zelora, Minneapolis.  
 Brown, George T., Minneapolis.  
 Campbell, Walter Henry, Alexandria.  
 Cannon, John Michael, Creseo, Ia.  
 Carver, Walter M., *B. S.*, Tracy.  
 Chinnock, Renville Austin, St. Paul.  
 Church, Arthur Bliss, *B. L.*, Minneapolis.  
 Coe, William Tatnal, *B. S.*, Minneapolis.  
 Cohen, Joseph W., Minneapolis.  
 Craven, Thomas, Watertown.  
 Dean, George Franklin, Minneapolis.  
 De Lauier, Otis Bernard, Long Prairie.  
 De Lury, Daniel, Manilla, Ont. Can.  
 Donahower, Harry Lawrence, St. Peter.  
 Donahue, John R., St. Paul.  
 Donahue, William Florence, Minneapolis.  
 Duerre, Harry James, Read's Landing.  
 Eckholdt, Walter Augustus, Rochester.  
 Egleston, Willis Jones, Minneapolis.  
 Estey, Elbert Harrison, Fayette, Iowa.  
 Ewert, Paul A., *B. A.*, *Macalaster*, Pipestone.  
 Farr, Richard, St. Paul.  
 Feltus, William Neil, New Auburn.  
 Finnegan, Andrew J., Minneapolis.  
 Flynn, Edward Francis, Faribault.  
 Foster, Luther Aaron, Minneapolis.  
 Frederickson, Adolph, Evan.  
 Frick, Carl, Robbinsdale.  
 Gilman, Zeeb Prescott, Jersey City, N. J.  
 Goetzinger, Martin Ernest, Minneapolis.  
 Goldblum, Charles Ezekial, Minneapolis.  
 Goodwin, Godfrey Gummer, *B. A.*, St. Paul.  
 Green, E. S. A., St. Paul.  
 Green, John Edward, *B. S.*, *N. I. Normal Coll.*, Carlton.  
 Gunderson, Charles John, *B. S.*, *U. of S. D.*, Vermillion, S. D.  
 Hampton, Harry Reid, All-Healing, N. C.  
 Hanft, Hugo Oscar, Minneapolis.  
 Hawley, George M. B., Minneapolis.  
 Helliwell, Arthur Llewellyn, Minneapolis.  
 Hoff, Charles Smith, St. Paul.  
 Hunkins, Hal. K., Austin.  
 Huntington, Guy B., Luverne.  
 Jones, Edwin James, Adrian.  
 Keller, Herbert P., St. Paul.  
 Kennedy, Lewis Henry, *B. A.*, Litchfield.  
 King, John Cochrane, Howard Lake.

- Kling, Elmer Ambrose, Minneapolis.  
 Larson, Augustus Theodore, *B. A.*, Alexandria.  
 Leacycraft, Charles Allen, Southampton, Bermuda.  
 Leonard, Frank Pierce, Minneapolis.  
 Massee, Freedom Chester, *B. A.*, Louisville, Wis.  
 Matthews, Edward William, Minneapolis.  
 Meyer, George William, Minneapolis.  
 Mitchell, William DeWitt, *B. A.*, St. Paul.  
 Nelson, Adolph Theodore, Grove City.  
 Niles, Edmund Merton, Diamond Bluff, Wis.  
 O'Brien, Michael N., Minneapolis.  
 Odelè, Daniel Austin, Granite Falls.  
 Oltman, Bernard F., Hagar City, Wis.  
 Olson, Carl Oscar Alexius, *B. S.*, Minneapolis.  
 Owens, David Thomas, Minneapolis.  
 Parsons, Arthur Leon, Theed, N. D.  
 Peterson, Isaac, Minneapolis.  
 Poehler, William Adam; Henderson.  
 Rawlins, Frank Edwin, St. Paul.  
 Reed, Carl Webster, Cresco, Ia.  
 Sathre, Jacob Cornelius, *B. S.*, *Valparaiso*, Adams.  
 Schurch, John Frederick, Hastings.  
 Schwager, Lewis *B. S.*, Bethany.  
 Shepherd, William Lyon, Ogdensburg, N. Y.  
 Smith, Fred Ellsworth, Minneapolis.  
 Smith, George Washington, Minneapolis.  
 Sowle, Ralph Clarence, Minneapolis.  
 Stephens, William James, Wisconsin.  
 Tappan, John Elliott, Minneapolis.  
 Van Sant, Grant, Winona.  
 Wasgatt, Franklin G., *Ph. B.*, *Parker College*, Winnebago City.  
 Westphall, Gustave Adolph, Graceville.  
 Whitcomb, Walter Benjamin, Minneapolis.  
 Will, Gustave A., Minneapolis.  
 Wilson, Edwin Clinton, Worthington.  
 Wilson, Samuel Bailey, Mankato.

## SENIOR CLASS—EVENING SECTION—23.

- Chamberlain, Sherman R., St. Paul.  
 Dennison, Charles H., Minneapolis.  
 Forsell, Claus F., St. Paul.  
 Gahre, Frank H., Minneapolis.  
 Gartenlaub, Max., Minneapolis.  
 Godfrey, Percy Downing, St. Paul.  
 Gordon, George Francis, Minneapolis.  
 Hollenberger, Theodore C., Minneapolis.  
 Holm, Peter Andrews, Minneapolis.  
 Keefe, Daniel J., St. Paul.  
 Lazarus, Jacob, St. Paul.  
 Loy, William Gephard, Minneapolis.  
 McMillan, William Duncan, Minneapolis.  
 Meade, James Augustine, St. Paul.  
 Merchant, Frank Davidson, Minneapolis.  
 Mills, Harvey L., St. Paul.  
 Monsch, Henry, Minneapolis.  
 Neilson, Peter S., Minneapolis.  
 Selleck, J. Howard, St. Paul.  
 Stalder, Robert Bujtschli, Minneapolis.  
 Swan, Charles Edington, St. Paul.  
 White, Rody Carl, Iola, Kan.  
 Whitten, John Alexander, Portland, Me.

## MIDDLE EVENING CLASS—44.

- Arnold, Frank, St. Paul.  
 Belden, George Kimball, *B. S.*, Minneapolis.  
 Bradford, John M., Minneapolis.  
 Brewster, William Bailey, *B. S.*, *Lake Forest*, Macalester Park.  
 Burns, William H., Minneapolis.  
 Chapman, Joseph, Jr., Painesville, Ohio.  
 DeBeltrand, Jean Baptiste Belanger, Minneapolis.  
 Dodge, Louis L., Minneapolis.  
 Duval, Henri, Minneapolis.  
 Evans, Scott Ford, Minneapolis.  
 Folds, George Robert, Minneapolis.  
 Godfrey, Alvin Keyes, Minneapolis.  
 Holbrook, Franklin G., Minneapolis.  
 Hosmer, Ernest C., St. Louis.  
 Jamar, Moses Scott, Jr., Merriam Park.  
 Jellico, Elmer James, Minneapolis.  
 Judd, Wilton Brewster, *B. S.*, *Ripon College*, Minneapolis.  
 Lehnertz, Nicholas C., St. Paul.  
 Leonard, George Benjamin, Minneapolis.  
 Osborne, Colman, La Crosse, Wis.  
 Paul, Richard, Wakefield, N. H.  
 Pratt, Rufus Irving, Minneapolis.  
 Pridham, Thomas Hill, St. Paul.  
 Putnam, William Charles, Minneapolis.  
 Rice, Isaac Francis, Minneapolis.  
 Rivenes, James, St. Paul.  
 Sawyer, Charles Lincoln, *M. A.*, *Dartmouth*, Minneapolis.  
 Simons, Hiram A., St. Paul.  
 Smith, Erastus, Minneapolis.  
 Sorenson, Luther Husher, Minneapolis.  
 Southwick, Claud Edward, Wells.  
 Spear, George Hancock, *B. L.*, Minneapolis.  
 Sternberg, Daniel, Minneapolis.  
 Stobbart, Arthur J., St. Paul.  
 Sullivan, William J., Merriam Park.  
 Taylor, Robert S., St. Paul.  
 Thompson, George Bowler, St. Paul.  
 Thompson, William Gould, Minneapolis.

Todd, George E., Kendallville, Iowa.  
 VanLoan, Jed Linwood, Minneapolis.  
 Vorland, George Tobias, Minneapolis.

Wallace, Carlton Lyman, Minneapolis.  
 Wallace, David, St. Paul.  
 Zschau, Charles Rudolph, St. Paul.

JUNIOR CLASS—DAY SECTION—130.

Armstrong, George Wallace, Minneapolis.  
 Baldy, Fred C., St. Paul.  
 Ball, Frank Algernon, Fargo, N. D.  
 Bates, William Spencer, Faribault.  
 Bayer, Anthony Matthew, Minneapolis.  
 Bessesen, Nelson Daniel, Albert Lea.  
 Biorn, Carl Herman, *B. A.*, Zumbrota.  
 Birkhauser, Frank Walter, Minneapolis.  
 Bjorge, Henry Olson, Lake Park.  
 Cameron, Donald Monroe, Minneapolis.  
 Campbell, Sheridan P., Menomonie, Wis.  
 Carpenter, Fred W., Lakeport, Cal.  
 Champlin, George Wallace, Garden City.  
 Chapman, Clair Abion, Lanesboro.  
 Child, George Erwin, Waseca.  
 Childress, Arthur Burke, Athens, Tenn.  
 Chinnock, Hersey Ray, River Falls, Wis.  
 Clifford, Elmer L., *B. A.*, Lake City.  
 Crane, Edwin Weston, Iron River, Wis.  
 Crooks, John Stearns, St. Paul.  
 Dann, Wilbur W., *B. S.* Minneapolis.  
 Downing, George Washington,  
 Sault Ste. Marie, Mich.  
 Ellefson, Edward O., Holmes City.  
 Elmquist, Charles, Rush City.  
 Ellis, Abner S., Minneapolis.  
 Embertson, John, Parker's Prairie.  
 Farmer, Ernest, Spring Valley.  
 Featherstone, Albert H., Red Wing.  
 Finehout, John William, St. Paul.  
 Finlayson, George Albert Edward,  
 Crookston.  
 Fossen, Henry John, Erhard.  
 Fowler, Carl Hitchcock, *B. A.* Minneapolis.  
 Gallup, William Wells, Cheney.  
 Gjertsen, George Gerbert, Minneapolis.  
 Goldblum, Hal Sol, Minneapolis.  
 Gray, Willis Butler, St. Paul.  
 Greer, Frank S., Minneapolis.  
 Gregory, Joel Ernest, St. Paul.  
 Gresham, William H., St. Peter.  
 Grover, Ezra Joseph, Menomonie, Wis.  
 Hand, Orra Palmer, Minneapolis.  
 Hauck, John Frederick, Arlington.  
 Hayden, Charles Gregory, Minneapolis.  
 Healey, Elbridge B., Milbank, S. D.  
 Hedding, George Dewil, Minneapolis.  
 Hemmy, J. Ulrich, Leland, Wis.  
 Henderson, William Boyd, Minneapolis.  
 Hill, Reuben David, Odessa.  
 Hoidale, Emil, Madison.  
 Hovland, William E., Northfield.

Jermene, Paul, Holton, Kan.  
 Jerome, Albert Clifford, Minneapolis.  
 Johns, James, Minneapolis,  
 Johnson, Charles, Willmar.  
 Johnson, Nels I., Thompson, N. D.  
 Kerwin, Mathew Francis, Minneapolis.  
 Kline, Louis Benjamin, Glendale.  
 Krelwitz, Edmund Henry, Duluth.  
 Kvello, Conrad Albert, Lisbon, N. D.  
 Langaard, Iver William, Garfield.  
 Latham, Allanson W., Minneapolis.  
 Laurisch, Christian Joseph, Mankato.  
 Loring, Charles. Kalispell, Mont.  
 Lucas, Edward, Minneapolis.  
 Ludwig, C., Thurston.  
 Lusk, Frank Herbert, Thorp, Wis.  
 McDermott, Peter Thomas, St. Paul.  
 McElhaney, Samuel Hugh, St. Charles.  
 Manley, Robert E. A., *B. S.*, Dawson.  
 Martin, Dayton W., Woodlake.  
 Marx, Michael, Wabasha.  
 Monfort, George Dickson, Litchfield.  
 Montague, James Edward, Crookston.  
 Moorhead, H. Paul, Minneapolis.  
 Morrow, Claude L., St. Paul.  
 Naylor, William Keith, Merriam Park.  
 Nightengale, John Henry, Minneapolis.  
 Niles, George Herbert, Hector.  
 Nordin, John Alyot, Minneapolis.  
 O'Brien, Edward James, Minneapolis.  
 O'Leary, William Frances, Eau Claire, Wis.  
 O'Neal, Grovenor Pixley, Minneapolis.  
 O'Reilly, G. A.  
 Oakley, Egbert S., Buffalo.  
 Olander, Willie, Granite Falls.  
 Peterson, George W., Albert Lea.  
 Pfau, Albert Robert, Jr., Mankato.  
 Phelps, Harry Elmer, Minneapolis.  
 Pierrard, William Edward, Sauk Center.  
 Prendergast, Edward Alozias, Minneapolis.  
 Reynolds, Ralph Wood, Minneapolis.  
 Richardson, Will Burdette, Rochester.  
 Rogers, Clyde Eugene, Minneapolis.  
 Sabin, Frederick Hosmer, St. Paul.  
 Scanlan, Patrick Joseph, Rochester.  
 Schuttler, Adolph, Chicago, Ill.  
 Sells, Max.  
 Sheldon, Edmund Perry, *B. S.*, Minneapolis.  
 Sjoblom, Peter Godfrey, Minneapolis.  
 Smith, Amos Delbert, Slayton.  
 Smith, Frank Henry, Minneapolis.  
 Smith, James William, St. Paul.

Somers, Stafford Benson, Faribault.  
 Sorkness, Halvor L., Madison.  
 Sperry, Lloyd Garrison, Wasioja.  
 Stebbins, George M., Rochester.  
 Steenson, James, *B. A.*, Eden Prairie.  
 Sweeney, John Walter, Garfield.  
 Taylor, Lucian, Lac Qui Parle.  
 Thompson, R. Celius, Preston.  
 Thormodson, Neils E., Madelia.  
 Tierney, Michael J., Henderson.  
 Titus, Richard Edward, Minneapolis.  
 Towle, Frank Ignatius, St. Paul.  
 Twitchell, L. Lathrop, Minneapolis.  
 Webb, Charles Julien, Arcadia, Wis.

Weil, Jonas, Minneapolis.  
 Werner, Carl Gustaf A., Minneapolis.  
 Werring, James Henry, Fairfax.  
 White, J. C., Chatfield.  
 White, McLaughlin, *B. S.*, Minneapolis.  
 Wilke, William A., Marble Rock, Ia.  
 Winston, Phillip B. Jr., Minneapolis.  
 Winters, John P., Fayette, Iowa.  
 Wold, Carl Angell, Brandon.  
 Wolff, August Charles, Mapleton.  
 Wood: Dan Beedy, Minneapolis.  
 Woodward, Frank Tyler, Indianola, Iowa.  
 Yale, Washington Jr., Minneapolis.

#### JUNIOR CLASS—EVENING SECTION—60.

—Allen, Edmund P., Minneapolis.  
 —Ames, Oliver H., St. Paul.  
 —Angst, Robert Arthur, Minneapolis.  
 Arnold, Albert Clinton, Minneapolis.  
 Bendixen, Christopher M., St. Paul.  
 Bennett, John Clarke, St. Paul.  
 Benton, Ward Hotchkiss, Madelia.  
 Bestor, Frank Clinton, Minneapolis.  
 Broberg, William John, Waconia.  
 Caldwell, Alexander Woods, St. Paul.  
 Canfield, Orville Edgar, Minneapolis.  
 Carroll, John Joseph, Minneapolis.  
 Clark, Henry C., St. Paul.  
 Clark, Leroy Eaton, *B. A.*, Minneapolis.  
 Cockran, George Dakin, St. Paul.  
 Conroy, Thomas F., St. Paul.  
 Costello, William James, Willmar.  
 Crandall, Edward Frank, Minneapolis.  
 Elliott, Joseph R., Minneapolis.  
 Faulhaber, Ernest A., St. Paul.  
 Freeman, John M., St. Paul.  
 Fritz, John Ezra, Minneapolis.  
 Garwood, Eugene Cary, Minneapolis.  
 Giantvalley, Jeremiah Anthony, St. Paul.  
 Gillette, Walter Arthur, St. Paul.  
 Gray, Argalus Wilson, DuBois, Pa.  
 Guy, Arthur P., St. Paul.  
 Hansen, Henry John, St. Paul.  
 Heiberg, A., Minneapolis.  
 Holmes, Adam John, St. Paul.  
 Hulback, Oliver, St. Paul.  
 Johnson, Harry Stickney, St. Paul.  
 Leary, Daniel James, Austin.  
 Leyden, John, St. Paul.  
 Lindeke, Albert W., St. Paul.  
 Lund, Harry Albert, Minneapolis.  
 McMillan, Robert Orr, St. Paul.  
 Matteson, Peter Marcus, New Rockford, N. D.  
 Matthews, Charles Alvin, St. Paul.  
 Meyers, J. Edward, St. Paul.  
 Netland, Andrew O., Minneapolis.  
 Ostrand, James, Book.  
 Palmer, Clarence Albert, St. Paul.  
 Pomeroy, Frank Edward, Minneapolis.  
 Rome, Robert Ralph, Albert Lea.  
 Schonarth, Peter, St. Paul.  
 Schroeder, John Piper, Ramsey.  
 Somsen, Stephen Herbert, Minneapolis.  
 Stapleton, Albert Martin, St. Paul.  
 Stephen, John August, in Minneapolis.  
 Strong, George Washington, Mineral Pt. Wis.  
 Sullivan, Patrick Edward, Winooski, Vt.  
 Sutherland, Eugene M., Minneapolis.  
 Sutton, Esli Lyle, Minneapolis.  
 Thompson, Robert Mitchell, Minneapolis.  
 Thori, Nels Olson, Arendahl.  
 Van Gorder, Asa Filmore, Minneapolis.  
 Wallace, James G., St. Paul.  
 Weber, Albert, Minneapolis.  
 Wright, Edwin Stanton, Lodi, La.

#### DEPARTMENT OF MEDICINE.

#### COLLEGE OF MEDICINE AND SURGERY.

#### SENIOR CLASS—57.

Beebe, Dan Goodwin, Minneapolis.  
 Birdsall, Albert Thornton, *B. L.*, N. Y. City.  
 Bjelland, Adolph Odin, Albert Lea.  
 Brown, Harry, Duluth.  
 —Buell, Mary Catherine, Minneapolis.  
 Burns, M. Alpheus, St. Paul.  
 Caine, Charles Edwin, Spencer Brook.  
 Campbell, Robert Allen, Alexandria.  
 Christenson, Charles Rasmi, Owatonna.  
 Corbett, James Frank, Minneapolis.

Crewe, John Eginton, Devil's Lake, N. D.  
 Crommett, Herbert Benton, Amery, Wis.  
 Dennis, Warren Arthur, *B. L. U. of Wis.*,  
 Dohm, Charles Lawrence, St. Paul. [Sharon, W. Merrill, James Edward, Minneapolis,  
 Drake, Fred Arthur, Rushford.  
 Earl, Robert Oscar, Minneapolis.  
 Edgerton, William Marshall, Sioux Falls, S. D.  
 Fanset, John Jay, Milbank, S. D.  
 Fischer, Otto Ferdinand, Northfield.  
 Geiger, John, Osceola Mill, Wis.  
 Gerrish, William Albert, Minneapolis.  
 Gibbon, Luther Llewellyn, Minneapolis.  
 Greeley, Liston Quincy, Waterman, Ill.  
 Grivelley, Charles Theodore, Young America.  
 Halgren, Harry Alfred, Watertown.  
 Heinze, Charles Frederick, Wabasha.  
 Hill, Arthur Lyman, Winnebago City.  
 Holbrook, John Snell, Northfield.  
 Howes, Harold Clifford, Springfield, Mass.  
 —Hughes, Helen, Blue Earth City.  
 Johnson, Asa Miller, Northfield.  
 Jewell, Thomas Percy, Hudson, Wis.  
 Krch, George C., St. Paul.  
 Krueger, Louis William, Mankato.  
 McLaughlin, Ernest William, Willmar.  
 Mayland, Lewis L., Aspeland.  
 Meighen, Jacob Wells, Mankato.  
 —Merrill, Rose Marie, Masonville, Iowa.  
 Mesker, George Henry, New Rome.  
 Nelson, Louis Allen, St. Paul.  
 Palmer, Frank Clarence, Shell Lake, Wis.  
 Palmquist, John Emil, Princeton, Ill.  
 Pitblado, John David, Minneapolis.  
 Poehler, Franklin Theodore, *B. S.*, Mpls.  
 Ramsey, Walter Reeve, Grand Forks, N. D.  
 Reimestad, Christian S., Minneapolis.  
 Ritchie, Harry Parks, *Ph. B.*, *Yale*, St. Paul,  
 Setnan, John Magnus, Minneapolis.  
 Soper, John Elford, Minneapolis.  
 Sorg, John Andrew, Hastings.  
 Stack, George Franklin, *B. A.*, Anok.  
 Stockman, Bert George, Woodville, Wis.  
 Thabes, John Alois, Brainerd.  
 Thyng, Date Kimball, Minneapolis.  
 Warren, Frank Stombs, St. Paul  
 Wilson, Louis Blanchard, St. Paul.

## JUNIOR CLASS—72.

Alexander, Frances Harley, St. Paul.  
 Allen, Mason, Grafton, Ill.  
 Anderson, Edwin Clark, Minneapolis.  
 Bacon, Harry Paddock, Los Angeles, Cal.  
 Baldwin, Louis Benedict, Lakota, N. D.  
 —Bebb, Rose Ann, *B. L.*, Minneapolis.  
 Bergquist, Karl Emil, Winthrop.  
 Bjorneby, Peter Cornelius, *B. A.*, *St. Olaf's College*, Grafton, N. D.  
 Blakeslee, Frank Adrian, Waukegan, Ill.  
 Blanchard, Henry George, Faribault.  
 Blomburgh, Alex Ferdinand, Waseca.  
 Bong, John Hultgren, Carlton.  
 —Booker, Gertrude, Dover.  
 Bouman, Herman, Murdock.  
 Briggs, Titus Church, Minneapolis.  
 Buck, Carroll De Forest, Jamestown, N. D.  
 Burch, Frank Earl, Menomonie, Wis.  
 Button, Arthur Jay, Minneapolis.  
 —Cahoon, Grace Wilson, Minneapolis.  
 Carman, Charles Lowry, St. Paul.  
 Carpenter, Carroll Clinton, Anoka.  
 Cavanaugh, James Owen, Shakopee.  
 Clark, Edward Jennings, Minneapolis.  
 Clark, Howard Shoemaker, Austin.  
 Coleman, Harry Marcus, Minneapolis.  
 Corse, Charles M., Montevideo.  
 Cuff, William Sherman, St. Paul.  
 Dinahan, Richard McPherson, New Haven,  
 Conn.  
 Edwards, George, Sebroughville, Ont.  
 Fowler, Fred Hill, Minneapolis.  
 Gaffney, Thomas James, Minneapolis.  
 Gilfillan, James Stirling, St. Paul.  
 Glim, Nes Nelson, Moline, Ill.  
 Goddard, Nathan Andrews, Nashua, N. H.  
 Goldsworthy, William, Ely.  
 Griswold, Frank Eugene, Cumberland, Wis.  
 Guthrie, John De Mott, *B. E. E.*, Minne-  
 apolis.  
 Hack, John Wesley, Garnet, Col.  
 Harrison, Elmer Elsworth, New Richland.  
 •Hedback, Alex. Emanuel, Star Prairie, Wis.  
 Hyde, Leon Willet, St. Paul.  
 Iverson, Lewis U., West Lake.  
 Justice, Oswald Middleton, Rochester.  
 Keene, Ralph Kendall, Mankato.  
 Kjerland, Thorsten N., Webster, S. D.  
 Kramps, John William, Belgrade.  
 Loe, Adolph Oscar, Minneapolis.  
 —McClung, Alberta Virginia, St. Paul.  
 Mathieson, George, Evansville.  
 Miller, Arthur Wenzell, St. Paul.  
 Moore, Albert Hall, Minneapolis.  
 Munroe, Alonzo Tullock, New Auburn.  
 Micholson, Daniel A., Minneapolis.  
 Parrott, Byron Walter, Minneapolis.  
 Perkins, George Albion, Red Wing.  
 Perry, Gentz, New Richmond, Wis.  
 Peterson, John Richard, Minneapolis.  
 Roadman, Ira N., Minneapolis.  
 Rulien, Frank William, New Richmond, Wis.

Seibel, Karl, Ashland, Wis.  
 Smith, Hiram Williams, Plainview.  
 —Stahl, Harriet Sherman, Harmony.  
 Stevens, John, Jr., Bangor, Me.  
 Thorpe, Arthur Clyde, Minneapolis.  
 Tupper, Eugene Larrey, Minneapolis.  
 Veline, Olaf Julius, Stillwater.

Vibrance, Gustave Charles, Farmington.  
 Wagar, William Desmond, Grand Forks, N. D.  
 Wanous, Ernest Zirus, Glencoe.  
 Wilcox, Montreville Russell, St. Paul.  
 Wilcox, Thomas Emmet, Barron, Wis.  
 Wiseman, Robert Laurence, St. Paul.

## SOPHOMORE CLASS—20.

Buckley, Daniel, *B. S.*, Farmington.  
 Chapple, Charles Loran, *B. L.*, Beldenville,  
 Wis.  
 Cowper, William Lafayette, *B. S.*, *U. of*  
*N. D.*, Grand Forks, N. D.  
 Darby, Harry William, St. Paul.  
 —Eddy, Ruth Elizabeth, *B. A.*, *Vassar*,  
 Minneapolis.  
 Gray, George Annand, *B. A.*, Minneapolis.  
 Hartshorn, Willis Ellis, *Ph. B.*, *Colorado*,  
*Col.*, New Haven, Conn.  
 Havorka, Wenceslaus Joseph, Owatonna.  
 Huhn, Carl, *B. A.*, Minneapolis.

Johnson, Edwin Martin, *B. L.*, Sauk Center.  
 Johnson, Lewis Olaf, *B. A.*, *St. Olaf's College*,  
 Granite Falls.  
 Kohler, Fred George, Watertown.  
 Luerssen, Herman Carsten, Fort Snelling.  
 —Neff, Georga, Lake Crystal.  
 Olson, Jacob Severn, Grover.  
 Parsons, Joseph Greeley, Orange, Mass.  
 Quain, Eric P., Minneapolis.  
 Reed, Charles Anthony, *B. S.*, Hastings.  
 Sherin, Wesley Morley, St. Paul.  
 —Towers, (Mrs.) Mary Elizabeth, Minneapolis

## FRESHMAN CLASS—69.

—Agnew, Anna Marie, Hudson, Wis.  
 Avery, Jacob Fowler, Minneapolis.  
 Benedict, Earl Edson, Minneapolis.  
 Best, Robert, Freeport, Ill.  
 Burgan, James Homer, Milbank, S. D.  
 Clarke, Eric Alexander, Windom.  
 Clinton, Edward Nathaniel, Sleepy Eye.  
 Cohen, Haskell Mier, Pueblo, Colo.  
 Cook, Paul Burns, Rochester.  
 Dezell, William James, Wabasha.  
 Dinneen, John, Merriam Park.  
 —Drake, Katherine, Minneapolis.  
 Endress, Karl John, St. Paul.  
 Ferguson, William John, Minneapolis.  
 Fogarty, Charles William, Buffalo.  
 Forrest, Charles George, Minneapolis.  
 Frost, Harold Edw., Willmar.  
 Fuller, Mert Lenore, Albert Lea.  
 Gaines, Everett Columbia, Minneapolis.  
 Geyerman, Peter, Worthington.  
 Gill, John Richard, Chatfield.  
 Grafton, Guy, Winona.  
 Grout, Sam Eugene, Eau Claire, Wis.  
 Guilford, Harry Morrill, *B. S.*, Minneapolis.  
 Haskell, A Dair, Minneapolis.  
 Haynes, Frederick Eugene, Minneapolis.  
 Heimark, Olaf E., Clarkfield.  
 Hoff, Peder Andreas, St. Paul.  
 Hotvedt, Ingvald Josephson, St. Paul.  
 Ilstrup, Orlando, Buffalo.  
 —Irwin, Mary Handlan, Wheeling, W. Va.  
 Johnson, Edwin B., Prescott, Wis.  
 Kenaston, Burt, Minneapolis.

Larson, Thomas Lewis, Kasson.  
 Lenont, Charles B., Northfield.  
 Litzenberg, Jennings Crawford, *B. S.*, Mpls.  
 Loberg, Adolph, Minneapolis.  
 Ludtke, Gustav Herman, Amboy.  
 McNerthney, John, Red Lake Falls.  
 —Mackel, Bertha Katharine, Ada.  
 Miles, Robert Scott, Glencoe.  
 Morcom, Harrie, Tower.  
 Morgan, Alexander S., Eau Claire, Wis.  
 Oberg, Carl Magnus, Minneapolis.  
 O'Connor, Jerry, Marysburg.  
 Olson, William C., Wells.  
 Palmer, Frank Wilbur, Aurora, Ill.  
 Patton, Frederick J., St. Paul.  
 Prim, Joseph Andrew, Minneapolis.  
 Ramstad, N. Oliver, Eau Claire, Wis.  
 —Ranson, Mary E., *Ph. B.*, *Hamlin Univer-*  
*sity*, Dodge Center.  
 Rassmussen, Fred, Moorhead.  
 Read, Harry Kirke, Richland, Mich.  
 Roberts, Floyd John, Devils Lake, N. D.  
 Schoonmaker, Edward C., Minneapolis.  
 Shaw, Albert William, Minneapolis.  
 Sorenson, Antony Niles, Kasson.  
 Stauff, Charles Homer, Wabasha.  
 Steward, Benjamin Gadsden, Missoula, Mont.  
 Swartz, West Jacobs, Fort Snelling.  
 Tennant, Russell Welcome, Wayzata.  
 Tenney, John Tenney, Wabasha.  
 Tennyson, Theodore, Minneapolis.  
 Tripp, George Arthur, Northfield.  
 —Valley, Rose Vivian, Fair Haven.

Walker, Stuart Brock, Buffalo.  
Ward, Austin, Stewart.

Williams, Boyd, Hudson, Wis.  
Woods, Ernest Arthur, Chicago.

## SPECIALS—13.

—Amy, Mrs. Jennie, Minneapolis.  
—Baier, (Mrs.) Florence Cornelia, Nichols.  
Batcheller, Oliver, Madelia.  
Bratrud, Theodore, Spring Valley.  
Culver, Charles Frank, New Rockford, N. D.  
Devereaux, Thomas, Minneapolis.  
Hjardemaal, Herman Edward, Minneapolis.

Jamieson, Albert Edward, Minneapolis.  
Kerkhoff, Edward Henry, Melrose.  
Manson, Frank Melville, B. S., Minneapolis.  
Norton, Francis Patrick, Rochester.  
D. Parry, Ivan A., Mankato.  
Rees, Soren P., B. S., Stillwater.

## GRADUATES—3.

Brinley, William Henry, Minneapolis.  
Parkyn, Herbert Arthur, B. A. M. D.,  
Toronto, Can.

Shrodes, George H., Minneapolis.

## UNCLASSED STUDENTS—10.

Fleming, Herman Frank, Winona.  
Gertsen, Johan P., Minneapolis.  
Grove, Carl Joseph, Millville.  
McNamara, William Francis, Minneapolis.  
Michelet, Wilhelm L. C., Minneapolis,

Smith, Allison, Winnipeg, Man.  
—Sprague, Phoebe Ann, Springfield, Mass.  
Steele, Charles Terell, St. Paul.  
Stouch, George Leonard, Fort Snelling.  
Strang, Charles Burney, Alexandria.

## COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

## SENIOR CLASS—8.

Balcom, George Goodrich,  
Grand Rapids, Mich.  
Beck, James Flournoy, Minneapolis.  
Bingham, Hiram Henry, Babcock, Wis.  
Hamlin, George Baldwin, Minneapolis.

Hammond, Asa John, B. A., Lake City.  
Phelps, Alva Gilbert, St. Paul.  
Reineke, George Ferdinand, Deerfield.  
Shipman, Louis Dwight, Minneapolis.

## JUNIOR CLASS—13.

Ballard, Charles Albert, St. Paul.  
Beckley, Fred Lee, Merriam Park.  
—Brauti, Andrea Ellingson, Fergus Falls.  
DeCoster, William Thompson, New Canada.  
—Hurd, Mrs. Ethel Amanda, Minneapolis.  
—Keeney, Emma Adaline, B. S. U. of S. D.  
Minneapolis.

Kendall, Walter Julian, Windom.  
Lares, Burt Victor, St. Paul.  
Pollock, Harry Meeker, Litchfield.  
Torgenson, William, Somber, Ia.  
Wedelstadt, George Sparr von, St. Paul.  
Williams, Leon Arlington, St. Paul.  
Woutat, Henry Gustav, Winona.

## SOPHOMORE CLASS—2.

Barber, Lee Warren, St. Paul.  
Warren, William John, B. S., Minneapolis.

## FRESHMAN CLASS—8.

Booth, Albert Edwin, Minneapolis.  
Caine, Arthur T., Stillwater.  
Gray, Burton Nassau, Minneapolis.  
—Hall, Charlotte, Chance, St. Paul.

Matchan, Glenn Robert, Minneapolis.  
Matchan, Wesley George, Zumbrota.  
Page, George Edgar, Anoka.  
Whittemore, Morse Ket, Glenwood.

## COLLEGE OF DENTISTRY.

## SENIOR CLASS—12.

Beise, Henry Christian, Mapleton.  
Benjamin, Winfred Garner, Hutchinson.  
Birch, Frank Waverly, Faribault.

Day, George Ransom, Farmington.  
Herrick, Clayton C., Rochester.  
Kelsey, Raymond Daniel, Minneapolis.



Maguire, James Oscar, East Dubuque, Ill.  
 Montgomery, Charles Purnell, St. Paul.  
 Moody, Frank Emil, St. James.  
 Munro, Robert Annand, New Auburn.  
 Norris, Frank Mortimer, Tracy.  
 Tift, Wallace Leonard, Hutchinson.

## JUNIOR CLASS--26.

Annis, Elwin Richard, Mapleton.  
 Baker, William Walter, Minneapolis.  
 Cooke, Thomas Frederick, Reads Landing.  
 Denton, Herbert Borgardus, Duluth.  
 Evans, Warren Thomas, Minneapolis.  
 Frederick, John Lupus, Waseca.  
 Gallagher, John Walter Sidney, Sleepy Eye.  
 Godfrey, Harvey Byron, Faribault.  
 Godfrey, Henry Samuel, Faribault.  
 Goodnow, Merton Stearns, Hutchinson.  
 Hagerty, Torry Philander, Chatfield.  
 Hawkinson, Alfred Eldridge, Grove City.  
 Leonard, Claude Albert, Menomonie, Wis.  
 McCadden, William, Fairmont.  
 —Madden, Winnifred Josephine, Waseca.  
 Maloney, John Francis, New Richmond, Wis.  
 —Medary, (Mrs.) Edna Pettit, Waukon, Ia.  
 Moore, William Alexander, Sauk Center.  
 Pattison, Thomas Alexander, St. Cloud.  
 Sanderson, Smith Arthur, Hamline  
 Shankland, James Wilbur, Des Moines, Ia.  
 Shumpik, Edward, Minneapolis.  
 Spence, Thomas, Minneapolis.  
 Stephen, Frank Lewis, Minnesota Lake.  
 Stevens, Bertram Theodore, Minneapolis.  
 Wells, Horace Rensselaer, Lansing.

## FRESHMAN CLASS—32.

Atwood, Almon Greer, Minneapolis.  
 Aurand, William Henry, Bowdle, S. D.  
 Banning, Claud Percy, Winnipeg, Man.  
 Bennion, Sydney Edward, Litchfield.  
 Betcher, Clarence Ward, Red Wing.  
 Brothers, Fletcher Marion, Minneapolis.  
 Purgan, John Edward, Minneapolis.  
 Calvert, Halford Frank, Eau Claire, Wis.  
 Card, William Henry, Minneapolis.  
 Couplen, Charles Ailen, St. Peter.  
 Curtis, Myron Eaton, Minneapolis.  
 Davern, John, St. Paul.  
 Fischer, Eugene Charles, Waseca.  
 Franklin, Frank Allan, Hastings.  
 Godward, Charles Henry, Elbow Lake.  
 Hardy, Milton J., Austin.  
 Harnish, Frank Gustave, Hastings.  
 Hollister, John Roy, Tomah, Wis.  
 Jeffers, John, Glenwood.  
 Miller, Fred Colonel, Hammond, Wis.  
 Newhouse, Chris, Minneapolis.  
 Olson, Rolf Johan, St. Ansgar, Ia.  
 Rhame, Walter Stevens, Minneapolis.  
 Prail, Fred William, Waseca.  
 Simmons, Alfred Knute, Red Wing.  
 Spencer, William Eleazer, Minneapolis.  
 Sullivan, Edwin, Minneapolis.  
 Titus, Fred Giles, Montevideo.  
 Torrence, Charles Murt, Minneapolis.  
 Van Bronkhorst, Everhard J., Austin.  
 Volker, Joseph John, Wabasha.  
 Weagant, Charles James, Grafton, N. D.  
 Weible, Fred Keller, Hunter, N. D.

## SPECIALS—6.

Argue, John Ephraim, Carlisle, N. D.  
 Eldred, Bert Henry, Rushford.  
 Herrick, Benjamin Arlington, St. Paul.  
 Pullen, Herbert Armitage, Austin.  
 Satory, Joseph C., Wabasha.  
 Williams, Martin, Lancaster, Wis.

## UNCLASSED—14.

—Covey, Martha Griswold, Worthington.  
 Hall, Jay Mason, Austin.  
 Haney, William Carlton, Minneapolis.  
 Humphrey, Omar Congar, St. Paul.  
 Lawton, John Reynolds, St. Paul.  
 Liberma, Mark Francis, Milan, Italy.  
 Rose, William Johnson, Minneapolis.  
 Schneider, Charles William, St. Paul.  
 Shibley, Edward Harold, Minneapolis.  
 Stone, Gilbert Ferdinand, St. Paul.  
 Stone, Laurence, Afton.  
 Summers, Charles Eliot, Minneapolis.  
 Wood, John Solon, Austin.  
 Wright, Ernest Avery, Minneapolis.

## COLLEGE OF PHARMACY.

## SENIORS,—12.

Arbes, Joseph Martin, Le Sueur.  
 Cady, Frank E., Flandreau, S. D.  
 Cahil, James Lawrence, Eagle Center, Ia.  
 Haugen, John Edward, Kasson.

—Hurd, Annah, Minneapolis.  
 Kehoe, Thomas Madigan, Lake Mills. Ia.  
 Larson, Theodore Lewis, Kassou.  
 McCulloch, Earl, Chatfield.

Meisen, John Anton, St. Paul.  
 Moen, Mathias, Starbuck.  
 Nichols, Benjamin Heber, Northfield.  
 Williams, Fred Horace, St. Louis Park.

#### JUNIOR CLASS,—10.

Blackmun, George Harvey, Alden.  
 Clark, Charles Henry, St. Peter.  
 Cornwell, Charles Burchard, Plainview.  
 Helk, Leon Valentine, Minneapolis.  
 Kirwin, Luke, Spring Valley.

McKnight, George William, Buffalo.  
 Newell, Thomas Ralph, New Richmond, Wis.  
 Oleson, Gustave Henry, Minneapolis.  
 Spicer, Lester Wedge, Albert Lea.  
 Tilford, Frederick Meek, Windom.

#### UNCLASSED STUDENTS—10.

Bowe, John William, Mankato.  
 Brede, William, Minneapolis.  
 Farmer, Dan E., Spring Valley.  
 Francis, William Edward, New Auburn.  
 Hosecheid, William, St. James.

Johnson, Flavius I., Bathgate, N. D.  
 Landeen, Arthur Ferdinand, Garfield.  
 Moffit, Isaac Edgerton, Carlisle, N. D.  
 Stock, William Julius, Winona.  
 Varney, Herbert Clarkson, St. Paul.

#### SPECIAL,—1.

Sarazin, Joseph James, Lake Linden, Mich.

### STUDENTS ATTENDING UNIVERSITY SUMMER SCHOOL,—332.

Adams, Bertram S., Lisbon, N. D.  
 —Adams, Emroy C., Faribault, Minn.  
 —Ainsworth, Mrs. Hattie I. J., Minneapolis.  
 —Allee, Anne May, Minneapolis.  
 —Allan, Irene A., Minneapolis.  
 —Allen, Julia, Lanesboro.  
 —Ames, Alma J., Hutchinson.  
 —Allen, Mark C., Minneapolis.  
 —Anderson, Anna E., Merrill, Wis.  
 —Andrews, Hattie L., Minneapolis.  
 —Andrews, May E., Louisville, Ky.  
 —Armstrong, Geo. W., Minneapolis.  
 —Arness, Ole J., Terrace, Minn.  
 —Arnold, Alice Lena, Minneapolis.  
 —Austin, James Fred, St. Paul.  
 —Avery, Carlos, Hutchinson.  
 —Aylard, Carlton, Stillwater.  
 —Bacon, Minna May, Minneapolis.  
 —Bailey, Clara E., Minneapolis.  
 —Bailey, Mrs. Etta E., Minneapolis.  
 —Bangs, Helen, Rapid City, S. D.  
 —Barnes, Wm. S., Duluth.  
 —Beck, Lily Louise, Minneapolis.  
 —Beede, Mrs. Belle R., Aurora, Ill.  
 —Bennett, Frances L., Minneapolis.  
 —Bittner, Alma R., St. Peter.  
 —Bowen, Bertha C., Minneapolis.  
 —Brack, Helen H., St. Paul.  
 —Brett, Martha L., Minneapolis.  
 —Browne, Squire F., Minneapolis.  
 —Buck, Clemma, Minneapolis.  
 —Buckley, Mary L., Farmington.  
 —Buckley, Nellie A., Farmington.  
 —Buenger, Theodor, St. Paul.

—Burch, Miriam Adele, Excelsior.  
 —Byrnes, Agnes P., Minneapolis.  
 —Cameron, Donald M., Minneapolis.  
 —Cannon, Charles, Minneapolis.  
 —Carr, James Stewart, Minneapolis.  
 —Carswell, Robert E., Minneapolis.  
 —Casey, John M., Minneapolis.  
 —Catchcart, Susan T., King's Mt., N. C.  
 —Chapin, Helen Louise, Jackson.  
 —Chapman, Fanny B., Minneapolis.  
 —Chappel, Benjamin P., Ellsworth, Wis.  
 —Chute, Richard Henry Jr., Minneapolis.  
 —Clarke, Arvesta L., Rich Valley.  
 —Clark, Martha, St. Paul.  
 —Condit, Wm. H., Minneapolis.  
 —Conner, Mrs. Flora C., Minneapolis.  
 —Constantine, Anna M., Red Wing.  
 —Cook, John H., Minneapolis.  
 —Countryman, Gratia, Minneapolis.  
 —Countryman, Lana, Minneapolis.  
 —Couper, Chlora E., Blue Earth City.  
 —Crump, Nadine, Minneapolis.  
 —Dalton, Joseph A., Saint Paul.  
 —Daniels, Ada E., Minneapolis.  
 —Davis, Harriett L., Minneapolis.  
 —Day, Reuben Noble, Minneapolis.  
 —Demmon, Alice E., Minneapolis.  
 —Donnaldson, Emma, Dundas.  
 —Dunlap, George C., Saint Paul.  
 —Dunton, Harriett E., Clearwater.  
 —Eaton, Benjamin G., Hamline.  
 —Eddy, Vernon, Minneapolis.  
 —Eggleston, Inda, Minneapolis.  
 —Eggleston, Lillie S., Wykoff.

- Eikeiland, Peter J., Minneapolis.  
 Engle, Oliver R., Preston.  
 —Eugenia, Sister, Waverly.  
 —Evans, May, Minneapolis.  
 —Evans, Tamazine McK., Minneapolis.  
 Farrar, Frank F., White Bear Lake.  
 —Fehr, Margaret, St. Cloud.  
 —Ferguson, Carrie A., Minneapolis.  
 —Fischer, Amelia, Wells.  
 —Fisher, Elizabeth A., Minneapolis.  
 Flaten, Nils, Minneapolis.  
 —Fletcher, Nelle C., Minneapolis.  
 Flitner, Charles E., Saint Paul.  
 —Flynn, Veronica C., Stillwater.  
 Flowell, Wm. B., Minneapolis.  
 —Foss, Elizabeth, Minneapolis.  
 Fowler, Harry A., Minneapolis.  
 Fritz, A. E., St. Cloud.  
 —Furlong, Bridget C., Pine Bend.  
 Galloway, Lee, Faribault.  
 Garfield, Wm. H., Minneapolis.  
 —Gaugon, Maud, Minneapolis.  
 —George, M. Helen, New Um.  
 Giffillan, Frederick J., Saint Paul.  
 Gould, Chester N., Owatonna.  
 —Gould, Gertrude H., Minneapolis.  
 —Gowdy, Chestine, Minneapolis.  
 —Gowdy, Jean L., Minneapolis.  
 —Graus, Elizabeth G., Hastings.  
 —Greathead, Frances S., Moorhead.  
 Green, Eugene Kibbey, Brooklyn Center.  
 Gregory, Joel E., St. Paul.  
 —Hagar, Etta Mabel, Minneapolis.  
 —Halpin, Agnes Grace, Springfield.  
 Hamilton, H. C., Sandy Lake, Penn.  
 Hamlin, Ernest T., Minneapolis.  
 —Hanley, Lucy H., Roberts, Wis.  
 Hannum, Harry, Minneapolis.  
 —Hannum, Mary Hunt, Minneapolis.  
 Harmon, Frank E., Crookston.  
 Harrison, Merton E., Minneapolis.  
 —Hart, Emma M., Spring Valley.  
 —Hawley, Mary E., Minneapolis.  
 —Hayes, Effie M., Minneapolis.  
 —Hays, Grace A., Minneapolis.  
 Hayward, Harry H., Minneapolis.  
 —Hendricks, Julia M., Minneapolis.  
 —Hern, Angelina K., St. Paul.  
 Hetler, James F., Fisher.  
 Higbee, Matt L., Minneapolis.  
 Higbee, Paul Albert, Minneapolis.  
 Hill, Lincoln, Creston, Ia.  
 Hill, Oliver, Madison.  
 Hodgson, Lawrence C., Minneapolis.  
 Hoffert, Henry J., Jordan.  
 Holbrook, Charles S., St. Anthony Park.  
 Hooker, Roy F., Minneapolis.  
 —Horning, Jennie L., Minneapolis.  
 —Houliston, Annie, Minneapolis.  
 —Hubbell, Flora E., Minneapolis.  
 Hintz, Charles A., Courtland.  
 —Janson, Mary M., Albert Lea.  
 —Janson, Sara A., Albert Lea.  
 —Jenison, Sarah A., Minneapolis.  
 Johnson, John H., Hawley.  
 Johnston, Geo. S., Minneapolis.  
 Jorgenson, Hilbert A., Comstock.  
 —Jorgenson, Mary A., St. Peter.  
 —Joslin, Mary E., Minneapolis.  
 Kehoe, Thomas M., Minneapolis.  
 Kelley, John, Ortonville.  
 Kenaston, Burt, Minneapolis.  
 —Kendall, Kate E., St. Paul Park.  
 —Kenyon, Lillian M., Maple Grove.  
 —Killiam, Mary H., Minneapolis.  
 —Kimball, Lizzie M., Hamline.  
 Kingsford, Alfred, Rushford.  
 Kinney, Alvin C., Lake City.  
 —Kirtland, Florence, Minneapolis.  
 Krueger, Louis W., Mankato.  
 —Lamereaux, Mrs. Antoinette A.,  
 Minneapolis.  
 —Lamp, Emma L., Medford.  
 Lancaster, George, Winsted.  
 Lane, Leon M., Minneapolis.  
 —La Rue, Mary D., Minneapolis.  
 —Lawton, Luzerne, Hopkins.  
 —Leavens, Julia P., Chicago.  
 Lee, Algrenon H., Minneapolis.  
 —Lenhart, Nellie, Minneapolis.  
 Lewis, Charles D., Plainview.  
 —Lewis, Sophie J., Minneapolis.  
 —Lieberg, Helen A., Mankato.  
 —Linwell, Malvine F., Minneapolis.  
 Locker, A. M., Cannon Falls.  
 Loomis, John B., Minneapolis.  
 Lord, L. H., Le Roy.  
 Luby, M. J., Minneapolis Park.  
 —Luce, Elizabeth, Minneapolis.  
 Lynch, Edward R., Minneapolis.  
 —Lyon, Mary L., Minneapolis.  
 McBee, Allen R., Jordan.  
 —McCullum, Josephine, Minneapolis.  
 —McCann, Alice, Minneapolis.  
 —McComber, Effie A., Minneapolis.  
 McCutchan, William, Duluth.  
 McPettridge, George H., St. Paul.  
 —McKean, Mary E., Wahpetou, N. D.  
 Mackey, John F., New Brighton.  
 —McLaughlin, Elizabeth, Mapleton.  
 —MacLennan, Hannah, Minneapolis.  
 —MacLeod, Mrs. Augusta, St. Paul.  
 —MacLeod, Mary K., Rushford.  
 —MacMillan, Jessie, St. Paul.

- McShane, Ellen, St. Paul.  
 —Manning, Sara M., Lake City.  
 —Markhus, Mrs. Ingerid, Red Wing.  
 —Martin, Mable, Hamline.  
 —Massey, Sue A., Minneapolis.  
 Matteson, Herman H., Minneapolis.  
 —Maxwell, Clara, Minneapolis.  
 —Meier, Minnie, New Ulm.  
 Merriam, Chas. F. O., Minneapolis.  
 Merrill, Clarence, Janesville.  
 Merriam, Raymond F., Minneapolis.  
 Metcalf, Clair F., Minneapolis.  
 Miles, Fred, Gibbon.  
 Miner, Frank N., Evansville.  
 Mooney, Francis X., Minneapolis.  
 Morrill, Forest A., Randolph.  
 —Nash, Julia, Minneapolis.  
 —Nash, Anna, Minneapolis.  
 —Nelson, Hannah E., Waverly Mills.  
 —Niven, Agnes M., Minneapolis.  
 Olson, Adolph, Minneapolis.  
 Omlie, Oscar K., Willmar.  
 Reilly, John O., Minneapolis.  
 Osborn, William J., Mankato.  
 —Page, Alice Maude, Minneapolis.  
 —Parker, Florence E., Minneapolis.  
 —Patrick, Maud L., Minneapolis.  
 Partridge, E. D., Minneapolis.  
 —Pendergast, Sophie M., Hutchinson.  
 —Perkins, E. Anna, Minneapolis.  
 —Perkins, Minnie A., Minneapolis.  
 —Perry, Alice I., St. Paul.  
 —Perry, Florence, St. Paul.  
 Pfander, Albert, New Ulm.  
 —Pfeiffer, H. Marie, Red Wing.  
 —Phelps, Gertrude, Minneapolis.  
 —Phelps, Mary F., Minneapolis.  
 —Phillbrick, Amanda M., Minneapolis.  
 —Pierce, Clarissa A., Waseca.  
 —Pierce, Nellie M., Minneapolis.  
 Pitts, Harold, Minneapolis.  
 —Pomeroy, Jane E., Minneapolis.  
 —Porcher, Mary L., Minneapolis.  
 —Potter, Marion M., Minneapolis.  
 —Pratt, Helen C., Minneapolis.  
 —Pretlow, Belle, Dublin, Ind.  
 —Pretlow, D. H., Dublin, Ind.  
 —Putnam, Catherine E., St. Paul.  
 —Putnam, Sarah L., Los Angeles, Cal.  
 Ramaley, Francis, St. Paul.  
 —Regan, Mary F., Winona.  
 —Riley, Mary, Sauk Center.  
 Ring, Merritt M., Owatonna.  
 Roberts, John N., Minneapolis.  
 —Rockwell, Minnie E., Rushford.  
 —Rodman, Margaret, Mankato.  
 Roe, Charles E., Minneapolis.  
 Rogers, Clarence R., Minneapolis.  
 —Rogers, Martha, Minneapolis.  
 Ronning, Nils N., Boe, Norway.  
 —Rossman, Floy, Hamline.  
 Russell, Bert, St. Paul.  
 Sage, C. W., Minneapolis.  
 —Sandford, Lina P., St. Paul.  
 —Sardeson, Bertha A., Minneapolis.  
 —Sardeson, Eva R., Minneapolis.  
 Sasse, Frank G., St. Charles.  
 Schmidt, Hans W., St. Paul.  
 Schroeder, Herman H., Guttenberg, Ia.  
 Schussler, Otto F., Minneapolis.  
 —Schoregge, Ida A., Glencoe.  
 —Scott, Joanna I., Theflmanton.  
 —Seamens, Maria, Minneapolis.  
 Sether, John O., Canby.  
 —Sewall, Margaret L., St. Paul.  
 —Share, Mary, Farmington.  
 —Sharpless, Caroline H., Minneapolis.  
 Sherburne, Walter H., Minneapolis.  
 —Sias, Mrs. Ida O., Farmington.  
 Simpson, George R., Princeton.  
 Smallidge, Joseph F., Faribault.  
 Smith, Ai Biley, Minneapolis.  
 Smith, Clifford A., Carver.  
 Smith, George A., Minneapolis.  
 Snow, George H., Lime Creek.  
 —Snow, Mae, Minneapolis.  
 —Snyder, Jennie M., Herman  
 Soule, Stephen B., Minneapolis.  
 —Southworth, Mary R., Northfield.  
 —Spencer, Nellie C., Minneapolis.  
 —Spooner, Elizabeth, Minneapolis.  
 Spratt, Chas. N., Minneapolis.  
 Stahl, M. R., Minneapolis.  
 Stapleton, Michael A., St. Paul.  
 Steffens, Joseph W., Zumbrota.  
 —Stevenson, Belle, Dodge Center.  
 —Stone, Jennie C., Minneapolis.  
 —Struble, Clara, Minneapolis.  
 Syer, Maud, St. Paul.  
 Swails, Robert F., Forest Lake.  
 Swensen, David F., Minneapolis.  
 Swensen, Harry S., Minneapolis.  
 —Tanner, Mrs. Dora T., Minneapolis.  
 Tandberg, John P., Minneapolis.  
 —Thaxter, Mary, Minneapolis.  
 Thomas, Philip Ralston, Minneapolis.  
 —Tibbetts, Lucia I., Winona.  
 —Tengwall, Millicent, Minneapolis.  
 —Tobin, Frances M., Minneapolis.  
 Tone, Aad, Minneapolis.  
 Torngren, Alfred, Mankato.  
 —Towler, May Belle, Minneapolis.  
 —Tracy, Emma (Sister M. Leo), Rochester.  
 —Trask, Abbie, St. Paul.

- Trask, John J., St. Paul.  
—Troy, Grace Luella, Anoka.  
—Truesdell, Hattie M., Minneapolis.  
—Turner, Georgia A., Minneapolis.  
—Turrell, Luella, Redwood Falls.  
Uhl, Alfred W., St. Paul Park.  
—Van Tuyl, Mrs. Katherine B., Minneapolis.  
—Virtue, Elizabeth, St. Paul.  
Vivian, William A., Duluth.  
Wales, Rowland T., Minneapolis.  
—Walker, Ella, St. Paul.  
—Walker, Elizabeth A., Minneapolis.  
Wallace, William H., Hamline.  
—Ward, Laura B., Plainview.  
—Warner, Beth L., Minneapolis.  
—Watts, Grace, Minneapolis.  
—Welles, Hattie E., Minneapolis.  
—Wheeler, Carrie M., Minneapolis.  
—Wheeler, Florence E., Minneapolis.  
Wheeler, Roy M., Minneapolis.  
—Whitaker, Alice, St. Paul.  
—Whetstone, Mary S., Minneapolis.  
—White, Ada E., Minneapolis.  
Wilcox, Guy M., Faribault.  
—Williamson, Emma, Cannon Falls.  
Willius, Ferdinand O., St. Paul.  
—Wilson, Charlotte, Dundas.  
—Wilson, Mary R., Minneapolis.  
—Wood, Mrs. Anna E., Waseca.  
—Woodward, Lucile M., Yellow Medicine.  
—Wright, Edith M., Minneapolis.  
—Yale, Lena, Minneapolis.  
—Young, Alice, Duluth.  
—Young, Josephine, St. Paul.  
—Zieger, Rosalie A., Owatonna.  
Zumbach, Paul, St. Paul.

## Summary of Students.

### THE GRADUATE DEPARTMENT.

	Men.	Women.	Total.
Candidates for the degree of doctor of philosophy.....	26	2	28
master of arts.....		3	11
master of science.....	11	1	12
master of literature.....	6	7	13
civil engineer.....	7		7
electrical engineer.....	2		2
mining engineer.....	1		1
master of laws.....	22		22
Others doing graduate work.....	23	19	42
Total.....	105	32	137-137

### THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

	Men.	Women.	Total.
<i>Senior class.</i> classical section.....	18	9	27
scientific section.....	33	11	44
literary section.....	11	20	31-102
<i>Junior class.</i> classical section.....	23	5	28
scientific section.....	41	16	57
literary section.....	21	26	47-152
<i>Sophomore class.</i> classical section.....	17	9	26
scientific section.....	57	22	79
literary section.....	13	46	59
teachers' section.....	3	16	19-183
<i>Freshman class.</i> classical section.....	28	17	45
scientific section.....	91	30	121
literary section.....	25	87	112
teachers' section.....	5	23	28-306
Unclassed students.....	16	80	96-96
Total.....	402	417	819-119

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

	Men.	Women.	Total.
<i>Senior class.</i>			
civil engineering section.....	5		5
mechanical engineering section.....	4		4
electrical engineering section.....	6		6
mining and metallurgy section.....	3		3-18
<i>Junior class.</i>			
civil engineering section.....	6		6
mechanical engineering section.....	5		5
electrical engineering section.....	13		13
mining engineering section.....	4		4
chemical engineering section.....	4		4-32
<i>Sophomore class.</i>			
civil engineering section.....	7		7
mechanical engineering section.....	6		6
electrical engineering section.....	13		13
mining engineering section.....	8		8
chemical engineering section.....	2		2-36
<i>Freshman class.</i>			
civil engineering section.....	8		8
mechanical engineering section.....	9		9
electrical engineering section.....	44		44
mining engineering section.....	6		6
chemical engineering section.....	1	3	4-71
Unclassed students.....	24	10	34-34
	178	13	191 191

THE COLLEGE OF AGRICULTURE

	Men.	Women.	Total.
Senior class.....	1		1-1
Junior class.....	2		2-2
Sophomore class.....	1		1-1
Freshman class.....	6		6-6
The school of agriculture—graduate students.....	7		7
class A.....	28		28
class B.....	41		41
class C.....	46		46
preparatory class.....	74		74
the summer school for women.....		46	46
the dairy school.....	97		97
special students.....	27		27-366
Total.....	330	46	376 376
Less duplicate.....	22	0	22 22
Revised total.....	308	46	354 354

COLLEGE OF LAW.

	Men.	Women.	Total.
Graduate class.....	23		23
Senior class.....	114		114
Middle class.....	44		44
Junior class.....	190		190
Total.....	371		371 371

*The University of Minnesota.*

## THE DEPARTMENT OF MEDICINE.

## THE COLLEGE OF MEDICINE AND SURGERY.

	Men.	Women.	Total
Graduate students.....	2	..	2
Senior class.....	55	2	57
Junior class.....	67	5	72
Sophomore.....	17	3	20
Freshman class.....	63	6	69
Special students.....	11	2	13
Unclassed.....	9	1	10
Total.....	224	19	243-243

## THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

Senior class.....	8	..	8
Junior class.....	10	3	13
Sophomore class.....	2	..	2
Freshman class.....	7	1	8
Total.....	27	4	31-31

## THE COLLEGE OF DENTISTRY.

Senior class.....	12	..	12
Junior class.....	24	2	26
Freshman class.....	32	..	32
Special students.....	6	..	6
Unclassed students.....	13	1	14
Total.....	87	3	90-90

## THE COLLEGE OF PHARMACY.

Senior class.....	11	1	12
Junior class.....	10	..	10
Special students.....	1	..	1
Unclassed students.....	10	..	10
Total.....	32	1	33-33

## SUMMER SCHOOL FOR TEACHERS.

University section.....	195	137	332
Less duplicates.....	57	41	98
Revised total.....	138	96	234

## SUMMARY OF TOTALS.

	Men.	Women.	Total.
Graduate students.....	105	32	137
The college of science, literature and the arts.....	402	417	819
The college of engineering, metallurgy and the mechanic arts....	178	13	191
The department of agriculture.....	308	46	354
The college of law.....	371	..	371
The department of medicine.....	370	27	397
The summer school—University section.....	138	96	234
Total.....	1872	631	2503
Duplicates.....	36	..	36
Total excluding duplicates.....	1836	631	2467



## Appendix A.

Certain changes have been made in the requirements for admission to the freshman class of the college of science, literature and the arts.

### I. CHANGES IN ENGLISH COMPOSITION AND ESSAY.

Beginning with the fall of 1897, the following will be required of all applicants in the place of English Composition and Essay as now required:

(a) *English Composition and Essay*—Two essays of two hundred and fifty words each, are required upon subjects to be chosen from the following list of books:

*For the year 1897-98*—Shakspeare, "The Merchant of Venice;" Burke, "Conciliation with America;" Scott, "Marmion;" Macaulay, "Life of Samuel Johnson."

*For the year 1898-99*—Shakspeare, "Macbeth;" Burke, "Conciliation with America;" De Quincy, "Flight of a Tartar Tribe;" Tennyson, "The Princess."

In grading these essays, there will be taken into consideration, not only the student's familiarity with the text, but his knowledge of grammatical construction and of rhetorical principles, particularly those relating to the choice of words, the structure of the sentences and paragraphs, and the plan of the work as a whole.

and (b) *English Literature*—An examination will be required upon the following list of English classics.

*For the year 1897-98*—Shakspeare, "As You Like It;" DeFoe, "History of the Plague in London;" Irving, "Tales of a Traveller;" Hawthorne, "Twice Told Tales;" Longfellow, "Evangeline;" George Elliott, "Silas Marner."

*For the year 1898-99*—Milton, "Paradise Lost," books i and ii; Pope, "Iliad," books i and xxii; "The Sir Roger de Coverly Papers" in the "Spectator;" Goldsmith, "The Vicar of Wakefield;" Coleridge, "The Ancient Mariner;" Southey, "Life of Nelson;" Carlyle, "Essays on Burns;" Lowell, "The Vision of Sir Launfal;" Hawthorne, "The House of Seven Gables."

These books are to be critically read and studied in class during the year. The student should know the literary history of the author's works, the leading facts connected with his time, as well as the form, subject matter and purpose of the classics themselves.

### II. CÆSAR.

Beginning with the year 1899-1900, four books of Caesar will be required.

### III. ANABASIS.

Beginning with the year 1898-99, four books of the Anabasis will be required.

## Appendix B.

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### UNIVERSITY EXTENSION.

The University of Minnesota was one of the first of American institutions to enter upon the work of University Extension. Before the work received its present name and models from England, the spirit of the new movement was embodied in the conduct of Farmers' Institutes, which in the earlier years were carried on under the auspices of the University.

University Extension courses with the modern methods and name were undertaken in 1889-'90. The rapid growth of the University itself, and the lack of funds, has prevented the faculty from pushing University Extension work. A standing committee of the faculty superintends this work, and invites the coöperation of the colleges, normal schools and high schools of the State.

For circulars of information concerning the organization of local centers, cost of courses, and announcement of courses to be offered, address Professor John F. Downey, secretary of the committee.

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